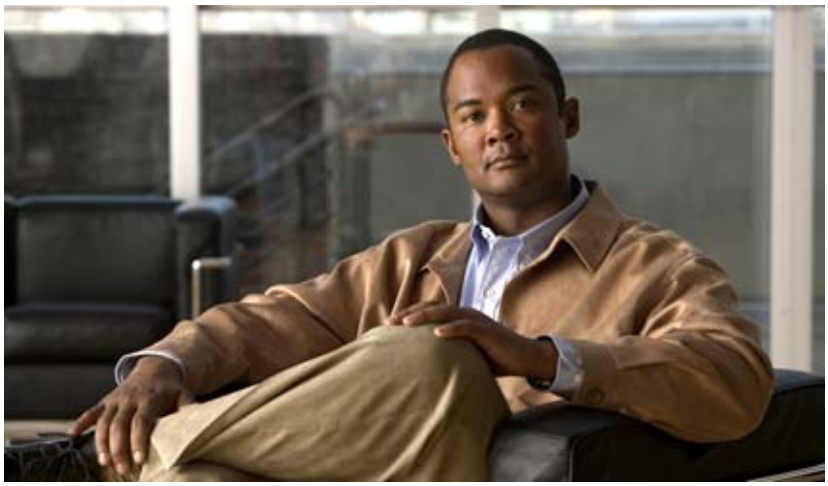

Cisco IOS Configuration Fundamentals Command Reference

April 2010

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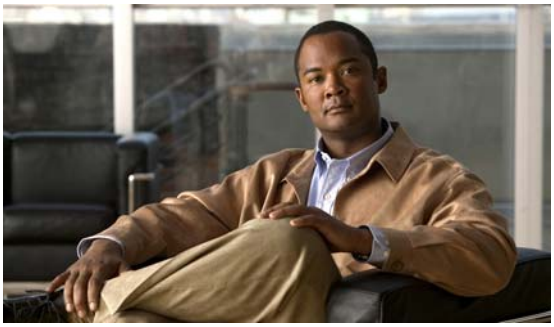
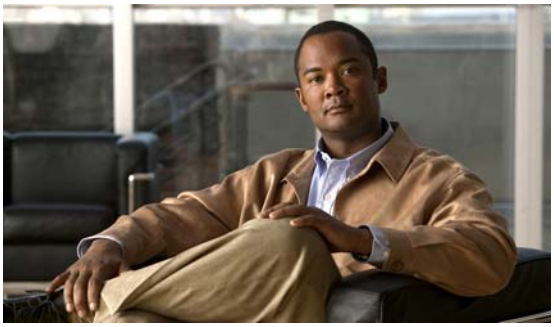
Text Part Number:

Cisco IOS Configuration Fundamentals Command Reference



CONTENTS



About Cisco IOS Software Documentation

Last Updated: March 26, 2010

This document describes the objectives, audience, conventions, and organization used in Cisco IOS software documentation. Also included are resources for obtaining technical assistance, additional documentation, and other information from Cisco. This document is organized into the following sections:

Documentation Objectives

Cisco IOS documentation describes the tasks and commands available to configure and maintain Cisco networking devices.

Audience

The Cisco IOS documentation set is intended for users who configure and maintain Cisco networking devices (such as routers and switches) but who may not be familiar with the configuration and maintenance tasks, the relationship among tasks, or the Cisco IOS commands necessary to perform particular tasks. The Cisco IOS documentation set is also intended for those users experienced with Cisco IOS software who need to know about new features, new configuration options, and new software characteristics in the current Cisco IOS release.

Documentation Conventions

In Cisco IOS documentation, the term *router* may be used to refer to various Cisco products; for example, routers, access servers, and switches. These and other networking devices that support Cisco IOS software are shown interchangeably in examples and are used only for illustrative purposes. An example that shows one product does not necessarily mean that other products are not supported.

This section contains the following topics:

Typographic Conventions

Cisco IOS documentation uses the following typographic conventions:

Convention	Description
^ or Ctrl	Both the ^ symbol and Ctrl represent the Control (Ctrl) key on a keyboard. For example, the key combination **^D** or **Ctrl-D** means that you hold down the Control key while you press the D key. (Keys are indicated in capital letters but are not case sensitive.)
string	A string is a nonquoted set of characters shown in italics. For example, when setting a Simple Network Management Protocol (SNMP) community string to *public*, do not use quotation marks around the string; otherwise, the string will include the quotation marks.

Command Syntax Conventions

Cisco IOS documentation uses the following command syntax conventions:

Convention	Description
bold	Bold text indicates commands and keywords that you enter as shown.
italic	Italic text indicates arguments for which you supply values.
[x]	Square brackets enclose an optional keyword or argument.
...	An ellipsis (three consecutive nonbolded periods without spaces) after a syntax element indicates that the element can be repeated.
|	A vertical line, called a pipe, that is enclosed within braces or square brackets indicates a choice within a set of keywords or arguments.
[x | y]	Square brackets enclosing keywords or arguments separated by a pipe indicate an optional choice.
{x | y}	Braces enclosing keywords or arguments separated by a pipe indicate a required choice.
[x {y | z}]	Braces and a pipe within square brackets indicate a required choice within an optional element.

Software Conventions

Cisco IOS software uses the following program code conventions:

Convention	Description
`Courier font`	Courier font is used for information that is displayed on a PC or terminal screen.
`Bold Courier font`	Bold Courier font indicates text that the user must enter.
< >	Angle brackets enclose text that is not displayed, such as a password. Angle brackets also are used in contexts in which the italic font style is not supported; for example, ASCII text.
!	An exclamation point at the beginning of a line indicates that the text that follows is a comment, not a line of code. An exclamation point is also displayed by Cisco IOS software for certain processes.
[ ]	Square brackets enclose default responses to system prompts.

Reader Alert Conventions

Cisco IOS documentation uses the following conventions for reader alerts:

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.

Timesaver Means *the described action saves time*. You can save time by performing the action described in the paragraph.

Documentation Organization

This section describes the Cisco IOS documentation set, how it is organized, and how to access it on Cisco.com. It also lists the configuration guides, command references, and supplementary references and resources that comprise the documentation set. It contains the following topics:

Cisco IOS Documentation Set

The Cisco IOS documentation set consists of the following:

- Release notes and caveats provide information about platform, technology, and feature support for a release and describe severity 1 (catastrophic), severity 2 (severe), and select severity 3 (moderate) defects in released Cisco IOS software. Review release notes before other documents to learn whether updates have been made to a feature.
- Sets of configuration guides and command references organized by technology and published for each standard Cisco IOS release.
  - Configuration guides—Compilations of documents that provide conceptual and task-oriented descriptions of Cisco IOS features.
  - Command references—Compilations of command pages in alphabetical order that provide detailed information about the commands used in the Cisco IOS features and the processes that comprise the related configuration guides. For each technology, there is a single command reference that supports all Cisco IOS releases and that is updated at each standard release.
- Lists of all the commands in a specific release and all commands that are new, modified, removed, or replaced in the release.
- Command reference book for **debug** commands. Command pages are listed in alphabetical order.
- Reference book for system messages for all Cisco IOS releases.

Cisco IOS Documentation on Cisco.com

The following sections describe the organization of the Cisco IOS documentation set and how to access various document types.

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Feature Guides

Cisco IOS features are documented in feature guides. Feature guides describe one feature or a group of related features that are supported on many different software releases and platforms. Your Cisco IOS software release or platform may not support all the features documented in a feature guide. See the Feature Information table at the end of the feature guide for information about which features in that guide are supported in your software release.

Configuration Guides

Configuration guides are provided by technology and release and comprise a set of individual feature guides relevant to the release and technology.

Command References

Command reference books contain descriptions of Cisco IOS commands that are supported in many different software releases and on many different platforms. The books are organized by technology. For information about all Cisco IOS commands, use the Command Lookup Tool at http://tools.cisco.com/Support/CLILookup or the *Cisco IOS Master Command List, All Releases*, at http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html.

Cisco IOS Supplementary Documents and Resources

Supplementary documents and resources are listed in Table 2 on page xxxi.

Configuration Guides, Command References, and Supplementary Resources

Table 1 lists, in alphabetical order, Cisco IOS software configuration guides and command references, including brief descriptions of the contents of the documents. The Cisco IOS command references contain commands for Cisco IOS software for all releases. The configuration guides and command references support many different software releases and platforms. Your Cisco IOS software release or platform may not support all these technologies.

Table 2 lists documents and resources that supplement the Cisco IOS software configuration guides and command references. These supplementary resources include release notes and caveats; master command lists; new, modified, removed, and replaced command lists; system messages; and the debug command reference.

For additional information about configuring and operating specific networking devices, and to access Cisco IOS documentation, go to the Product/Technologies Support area of Cisco.com at the following location:

http://www.cisco.com/go/techdocs

Table 1 Cisco IOS Configuration Guides and Command References

Configuration Guide and Command Reference Titles	Features/Protocols/Technologies
• *Cisco IOS AppleTalk Configuration Guide* • *Cisco IOS AppleTalk Command Reference*	AppleTalk protocol.
• *Cisco IOS Asynchronous Transfer Mode Configuration Guide* • *Cisco IOS Asynchronous Transfer Mode Command Reference*	LAN ATM, multiprotocol over ATM (MPoA), and WAN ATM.
• *Cisco IOS Bridging and IBM Networking Configuration Guide* • *Cisco IOS Bridging Command Reference* • *Cisco IOS IBM Networking Command Reference*	Transparent and source-route transparent (SRT) bridging, source-route bridging (SRB), Token Ring Inter-Switch Link (TRISL), and token ring route switch module (TRRSM). Data-link switching plus (DLSw+), serial tunnel (STUN), block serial tunnel (BSTUN); logical link control, type 2 (LLC2), synchronous data link control (SDLC); IBM Network Media Translation, including Synchronous Data Logical Link Control (SDLLC) and qualified LLC (QLLC); downstream physical unit (DSPU), Systems Network Architecture (SNA) service point, SNA frame relay access, advanced peer-to-peer networking (APPN), native client interface architecture (NCIA) client/server topologies, and IBM Channel Attach.
• *Cisco IOS Broadband Access Aggregation and DSL Configuration Guide* • *Cisco IOS Broadband Access Aggregation and DSL Command Reference*	PPP over ATM (PPPoA) and PPP over Ethernet (PPPoE).

Table 1 Cisco IOS Configuration Guides and Command References (continued)

Configuration Guide and Command Reference Titles	Features/Protocols/Technologies
• *Cisco IOS Carrier Ethernet Configuration Guide* • *Cisco IOS Carrier Ethernet Command Reference*	Operations, Administration, and Maintenance (OAM); Ethernet connectivity fault management (CFM); ITU-T Y.1731 fault management functions; Ethernet Local Management Interface (ELMI); MAC address support on service instances, bridge domains, and pseudowire; IEEE 802.3ad Link Bundling; Link Aggregation Control Protocol (LACP) support for Ethernet and Gigabit Ethernet links and EtherChannel bundles; LACP support for stateful switchover (SSO), in service software upgrade (ISSU), Cisco nonstop forwarding (NSF), and nonstop routing (NSR) on Gigabit EtherChannel bundles; and Link Layer Discovery Protocol (LLDP) and media endpoint discovery (MED).
• *Cisco IOS Configuration Fundamentals Configuration Guide* • *Cisco IOS Configuration Fundamentals Command Reference*	Autoinstall, Setup, Cisco IOS command-line interface (CLI), Cisco IOS file system (IFS), Cisco IOS web browser user interface (UI), basic file transfer services, and file management.
• *Cisco IOS DECnet Configuration Guide* • *Cisco IOS DECnet Command Reference*	DECnet protocol.
• *Cisco IOS Dial Technologies Configuration Guide* • *Cisco IOS Dial Technologies Command Reference*	Asynchronous communications, dial backup, dialer technology, dial-in terminal services and AppleTalk remote access (ARA), dial-on-demand routing, dial-out, ISDN, large scale dial-out, modem and resource pooling, Multilink PPP (MLP), PPP, and virtual private dialup network (VPDN).
• *Cisco IOS Flexible NetFlow Configuration Guide* • *Cisco IOS Flexible NetFlow Command Reference*	Flexible NetFlow.
• *Cisco IOS High Availability Configuration Guide* • *Cisco IOS High Availability Command Reference*	A variety of high availability (HA) features and technologies that are available for different network segments (from enterprise access to service provider core) to facilitate creation of end-to-end highly available networks. Cisco IOS HA features and technologies can be categorized in three key areas: system-level resiliency, network-level resiliency, and embedded management for resiliency.
• *Cisco IOS Intelligent Services Gateway Configuration Guide* • *Cisco IOS Intelligent Services Gateway Command Reference*	Subscriber identification, service and policy determination, session creation, session policy enforcement, session life-cycle management, accounting for access and service usage, and session state monitoring.
• *Cisco IOS Interface and Hardware Component Configuration Guide* • *Cisco IOS Interface and Hardware Component Command Reference*	LAN interfaces, logical interfaces, serial interfaces, virtual interfaces, and interface configuration.
• *Cisco IOS IP Addressing Services Configuration Guide* • *Cisco IOS IP Addressing Services Command Reference*	Address Resolution Protocol (ARP), Network Address Translation (NAT), Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), and Next Hop Address Resolution Protocol (NHRP).

Table 1 Cisco IOS Configuration Guides and Command References (continued)

Configuration Guide and Command Reference Titles	Features/Protocols/Technologies
• *Cisco IOS IP Application Services Configuration Guide* • *Cisco IOS IP Application Services Command Reference*	Enhanced Object Tracking (EOT), Gateway Load Balancing Protocol (GLBP), Hot Standby Router Protocol (HSRP), IP Services, Server Load Balancing (SLB), Stream Control Transmission Protocol (SCTP), TCP, Web Cache Communication Protocol (WCCP), User Datagram Protocol (UDP), and Virtual Router Redundancy Protocol (VRRP).
• *Cisco IOS IP Mobility Configuration Guide* • *Cisco IOS IP Mobility Command Reference*	Mobile ad hoc networks (MANet) and Cisco mobile networks.
• *Cisco IOS IP Multicast Configuration Guide* • *Cisco IOS IP Multicast Command Reference*	Protocol Independent Multicast (PIM) sparse mode (PIM-SM), bidirectional PIM (bidir-PIM), Source Specific Multicast (SSM), Multicast Source Discovery Protocol (MSDP), Internet Group Management Protocol (IGMP), and Multicast VPN (MVPN).
• *Cisco IOS IP Routing: BFD Configuration Guide*	Bidirectional forwarding detection (BFD).
• *Cisco IOS IP Routing: BGP Configuration Guide* • *Cisco IOS IP Routing: BGP Command Reference*	Border Gateway Protocol (BGP), multiprotocol BGP, multiprotocol BGP extensions for IP multicast.
• *Cisco IOS IP Routing: EIGRP Configuration Guide* • *Cisco IOS IP Routing: EIGRP Command Reference*	Enhanced Interior Gateway Routing Protocol (EIGRP).
• *Cisco IOS IP Routing: ISIS Configuration Guide* • *Cisco IOS IP Routing: ISIS Command Reference*	Intermediate System-to-Intermediate System (IS-IS).
• *Cisco IOS IP Routing: ODR Configuration Guide* • *Cisco IOS IP Routing: ODR Command Reference*	On-Demand Routing (ODR).
• *Cisco IOS IP Routing: OSPF Configuration Guide* • *Cisco IOS IP Routing: OSPF Command Reference*	Open Shortest Path First (OSPF).
• *Cisco IOS IP Routing: Protocol-Independent Configuration Guide* • *Cisco IOS IP Routing: Protocol-Independent Command Reference*	IP routing protocol-independent features and commands. Generic policy-based routing (PBR) features and commands are included.
• *Cisco IOS IP Routing: RIP Configuration Guide* • *Cisco IOS IP Routing: RIP Command Reference*	Routing Information Protocol (RIP).
• *Cisco IOS IP SLAs Configuration Guide* • *Cisco IOS IP SLAs Command Reference*	Cisco IOS IP Service Level Agreements (IP SLAs).
• *Cisco IOS IP Switching Configuration Guide* • *Cisco IOS IP Switching Command Reference*	Cisco Express Forwarding, fast switching, and Multicast Distributed Switching (MDS).
• *Cisco IOS IPv6 Configuration Guide* • *Cisco IOS IPv6 Command Reference*	For IPv6 features, protocols, and technologies, go to the IPv6 "Start Here" document.
• *Cisco IOS ISO CLNS Configuration Guide* • *Cisco IOS ISO CLNS Command Reference*	ISO Connectionless Network Service (CLNS).

Table 1 Cisco IOS Configuration Guides and Command References (continued)

Configuration Guide and Command Reference Titles	Features/Protocols/Technologies
• *Cisco IOS LAN Switching Configuration Guide* • *Cisco IOS LAN Switching Command Reference*	VLANs, Inter-Switch Link (ISL) encapsulation, IEEE 802.10 encapsulation, IEEE 802.1Q encapsulation, and multilayer switching (MLS).
• *Cisco IOS Mobile Wireless Gateway GPRS Support Node Configuration Guide* • *Cisco IOS Mobile Wireless Gateway GPRS Support Node Command Reference*	Cisco IOS Gateway GPRS Support Node (GGSN) in a 2.5-generation general packet radio service (GPRS) and 3-generation universal mobile telecommunication system (UMTS) network.
• *Cisco IOS Mobile Wireless Home Agent Configuration Guide* • *Cisco IOS Mobile Wireless Home Agent Command Reference*	Cisco Mobile Wireless Home Agent, an anchor point for mobile terminals for which mobile IP or proxy mobile IP services are provided.
• *Cisco IOS Mobile Wireless Packet Data Serving Node Configuration Guide* • *Cisco IOS Mobile Wireless Packet Data Serving Node Command Reference*	Cisco Packet Data Serving Node (PDSN), a wireless gateway that is between the mobile infrastructure and standard IP networks and that enables packet data services in a code division multiple access (CDMA) environment.
• *Cisco IOS Mobile Wireless Radio Access Networking Configuration Guide* • *Cisco IOS Mobile Wireless Radio Access Networking Command Reference*	Cisco IOS radio access network products.
• *Cisco IOS Multiprotocol Label Switching Configuration Guide* • *Cisco IOS Multiprotocol Label Switching Command Reference*	MPLS Label Distribution Protocol (LDP), MPLS Layer 2 VPNs, MPLS Layer 3 VPNs, MPLS traffic engineering (TE), and MPLS Embedded Management (EM) and MIBs.
• *Cisco IOS Multi-Topology Routing Configuration Guide* • *Cisco IOS Multi-Topology Routing Command Reference*	Unicast and multicast topology configurations, traffic classification, routing protocol support, and network management support.
• *Cisco IOS NetFlow Configuration Guide* • *Cisco IOS NetFlow Command Reference*	Network traffic data analysis, aggregation caches, and export features.
• *Cisco IOS Network Management Configuration Guide* • *Cisco IOS Network Management Command Reference*	Basic system management; system monitoring and logging; troubleshooting, logging, and fault management; Cisco Discovery Protocol; Cisco IOS Scripting with Tool Control Language (Tcl); Cisco networking services (CNS); DistributedDirector; Embedded Event Manager (EEM); Embedded Resource Manager (ERM); Embedded Syslog Manager (ESM); HTTP; Remote Monitoring (RMON); SNMP; and VPN Device Manager Client for Cisco IOS software (XSM Configuration).
• *Cisco IOS Novell IPX Configuration Guide* • *Cisco IOS Novell IPX Command Reference*	Novell Internetwork Packet Exchange (IPX) protocol.

Table 1 Cisco IOS Configuration Guides and Command References (continued)

Configuration Guide and Command Reference Titles	Features/Protocols/Technologies
• *Cisco IOS Optimized Edge Routing Command Reference*	Optimized edge routing (OER) monitoring and automatic route optimization and load distribution for multiple connections between networks.
• *Cisco IOS Performance Routing Configuration Guide*	Performance Routing (PfR) provides additional intelligence to classic routing technologies to track the performance of, or verify the quality of, a path between two devices over a WAN infrastructure in order to determine the best egress or ingress path for application traffic.
• *Cisco IOS Quality of Service Solutions Configuration Guide* • *Cisco IOS Quality of Service Solutions Command Reference*	Traffic queueing, traffic policing, traffic shaping, Modular QoS CLI (MQC), Network-Based Application Recognition (NBAR), Multilink PPP (MLP) for QoS, header compression, AutoQoS, Resource Reservation Protocol (RSVP), and weighted random early detection (WRED).
• *Cisco IOS Security Command Reference*	Access control lists (ACLs); authentication, authorization, and accounting (AAA); firewalls; IP security and encryption; neighbor router authentication; network access security; network data encryption with router authentication; public key infrastructure (PKI); RADIUS; TACACS+; terminal access security; and traffic filters.
• *Cisco IOS Security Configuration Guide: Securing the Data Plane*	Access Control Lists (ACLs); Firewalls: Context-Based Access Control (CBAC) and Zone-Based Firewall; Cisco IOS Intrusion Prevention System (IPS); Flexible Packet Matching; Unicast Reverse Path Forwarding (uRPF); Threat Information Distribution Protocol (TIDP) and TMS.
• *Cisco IOS Security Configuration Guide: Securing the Control Plane*	Control Plane Policing, Neighborhood Router Authentication.
• *Cisco IOS Security Configuration Guide: Securing User Services*	AAA (includes 802.1x authentication and Network Admission Control [NAC]); Security Server Protocols (RADIUS and TACACS+); Secure Shell (SSH); Secure Access for Networking Devices (includes Autosecure and Role-Based CLI access); Lawful Intercept.
• *Cisco IOS Security Configuration Guide: Secure Connectivity*	Internet Key Exchange (IKE) for IPsec VPNs; IPsec Data Plane features; IPsec Management features; Public Key Infrastructure (PKI); Dynamic Multipoint VPN (DMVPN); Easy VPN; Cisco Group Encrypted Transport VPN (GETVPN); SSL VPN.
• *Cisco IOS Service Advertisement Framework Configuration Guide* • *Cisco IOS Service Advertisement Framework Command Reference*	Cisco Service Advertisement Framework.
• *Cisco IOS Service Selection Gateway Configuration Guide* • *Cisco IOS Service Selection Gateway Command Reference*	Subscriber authentication, service access, and accounting.

Table 1 Cisco IOS Configuration Guides and Command References (continued)

Configuration Guide and Command Reference Titles	Features/Protocols/Technologies
• *Cisco IOS Software Activation Configuration Guide* • *Cisco IOS Software Activation Command Reference*	An orchestrated collection of processes and components to activate Cisco IOS software feature sets by obtaining and validating Cisco software licenses.
• *Cisco IOS Software Modularity Installation and Configuration Guide* • *Cisco IOS Software Modularity Command Reference*	Installation and basic configuration of software modularity images, including installations on single and dual route processors, installation rollbacks, software modularity binding, software modularity processes, and patches.
• *Cisco IOS Terminal Services Configuration Guide* • *Cisco IOS Terminal Services Command Reference*	DEC, local-area transport (LAT), and X.25 packet assembler/disassembler (PAD).
• *Cisco IOS Virtual Switch Command Reference*	Virtual switch redundancy, high availability, and packet handling; converting between standalone and virtual switch modes; virtual switch link (VSL); Virtual Switch Link Protocol (VSLP). **Note** For information about virtual switch configuration, see the product-specific software configuration information for the Cisco Catalyst 6500 series switch or for the Metro Ethernet 6500 series switch.
• *Cisco IOS Voice Configuration Library* • *Cisco IOS Voice Command Reference*	Cisco IOS support for voice call control protocols, interoperability, physical and virtual interface management, and troubleshooting. The library includes documentation for IP telephony applications.
• *Cisco IOS VPDN Configuration Guide* • *Cisco IOS VPDN Command Reference*	Layer 2 Tunneling Protocol (L2TP) dial-out load balancing and redundancy; L2TP extended failover; L2TP security VPDN; multihop by Dialed Number Identification Service (DNIS); timer and retry enhancements for L2TP and Layer 2 Forwarding (L2F); RADIUS Attribute 82 (tunnel assignment ID); shell-based authentication of VPDN users; tunnel authentication via RADIUS on tunnel terminator.
• *Cisco IOS Wide-Area Networking Configuration Guide* • *Cisco IOS Wide-Area Networking Command Reference*	Frame Relay; Layer 2 Tunnel Protocol Version 3 (L2TPv3); L2VPN Pseudowire Redundancy; L2VPN Interworking; Layer 2 Local Switching; Link Access Procedure, Balanced (LAPB); and X.25.
• *Cisco IOS Wireless LAN Configuration Guide* • *Cisco IOS Wireless LAN Command Reference*	Broadcast key rotation, IEEE 802.11x support, IEEE 802.1x authenticator, IEEE 802.1x local authentication service for Extensible Authentication Protocol-Flexible Authentication via Secure Tunneling (EAP-FAST), Multiple Basic Service Set ID (BSSID), Wi-Fi Multimedia (WMM) required elements, and Wi-Fi Protected Access (WPA).

Table 2 lists documents and resources that supplement the Cisco IOS software configuration guides and command references.

Table 2 Cisco IOS Supplementary Documents and Resources

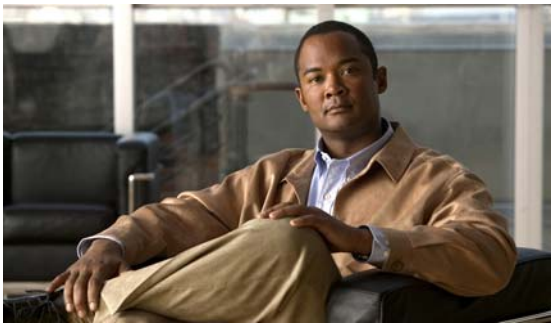
Document Title or Resource	Description
Cisco IOS Master Command List, All Releases	Alphabetical list of all the commands documented in all Cisco IOS releases.
Cisco IOS New, Modified, Removed, and Replaced Commands	List of all the new, modified, removed, and replaced commands for a Cisco IOS release.
Cisco IOS System Message Guide	List of Cisco IOS system messages and descriptions. System messages may indicate problems with your system, may be informational only, or may help diagnose problems with communications lines, internal hardware, or system software.
Cisco IOS Debug Command Reference	Alphabetical list of **debug** commands including brief descriptions of use, command syntax, and usage guidelines.
Release Notes and Caveats	Information about new and changed features, system requirements, and other useful information about specific software releases; information about defects in specific Cisco IOS software releases.
MIBs	Files used for network monitoring. To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator.
RFCs	Standards documents maintained by the Internet Engineering Task Force (IETF) that Cisco IOS documentation references where applicable. The full text of referenced RFCs may be obtained at the following URL: http://www.rfc-editor.org/

Additional Resources and Documentation Feedback

What's New in Cisco Product Documentation is released monthly and describes all new and revised Cisco technical documentation. The *What's New in Cisco Product Documentation* publication also provides information about obtaining the following resources:

- Technical documentation
- Cisco product security overview
- Product alerts and field notices
- Technical assistance

Cisco IOS technical documentation includes embedded feedback forms where you can rate documents and provide suggestions for improvement. Your feedback helps us improve our documentation.



Using the Command-Line Interface in Cisco IOS Software

Last Updated: February 24, 2010

This document provides basic information about the command-line interface (CLI) in Cisco IOS software and how you can use some of the CLI features. This document contains the following sections:

For more information about using the CLI, see the "Using the Cisco IOS Command-Line Interface" section of the *Cisco IOS Configuration Fundamentals Configuration Guide*.

For information about the software documentation set, see the "About Cisco IOS Software Documentation" document.

Initially Configuring a Device

Initially configuring a device varies by platform. For information about performing an initial configuration, see the hardware installation documentation that is provided with the original packaging of the product or go to the Product/Technologies Support area of Cisco.com at http://www.cisco.com/go/techdocs.

After you have performed the initial configuration and connected the device to your network, you can configure the device by using the console port or a remote access method, such as Telnet or Secure Shell (SSH), to access the CLI or by using the configuration method provided on the device, such as Security Device Manager.

Changing the Default Settings for a Console or AUX Port

There are only two changes that you can make to a console port and an AUX port:

- Change the port speed with the **config-register 0x** command. Changing the port speed is not recommended. The well-known default speed is 9600.
- Change the behavior of the port; for example, by adding a password or changing the timeout value.

Note The AUX port on the Route Processor (RP) installed in a Cisco ASR 1000 series router does not serve any useful customer purpose and should be accessed only under the advisement of a customer support representative.

Using the CLI

This section describes the following topics:

Understanding Command Modes

The CLI command mode structure is hierarchical, and each mode supports a set of specific commands. This section describes the most common of the many modes that exist.

Table 3 lists common command modes with associated CLI prompts, access and exit methods, and a brief description of how each mode is used.

Table 3 CLI Command Modes

Command Mode	Access Method	Prompt	Exit Method	Mode Usage
User EXEC	Log in.	`Router>`	Issue the **logout** or **exit** command.	• Change terminal settings. • Perform basic tests. • Display device status.
Privileged EXEC	From user EXEC mode, issue the **enable** command.	`Router#`	Issue the **disable** command or the **exit** command to return to user EXEC mode.	• Issue **show** and **debug** commands. • Copy images to the device. • Reload the device. • Manage device configuration files. • Manage device file systems.
Global configuration	From privileged EXEC mode, issue the **configure terminal** command.	`Router(config)#`	Issue the **exit** command or the **end** command to return to privileged EXEC mode.	Configure the device.
Interface configuration	From global configuration mode, issue the **interface** command.	`Router(config-if)#`	Issue the **exit** command to return to global configuration mode or the **end** command to return to privileged EXEC mode.	Configure individual interfaces.
Line configuration	From global configuration mode, issue the **line vty** or **line console** command.	`Router(config-line)#`	Issue the **exit** command to return to global configuration mode or the **end** command to return to privileged EXEC mode.	Configure individual terminal lines.

Table 3 CLI Command Modes (continued)

Command Mode	Access Method	Prompt	Exit Method	Mode Usage
ROM monitor	From privileged EXEC mode, issue the **reload** command. Press the **Break** key during the first 60 seconds while the system is booting.	`rommon # >` The # symbol represents the line number and increments at each prompt.	Issue the **continue** command.	• Run as the default operating mode when a valid image cannot be loaded. • Access the fall-back procedure for loading an image when the device lacks a valid image and cannot be booted. • Perform password recovery when a Ctrl-Break sequence is issued within 60 seconds of a power-on or reload event.
Diagnostic (available only on Cisco ASR 1000 series routers)	The router boots or enters diagnostic mode in the following scenarios. When a Cisco IOS process or processes fail, in most scenarios the router will reload. • A user-configured access policy was configured using the **transport-map** command, which directed the user into diagnostic mode. • The router was accessed using an RP auxiliary port. • A break signal (**Ctrl-C**, **Ctrl-Shift-6**, or the **send break** command) was entered, and the router was configured to enter diagnostic mode when the break signal was received.	`Router(diag)#`	If a Cisco IOS process failure is the reason for entering diagnostic mode, the failure must be resolved and the router must be rebooted to exit diagnostic mode. If the router is in diagnostic mode because of a transport-map configuration, access the router through another port or use a method that is configured to connect to the Cisco IOS CLI. If the RP auxiliary port was used to access the router, use another port for access. Accessing the router through the auxiliary port is not useful for customer purposes.	• Inspect various states on the router, including the Cisco IOS state. • Replace or roll back the configuration. • Provide methods of restarting the Cisco IOS software or other processes. • Reboot hardware (such as the entire router, an RP, an ESP, a SIP, a SPA) or other hardware components. • Transfer files into or off of the router using remote access methods such as FTP, TFTP, and SCP.

EXEC commands are not saved when the software reboots. Commands that you issue in a configuration mode can be saved to the startup configuration. If you save the running configuration to the startup configuration, these commands will execute when the software is rebooted. Global configuration mode is the highest level of configuration mode. From global configuration mode, you can enter a variety of other configuration modes, including protocol-specific modes.

ROM monitor mode is a separate mode that is used when the software cannot load properly. If a valid software image is not found when the software boots or if the configuration file is corrupted at startup, the software might enter ROM monitor mode. Use the question symbol (?) to view the commands that you can use while the device is in ROM monitor mode.

```
rommon 1 > ?
alias               set and display aliases command
boot                boot up an external process
confreg             configuration register utility
cont                continue executing a downloaded image
context             display the context of a loaded image
cookie              display contents of cookie PROM in hex
.
.
.
rommon 2 >
```

The following example shows how the command prompt changes to indicate a different command mode:

```
Router> enable
Router# configure terminal
Router(config)# interface ethernet 1/1
Router(config-if)# ethernet
Router(config-line)# exit
Router(config)# end
Router#
```

Note A keyboard alternative to the **end** command is Ctrl-Z.

Using the Interactive Help Feature

The CLI includes an interactive Help feature. Table 4 describes the purpose of the CLI interactive Help commands.

Table 4 CLI Interactive Help Commands

Command	Purpose
help	Provides a brief description of the Help feature in any command mode.
?	Lists all commands available for a particular command mode.
*partial command***?**	Provides a list of commands that begin with the character string (no space between the command and the question mark).
partial command<**Tab**>	Completes a partial command name (no space between the command and <Tab>).
command **?**	Lists the keywords, arguments, or both associated with the command (space between the command and the question mark).
command keyword **?**	Lists the arguments that are associated with the keyword (space between the keyword and the question mark).

The following examples show how to use the help commands:

help

```
Router> help

Help may be requested at any point in a command by entering a question mark '?'. If nothing
matches, the help list will be empty and you must backup until entering a '?' shows the
available options.

Two styles of help are provided:

1. Full help is available when you are ready to enter a command argument (e.g. 'show ?')
and describes each possible argument.

2. Partial help is provided when an abbreviated argument is entered and you want to know
what arguments match the input (e.g. 'show pr?'.)
```

?

```
Router# ?
Exec commands:
  access-enable        Create a temporary access-List entry
  access-profile       Apply user-profile to interface
  access-template      Create a temporary access-List entry
  alps                 ALPS exec commands
  archive              manage archive files
<snip>
```

***partial command*?**

```
Router(config)# zo?
zone  zone-pair
```

***partial command*<Tab>**

```
Router(config)# we<Tab> webvpn
```

***command* ?**

```
Router(config-if)# pppoe ?
  enable        Enable pppoe
  max-sessions  Maximum PPPOE sessions
```

***command keyword* ?**

```
Router(config-if)# pppoe enable ?
  group  attach a BBA group
  <cr>
```

Understanding Command Syntax

Command syntax is the format in which a command should be entered in the CLI. Commands include the name of the command, keywords, and arguments. Keywords are alphanumeric strings that are used literally. Arguments are placeholders for values that a user must supply. Keywords and arguments may be required or optional.

Specific conventions convey information about syntax and command elements. Table 5 describes these conventions.

Table 5 CLI Syntax Conventions

Symbol/Text	Function	Notes
< > (angle brackets)	Indicate that the option is an argument.	Sometimes arguments are displayed without angle brackets.
A.B.C.D.	Indicates that you must enter a dotted decimal IP address.	Angle brackets (< >) are not always used to indicate that an IP address is an argument.
WORD (all capital letters)	Indicates that you must enter one word.	Angle brackets (< >) are not always used to indicate that a WORD is an argument.
LINE (all capital letters)	Indicates that you must enter more than one word.	Angle brackets (< >) are not always used to indicate that a LINE is an argument.
<cr> (carriage return)	Indicates the end of the list of available keywords and arguments, and also indicates when keywords and arguments are optional. When <cr> is the only option, you have reached the end of the branch or the end of the command if the command has only one branch.	—

The following examples show syntax conventions:

```
Router(config)# ethernet cfm domain ?
  WORD  domain name
Router(config)# ethernet cfm domain dname ?
  level
Router(config)# ethernet cfm domain dname level ?
  <0-7>  maintenance level number
Router(config)# ethernet cfm domain dname level 7 ?
  <cr>

Router(config)# snmp-server file-transfer access-group 10 ?
  protocol  protocol options
  <cr>

Router(config)# logging host ?
  Hostname or A.B.C.D  IP address of the syslog server
  ipv6                 Configure IPv6 syslog server
```

Understanding Enable and Enable Secret Passwords

Some privileged EXEC commands are used for actions that impact the system, and it is recommended that you set a password for these commands to prevent unauthorized use. Two types of passwords, enable (not encrypted) and enable secret (encrypted), can be set. The following commands set these passwords and are issued in global configuration mode:

- **enable** *password*
- **enable secret** *password*

Using an enable secret password is recommended because it is encrypted and more secure than the enable password. When you use an enable secret password, text is encrypted (unreadable) before it is written to the config.text file. When you use an enable password, the text is written as entered (readable) to the config.text file.

Each type of password is case sensitive, can contain from 1 to 25 uppercase and lowercase alphanumeric characters, and can start with a numeral. Spaces are also valid password characters; for example, "two words" is a valid password. Leading spaces are ignored, but trailing spaces are recognized.

Note Both password commands have numeric keywords that are single integer values. If you choose a numeral for the first character of your password followed by a space, the system will read the number as if it were the numeric keyword and not as part of your password.

When both passwords are set, the enable secret password takes precedence over the enable password.

To remove a password, use the **no** form of the commands: **no enable** *password* or **no enable secret** *password*.

For more information about password recovery procedures for Cisco products, see the following:

http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products_tech_note09186a00801746e6.shtml

Using the Command History Feature

The command history feature saves, in a command history buffer, the commands that you enter during a session. The default number of saved commands is 10, but the number is configurable within the range of 0 to 256. This command history feature is particularly useful for recalling long or complex commands.

To change the number of commands saved in the history buffer for a terminal session, issue the **terminal history size** command:

```
Router# terminal history size num
```

A command history buffer is also available in line configuration mode with the same default and configuration options. To set the command history buffer size for a terminal session in line configuration mode, issue the **history** command:

```
Router(config-line)# history [size num]
```

To recall commands from the history buffer, use the following methods:

- Press Ctrl-P or the Up Arrow key—Recalls commands beginning with the most recent command. Repeat the key sequence to recall successively older commands.
- Press Ctrl-N or the Down Arrow key—Recalls the most recent commands in the history buffer after they have been recalled using Ctrl-P or the Up Arrow key. Repeat the key sequence to recall successively more recent commands.

  Note The arrow keys function only on ANSI-compatible terminals such as the VT100.

- Issue the **show history** command in user EXEC or privileged EXEC mode—Lists the most recent commands that you entered. The number of commands that are displayed is determined by the setting of the **terminal history size** and **history** commands.

The command history feature is enabled by default. To disable this feature for a terminal session, issue the **terminal no history** command in user EXEC or privileged EXEC mode or the **no history** command in line configuration mode.

Abbreviating Commands

Typing a complete command name is not always required for the command to execute. The CLI recognizes an abbreviated command when the abbreviation contains enough characters to uniquely identify the command. For example, the **show version** command can be abbreviated as **sh ver**. It cannot be abbreviated as **s ver** because **s** could mean **show**, **set**, or **systat**. The **sh v** abbreviation also is not valid because the **show** command has **vrrp** as a keyword in addition to **version**. (Command and keyword examples are from Cisco IOS Release 12.4(13)T.)

Using Aliases for CLI Commands

To save time and the repetition of entering the same command multiple times, you can use a command alias. An alias can be configured to do anything that can be done at the command line, but an alias cannot move between modes, type in passwords, or perform any interactive functions.

Table 6 shows the default command aliases.

Table 6 Default Command Aliases

Command Alias	Original Command
h	help
lo	logout
p	ping
s	show
u or **un**	undebug
w	where

To create a command alias, issue the **alias** command in global configuration mode. The syntax of the command is **alias** *mode command-alias original-command*. Following are some examples:

- Router(config)# **alias exec prt partition**—privileged EXEC mode
- Router(config)# **alias configure sb source-bridge**—global configuration mode
- Router(config)# **alias interface rl rate-limit**—interface configuration mode

To view both default and user-created aliases, issue the **show alias** command.

For more information about the **alias** command, see the following:

http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf_a1.html

Using the no and default Forms of Commands

Most configuration commands have a **no** form that is used to reset a command to its default value or to disable a feature or function. For example, the **ip routing** command is enabled by default. To disable this command, you would issue the **no ip routing** command. To re-enable IP routing, you would issue the **ip routing** command.

Configuration commands may also have a **default** form, which returns the command settings to their default values. For commands that are disabled by default, using the **default** form has the same effect as using the **no** form of the command. For commands that are enabled by default and have default settings, the **default** form enables the command and returns the settings to their default values. To see what **default** commands are available on your system, enter **default ?** in the appropriate command mode of the command-line interface.

The **no** form is documented in the command pages of Cisco IOS command references. The **default** form is generally documented in the command pages only when the **default** form performs a function different than that of the plain and **no** forms of the command.

Command pages often include a "Command Default" section as well. The "Command Default" section documents the state of the configuration if the command is not used (for configuration commands) or the outcome of using the command if none of the optional keywords or arguments is specified (for EXEC commands).

Using the debug Command

A **debug** command produces extensive output that helps you troubleshoot problems in your network. These commands are available for many features and functions within Cisco IOS software. Some **debug** commands are **debug all**, **debug aaa accounting**, and **debug mpls packets**. To use **debug** commands during a Telnet session with a device, you must first enter the **terminal monitor** command. To turn off debugging completely, you must enter the **undebug all** command.

For more information about **debug** commands, see the *Cisco IOS Debug Command Reference*:

http://www.cisco.com/en/US/docs/ios/debug/command/reference/db_book.html

Caution Debugging is a high priority and high CPU utilization process that can render your device unusable. Use **debug** commands only to troubleshoot specific problems. The best times to run debugging are during periods of low network traffic and when few users are interacting with the network. Debugging during these periods decreases the likelihood that the **debug** command processing overhead will affect network performance or user access or response times.

Filtering Output Using Output Modifiers

Many commands produce lengthy output that may use several screens to display. Using output modifiers, you can filter this output to show only the information that you want to see.

The following three output modifiers are available:

- **begin** *regular-expression*—Displays the first line in which a match of the regular expression is found and all lines that follow.
- **include** *regular-expression*—Displays all lines in which a match of the regular expression is found.
- **exclude** *regular-expression*—Displays all lines except those in which a match of the regular expression is found.

To use one of these output modifiers, type the command followed by the pipe symbol (|), the modifier, and the regular expression that you want to search for or filter. A regular expression is a case-sensitive alphanumeric pattern. It can be a single character or number, a phrase, or a more complex string.

The following example illustrates how to filter output of the **show interface** command to display only lines that include the expression "protocol."

```
Router# show interface | include protocol

FastEthernet0/0 is up, line protocol is up
Serial4/0 is up, line protocol is up
Serial4/1 is up, line protocol is up
Serial4/2 is administratively down, line protocol is down
Serial4/3 is administratively down, line protocol is down
```

Understanding CLI Error Messages

You may encounter some error messages while using the CLI. Table 7 shows the common CLI error messages.

Table 7 Common CLI Error Messages

Error Message	Meaning	How to Get Help
% Ambiguous command: "show con"	You did not enter enough characters for the command to be recognized.	Reenter the command followed by a space and a question mark (?). The keywords that you are allowed to enter for the command appear.
% Incomplete command.	You did not enter all the keywords or values required by the command.	Reenter the command followed by a space and a question mark (?). The keywords that you are allowed to enter for the command appear.
% Invalid input detected at "^" marker.	You entered the command incorrectly. The caret (^) marks the point of the error.	Enter a question mark (?) to display all the commands that are available in this command mode. The keywords that you are allowed to enter for the command appear.

For more system error messages, see the *Cisco IOS Release 12.4T System Message Guide*.

Saving Changes to a Configuration

To save changes that you made to the configuration of a device, you must issue the **copy running-config startup-config** command or the **copy system:running-config nvram:startup-config** command. When you issue these commands, the configuration changes that you made are saved to the startup configuration and saved when the software reloads or power to the device is turned off or interrupted. The following example shows the syntax of the **copy running-config startup-config** command:

```
Router# copy running-config startup-config
Destination filename [startup-config]?
```

You press Enter to accept the startup-config filename (the default), or type a new filename and then press Enter to accept that name. The following output is displayed indicating that the configuration was saved.

```
Building configuration...
[OK]
Router#
```

On most platforms, the configuration is saved to NVRAM. On platforms with a Class A flash file system, the configuration is saved to the location specified by the CONFIG_FILE environment variable. The CONFIG_FILE variable defaults to NVRAM.

Additional Information

- "Using the Cisco IOS Command-Line Interface" section of the *Cisco IOS Configuration Fundamentals Configuration Guide*

  http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/cf_cli-basics.html
- Cisco Product/Technology Support

  http://www.cisco.com/go/techdocs
- Support area on Cisco.com (also search for documentation by task or product)

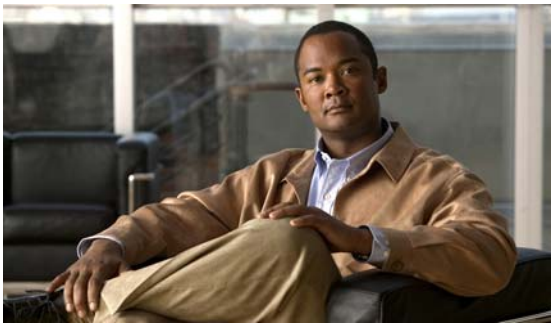
  http://www.cisco.com/en/US/support/index.html
- Software Download Center (downloads; tools; licensing, registration, advisory, and general information) (requires Cisco.com user ID and password)

  http://www.cisco.com/kobayashi/sw-center/
- Error Message Decoder, a tool to help you research and resolve error messages for Cisco IOS software

  http://www.cisco.com/pcgi-bin/Support/Errordecoder/index.cgi
- Command Lookup Tool, a tool to help you find detailed descriptions of Cisco IOS commands (requires Cisco.com user ID and password)

  http://tools.cisco.com/Support/CLILookup
- Output Interpreter, a troubleshooting tool that analyzes command output of supported **show** commands

  https://www.cisco.com/pcgi-bin/Support/OutputInterpreter/home.pl



Introduction

The *Cisco IOS Configuration Fundamentals Command Reference* provides command documentation associated with the following tasks:

- Using the Cisco IOS Command-Line Interface (CLI)
- Configuration Using Setup and AutoInstall
- Configuring Operating Characteristics for Terminals
- Managing Connections, Logins, Menus, and System Banners
  - Configure user menus and banners
- Using the Cisco Web Browser User Interface (UI)
  - Using the HTTP server-based UI as an alternative to the CLI
- Using the Cisco IOS Integrated File System (IFS)
  - The basics of filesystem use and Cisco IOS software's filesystem infrastructure
- Configuring Basic File Transfer Services
  - Copy, move, and delete files locally or across the network
- Managing Configuration Files
- Loading, Maintaining, and Upgrading System Images
- Rebooting

For further information about performing these tasks, refer to the *Cisco IOS Configuration Fundamentals Configuration Guide* for your release.

Note Some commands previously documented in this *Command Reference* have been moved to other books*:* Commands related to system management and network monitoring can be found in the *Cisco IOS Network Management Command Reference*.
Command reference documentation for the Cisco IOS software feature "Service Assurance Agent (SAA)" can be found in the the *Cisco IOS IP SLAs Command Reference.*

Cisco IOS IFS Command Syntax

Some commands in this book use URLs (uniform resource locators) as part of the command syntax. URLs used in the Cisco IOS Integrated File System (IFS) contain two parts: a file system or network prefix, and a file identification suffix. The following tables list URL keywords that can be used in the *source-url* and *destination-url* arguments for all commands in this book. The prefixes listed below can also be used in the *filesystem* arguments in this document.

Table 8 lists common URL network prefixes used to indicate a device on the network.

Table 8 Network Prefixes for Cisco IFS URLs

Prefix	Description
ftp:	Specifies a File Transfer Protocol (FTP) network server.
rcp:	Specifies an remote copy protocol (rcp) network server.
tftp:	Specifies a TFTP server.

Table 9 lists the available suffix options (file indentification suffixes) for the URL prefixes used in Table 8.

Table 9 File ID Suffixes for Cisco IFS URLs

Prefix	Suffix Options
ftp:	[[//[username[:password]@]location]/directory]/filename For example: **ftp://network-config** (*prefix*://*filename*) **ftp://user1:mypassword1@example.com/config-files**
rcp:	rcp:[[//[username@]location]/directory]/filename
tftp:	tftp:[[//location]/directory]/filename

Table 10 lists common URL prefixes used to indicate memory locations on the system.

Table 10 File System Prefixes for Cisco IFS URLs

Prefix	Description
bootflash:	Boot flash memory.
disk0:	Rotating disk media.
flash: [*partition-number*]	Flash memory. This prefix is available on all platforms. For platforms that do not have a device named **flash:**, the prefix **flash:** is aliased to **slot0:**. Therefore, you can use the prefix **flash:** to refer to the main Flash memory storage area on all platforms.
flh:	Flash load helper log files.
null:	Null destination for copies. You can copy a remote file to null to determine its size.
nvram:	NVRAM. This is the default location for the running-configuration file.

Table 10 File System Prefixes for Cisco IFS URLs (continued)

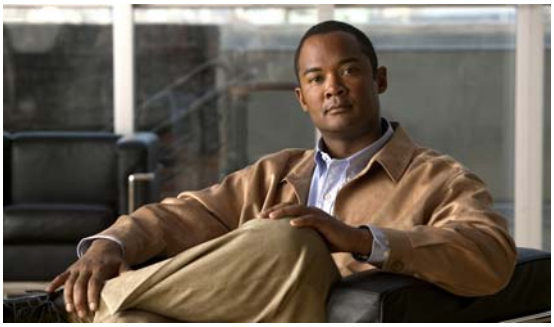
Prefix	Description
slavebootflash:	Internal Flash memory on a slave RSP card of a router configured with Dual RSPs.
slavenvram:	NVRAM on a slave RSP card.
slaveslot0:	First PCMCIA card on a slave RSP card.
slaveslot1:	Second PCMCIA card on a slave RSP card.
slot0:	First PCMCIA Flash memory card.
slot1:	Second PCMCIA Flash memory card.
xmodem:	Obtain the file from a network machine using the Xmodem protocol.
ymodem:	Obtain the file from a network machine using the Ymodem protocol.

For details about the Cisco IOS IFS, and for IFS configuration tasks, refer to the "Using the Cisco IOS Integrated File System (IFS)" chapter in the latest *Cisco IOS Configuration Fundamentals Configuration Guide* appropriate for your release version.

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html



Configuration Fundamentals Commands

activation-character

To define the character you enter at a vacant terminal to begin a terminal session, use the **activation-character** command in line configuration mode. To make any character activate a terminal, use the **no** form of this command.

activation-character *ascii-number*

no activation-character

Syntax Description

ascii-number	Decimal representation of the activation character.

Defaults

Return (decimal 13)

Command Modes

Line configuration (config-line)

Command History

Release	Modification
10.0	This command was introduced.
	This command is supported in all Cisco IOS software Releases.

Usage Guidelines

See the "ASCII Character Set and Hexadecimal Values" document for a list of ASCII characters.

Note If you are using the **autoselect** function, set the activation character to the default, Return, and exec-character-bits to 7. If you change these defaults, the application will not recognize the activation request.

Examples

The following example shows how to set the activation character for the console to Delete, which is decimal character 127:

```
Router(config)# line console
Router(config-line)# activation-character 127
```

alias

To create a command alias, use the **alias** command in global configuration mode. To delete all aliases in a command mode or to delete a specific alias, and to revert to the original command syntax, use the **no** form of this command.

alias *mode command-alias original-command*

no alias *mode* [*command-alias*]

Syntax Description

mode	Command mode of the original and alias commands.
command-alias	Command alias.
original-command	Original command syntax.

Defaults

A set of six basic EXEC mode aliases are enabled by default. See the "Usage Guidelines" section of this command for a list of default aliases.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can use simple words or abbreviations as command aliases.

Table 11 lists the basic EXEC mode aliases that are enabled by default.

Table 11 Default Command Aliases

Command Alias	Original Command
h	**help**
lo	**logout**
p	**ping**
r	**resume**
s	**show**
w	**where**

The default aliases in Table 11 are predefined. These default aliases can be disabled with the **no alias exec** command.

Common keyword aliases (which cannot be disabled) include **running-config** (keyword alias for **system:running-config**) and **startup-config** (keyword alias for **nvram:startup-config**). See the description of the **copy** command for more information about these keyword aliases.

Note that aliases can be configured for keywords instead of entire commands. You can create, for example, an alias for the first part of any command and still enter the additional keywords and arguments as normal.

To determine the value for the mode argument, enter the command mode in which you would issue the original command (and in which you will issue the alias) and enter the **?** command. The name of the command mode should appear at the top of the list of commands. For example, the second line in the following sample output shows the name of the command mode as “Interface configuration”:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# interface e0
Router(config-if)# ?
Interface configuration commands:
  access-expression       Build a bridge boolean access expression
 .
 .
 .
```

To match the name of the command mode to the acceptable mode keyword for the **alias** command, issue the **alias ?** command. As shown in the following sample output, the keyword needed to create a command alias for the access-expression command is **interface**:

```
Router(config)# alias ?
  accept-dialin          VPDN group accept dialin configuration mode
  accept-dialout         VPDN group accept dialout configuration mode
  address-family         Address Family configuration mode
  call-discriminator     Call Discriminator Configuration
  cascustom              Cas custom configuration mode
  clid-group             CLID group configuration mode
  configure              Global configuration mode
  congestion             Frame Relay congestion configuration mode
  controller             Controller configuration mode
  cptone-set             custom call progress tone configuration mode
  customer-profile       customer profile configuration mode
  dhcp                   DHCP pool configuration mode
  dnis-group             DNIS group configuration mode
  exec                   Exec mode
  flow-cache             Flow aggregation cache config mode
  fr-fr                  FR/FR connection configuration mode
  interface              Interface configuration mode
 .
 .
 .
Router(config)# alias interface express access-expression
```

When you use online help, command aliases are indicated by an asterisk (*), and displayed in the following format:

**command-alias=original-command*

For example, the **lo** command alias is shown here along with other EXEC mode commands that start with “lo”:

```
Router# lo?
*lo=logout  lock  login  logout
```

When you use online help, aliases that contain multiple keyword elements separated by spaces are displayed in quotes, as shown here:

```
Router(config)#alias exec device-mail telnet device.cisco.com 25
Router(config)#end
Router#device-mail?
*device-mail=”telnet device.cisco.com 25"
```

To list only commands and omit aliases, begin your input line with a space. In the following example, the alias **td** is not shown, because there is a space before the **t?** command line.

```
Router(config)#alias exec td telnet device
Router(config)#end
Router# t?
telnet terminal test tn3270 trace
```

To circumvent command aliases, use a space before entering the command. In the following example, the command alias **express** is not recognized because a space is used before the command.

```
Router(config-if)#exp?
*express=access-expression
Router(config-if)# express ?
% Unrecognized command
```

As with commands, you can use online help to display the arguments and keywords that can follow a command alias. In the following example, the alias **td** is created to represent the command **telnet device**. The /debug and /line switches can be added to **telnet device** to modify the command:

```
Router(config)#alias exec td telnet device
Router(config)#end
Router#td ?
      /debug     Enable telnet debugging mode
      /line      Enable telnet line mode
      ...
      whois      Whois port
      <cr>
Router# telnet device
```

You must enter the complete syntax for the command alias. Partial syntax for aliases is not accepted. In the following example, the parser does not recognize the command **t** as indicating the alias **td**:

```
Router# t
% Ambiguous command: “t”
```

Examples

In the following example, the alias **fixmyrt** is configured for the **clear iproute 192.168.116.16** EXEC mode command:

```
Router(config)#alias exec fixmyrt clear ip route 192.168.116.16
```

In the following example, the alias **express** is configured for the first part of the **access-expression** interface configuration command:

```
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface e0
Router(config-if)#?
Interface configuration commands:
  access-expression        Build a bridge boolean access expression
  .
  .
  .

Router(config-if)#exit
Router(config)#alias ?
  accept-dialin         VPDN group accept dialin configuration mode
```

```
  accept-dialout        VPDN group accept dialout configuration mode
  address-family        Address Family configuration mode
  call-discriminator    Call Discriminator Configuration
  cascustom             Cas custom configuration mode
  clid-group            CLID group configuration mode
  configure             Global configuration mode
  congestion            Frame Relay congestion configuration mode
  controller            Controller configuration mode
  cptone-set            custom call progress tone configuration mode
  customer-profile      customer profile configuration mode
  dhcp                  DHCP pool configuration mode
  dnis-group            DNIS group configuration mode
  exec                  Exec mode
  flow-cache            Flow aggregation cache config mode
  fr-fr                 FR/FR connection configuration mode
  interface             Interface configuration mode
 .
 .
 .

Router(config)#alias interface express access-expression
Router(config)#int e0
Router(config-if)#exp?
*express=access-expression

Router(config-if)#express ?
  input   Filter input packets
  output   Filter output packets

!Note that the true form of the command/keyword alias appears on the screen after issuing
!the express ? command.
Router(config-if)#access-expression ?
  input   Filter input packets
  output  Filter output packets
Router(config-if)#ex?
*express=access-expression  exit

!Note that in the following line, a space is used before the ex? command
!so the alias is not displayed.
Router(config-if)# ex?
exit

!Note that in the following line, the alias cannot be recognized because
!a space is used before the command.
Router#(config-if)# express ?
% Unrecognized command

Router(config-if)# end
Router# show alias interface
Interface configuration mode aliases:
  express               access-expression
```

Related Commands

Command	Description
show aliases	Displays command aliases.

archive

To enter archive configuration mode, use the **archive** command in global configuration mode.

archive

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Examples

The following example shows how to place the router in archive configuration mode:

```
Router# configure terminal
!
Router(config)# archive
Router(config-archive)#
```

Related Commands

Command	Description
log config	Enters configuration change logger configuration mode.
logging enable	Enables the logging of configuration changes.
maximum	Sets the maximum number of archive files of the running configuration to be saved in the Cisco IOS configuration archive.
path	Specifies the location and filename prefix for the files in the Cisco IOS configuration archive.
time-period	Sets the time increment for automatically saving an archive file of the current running configuration in the Cisco IOS configuration archive.

archive config

To save a copy of the current running configuration to the Cisco IOS configuration archive, use the **archive config** command in privileged EXEC mode.

archive config

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was implemented on the Cisco 10000 series.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Usage Guidelines

Note Before using this command, you must configure the **path** command in order to specify the location and filename prefix for the files in the Cisco IOS configuration archive.

The Cisco IOS configuration archive is intended to provide a mechanism to store, organize, and manage an archive of Cisco IOS configuration files to enhance the configuration rollback capability provided by the **configure replace** command. Before this feature was introduced, you could save copies of the running configuration using the **copy running-config** *destination-url* command, storing the target file either locally or remotely. However, this method lacked any automated file management. On the other hand, the Configuration Replace and Configuration Rollback feature provides the capability to automatically save copies of the running configuration to the Cisco IOS configuration archive. These archived files serve as checkpoint configuration references and can be used by the **configure replace** command to revert to previous configuration states.

The **archive config** command allows you to save Cisco IOS configurations in the configuration archive using a standard location and filename prefix that is automatically appended with an incremental version number (and optional time stamp) as each consecutive file is saved. This functionality provides a means for consistent identification of saved Cisco IOS configuration files. You can specify how many versions of the running configuration are kept in the archive. After the maximum number of files has been saved in the archive, the oldest file is automatically deleted when the next, most recent file is saved. The **show archive** command displays information for all configuration files saved in the Cisco IOS configuration archive.

Examples

The following example shows how to save the current running configuration to the Cisco IOS configuration archive using the **archive config** command. Before using the **archive config** command, you must configure the **path** command to specify the location and filename prefix for the files in the Cisco IOS configuration archive. In this example, the location and filename prefix are specified as disk0:myconfig as follows:

```
configure terminal
!
archive
 path disk0:myconfig
 end
```

You then save the current running configuration in the configuration archive, as follows:

```
archive config
```

The **show archive** command displays information on the files saved in the configuration archive as shown in the following sample output:

```
Router# show archive

There are currently 1 archive configurations saved.
The next archive file will be named disk0:myconfig-2
 Archive #  Name
   0
   1       disk0:myconfig-1 <- Most Recent
   2
   3
   4
   5
   6
   7
   8
   9
   10
```

Related Commands

Command	Description
archive	Enters archive configuration mode.
configure confirm	Confirms replacement of the current running configuration with a saved Cisco IOS configuration file.
configure replace	Replaces the current running configuration with a saved Cisco IOS configuration file.
maximum	Sets the maximum number of archive files of the running configuration to be saved in the Cisco IOS configuration archive.
path	Specifies the location and filename prefix for the files in the Cisco IOS configuration archive.
show archive	Displays information about the files saved in the Cisco IOS configuration archive.
time-period	Sets the time increment for automatically saving an archive file of the current running configuration in the Cisco IOS configuration archive.

archive log config persistent save

To save the persisted commands in the configuration log to the Cisco IOS secure file system, use the **archive log config persistent save** command in virtually any configuration mode.

archive log config persistent save

Syntax Description

This command has no arguments or keywords.

Command Default

If this command is not entered, the persisted configuration commands in the archive log are not saved to the Cisco IOS secure file system.

Command Modes

Configuration change logger configuration mode in archive configuration mode is common for this command, but the command can be used in virtually any configuration mode.

Command History

Release	Modification
12.2(33)SRA	This command was introduced.
12.4(11)T	This command was integrated into Cisco IOS Release 12.4(11)T.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.

Usage Guidelines

This command can be entered at any time, regardless of what mode the router is in. If the router is in the persistent periodic mode, the persistent timer is restarted.

Examples

The following example saves the persisted commands in the archive log to the Cisco IOS secure file system:

```
Router(config-archive-log-cfg)# archive log config persistent save
```

Related Commands

Command	Description
log config	Enters configuration change logger configuration mode.
logging enable	Enables the logging of configuration changes.
logging persistent	Enables the configuration logging persistent feature.

archive tar

To create a TAR file, to list files in a TAR file, or to extract the files from a TAR file, use the **archive tar** command in privileged EXEC mode.

archive tar {**/create** *destination-url* **flash:**/*file-url* | **/table** *source-url* | **/xtract** *source-url* **flash:**/*file-url* [*dir*/*file*...]}

Syntax Description

/create *destination-url* **flash:**/*file-url*	Creates a new TAR file on the local or network file system. For *destination-url*, specify the destination URL alias for the local or network file system and the name of the TAR file to create. The following options are supported: • **flash:**—Syntax for the local flash file system. • **ftp:**[[*//username*[**:***password*]**@***location*]/*directory*]/*tar-filename.tar*—Syntax for FTP. • **rcp:**[[*//username***@***location*]/*directory*]/*tar-filename.tar*—Syntax for Remote Copy Protocol (RCP). • **tftp:**[[*//location*]/*directory*]/*tar-filename.tar* —Syntax for TFTP. The *tar-filename.tar* is the name of the TAR file to be created. For **flash:**/*file-url*, specify the location on the local flash file system from which the new TAR file is created. An optional list of files or directories within the source directory can be specified to write to the new TAR file. If none is specified, all files and directories at this level are written to the newly created TAR file.
/table *source-url*	Display the contents of an existing TAR file to the screen. For *source-url*, specify the source URL alias for the local or network file system. The following options are supported: • **flash:**—Syntax for the local flash file system. • **ftp:**[[*//username*[**:***password*]**@***location*]/*directory*]/*tar-filename.tar*—Syntax for FTP. • **rcp:**[[*//username***@***location*]/*directory*]/*tar-filename.tar*—Syntax for Remote Copy Protocol (RCP). • **tftp:**[[*//location*]/*directory*]/*tar-filename.tar* —Syntax for TFTP. The *tar-filename.tar* is the name of the TAR file to be created.

/xtract *source-url* **flash:**/*file-url* [*dir/file...*]	Extracts files from a TAR file to the local file system. For *source-url*, specify the source URL alias for the local file system. These options are supported: • **flash:**—Syntax for the local flash file system. • **ftp:**[[*//username*[**:***password*]**@***location*]/*directory*]/*tar-filename.tar*—Syntax for FTP. • **rcp:**[[*//username@location*]*/directory*]/*tar-filename.tar*—Syntax for Remote Copy Protocol (RCP). • **tftp:**[[*//location*]/*directory*]/*tar-filename.tar* —Syntax for TFTP. The *tar-filename.tar* is the name of the TAR file to be created.

Command Default

The TAR archive file is not created.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.1(13)AY	This command was introduced.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.4(22)YB	This command was integrated into Cisco IOS Release 12.4(22)YB.
12.4(24)T	This command was integrated into Cisco IOS Release 12.4(24)T.

Usage Guidelines

Filenames, directory names, and image names are case sensitive.

The TAR file is an archive file from which you can extract files by using the **archive tar** command.

Examples

The following example shows how to create a TAR file. The command writes the contents of the new-configs directory on the local flash device to a file named saved.tar on the TFTP server at 172.20.136.9.

```
Switch# archive tar /create tftp:172.20.136.9/saved.tar flash:/new-configs
```

The following example shows how to display the contents of the c2940-tv0-m.tar file that is in flash memory. The contents of the TAR file appear on the screen.

```
Switch# archive tar /table flash:c2940-tv0-m.tar

info (219 bytes)
c2940-tv0-mz-121/ (directory)
c2940-tv0-mz-121/html/ (directory)
c2940-tv0-mz-121/html/foo.html (0 bytes)
c2940-tv0-mz-121/vegas-tv0-mz-121.bin (610856 bytes)
c2940-tv0-mz-121/info (219 bytes)
info.ver (219 bytes)
```

The following example shows how to extract the contents of a TAR file on the TFTP server at 172.20.10.30. This command extracts only the new-configs directory into the root directory on the local flash file system. The remaining files in the saved.tar file are ignored.

```
Switch# archive tar /xtract tftp:/172.20.10.30/saved.tar flash:/ new-configs
```

async-bootp

To configure extended BOOTP requests for asynchronous interfaces as defined in RFC 1084, use the **async-bootp** command in global configuration mode. To restore the default, use the **no** form of this command.

async-bootp *tag* [**:***hostname*] *data*

no async-bootp

Syntax Description

tag	Item being requested; expressed as filename, integer, or IP dotted decimal address. See Table 12 for possible keywords.
:*hostname*	(Optional) This entry applies only to the specified host. The **:***hostname* argument accepts both an IP address and a logical host name.
data	List of IP addresses entered in dotted decimal notation or as logical host names, a number, or a quoted string.

Table 12 tag Keyword Options

Keyword	Description
bootfile	Specifies use of a server boot file from which to download the boot program. Use the optional :*hostname* argument and the *data* argument to specify the filename.
subnet-mask *mask*	Dotted decimal address specifying the network and local subnetwork mask (as defined by RFC 950).
time-offset *offset*	Signed 32-bit integer specifying the time offset of the local subnetwork in seconds from Coordinated Universal Time (UTC).
gateway *address*	Dotted decimal address specifying the IP addresses of gateways for this subnetwork. A preferred gateway should be listed first.
time-server *address*	Dotted decimal address specifying the IP address of time servers (as defined by RFC 868).
IEN116-server *address*	Dotted decimal address specifying the IP address of name servers (as defined by IEN 116).
nbns-server *address*	Dotted decimal address specifying the IP address of Windows NT servers.
DNS-server *address*	Dotted decimal address specifying the IP address of domain name servers (as defined by RFC 1034).
log-server *address*	Dotted decimal address specifying the IP address of an MIT-LCS UDP log server.
quote-server *address*	Dotted decimal address specifying the IP address of Quote of the Day servers (as defined in RFC 865).
lpr-server *address*	Dotted decimal address specifying the IP address of Berkeley UNIX Version 4 BSD servers.
impress-server *address*	Dotted decimal address specifying the IP address of Impress network image servers.

Table 12 tag Keyword Options (continued)

Keyword	Description
rlp-server *address*	Dotted decimal address specifying the IP address of Resource Location Protocol (RLP) servers (as defined in RFC 887).
hostname *name*	The name of the client, which may or may not be domain qualified, depending upon the site.
bootfile-size *value*	A two-octet value specifying the number of 512-octet (byte) blocks in the default boot file.

Defaults

If no extended BOOTP commands are entered, the Cisco IOS software generates a gateway and subnet mask appropriate for the local network.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use the **show async-bootp** EXEC command to list the configured parameters. Use the **no async-bootp** command to clear the list.

Examples

The following example illustrates how to specify different boot files: one for a PC, and one for a Macintosh. With this configuration, a BOOTP request from the host on 172.30.1.1 results in a reply listing the boot filename as pcboot. A BOOTP request from the host named “mac” results in a reply listing the boot filename as “macboot.”

```
async-bootp bootfile :172.30.1.1 “pcboot”
async-bootp bootfile :mac “macboot”
```

The following example specifies a subnet mask of 255.255.0.0:

```
async-bootp subnet-mask 255.255.0.0
```

The following example specifies a negative time offset of the local subnetwork of 3600 seconds:

```
async-bootp time-offset -3600
```

The following example specifies the IP address of a time server:

```
async-bootp time-server 172.16.1.1
```

Related Commands

Command	Description
show async bootp	Displays the extended BOOTP request parameters that have been configured for asynchronous interfaces.

attach

To connect to a specific line card or module from a remote location for the purpose of executing monitoring and maintenance commands on that line card or module, use the **attach** command in privileged EXEC mode. To exit from the Cisco IOS software image on the line card and return to the Cisco IOS image on the main (Supervisor) module, use the **exit** command.

Cisco 12000 Series

attach *slot-number*

Cisco 7600 Series and Catalyst 6500 Series

attach *module-number*

Syntax Description

slot-number	Slot number of the line card to which you wish to connect. If you omit the slot number, you will be prompted for it.
module-number	Module number; see the "Usage Guidelines" section for valid values.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2GS	This command was introduced on the Cisco 12000 series.
12.2(14)SX	This command was implemented on the Supervisor Engine 720.
12.2(17d)SXB	Support was added for the Supervisor Engine 2.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Cisco 12000 Series

You must first use the **attach** privileged EXEC command to access the Cisco IOS software image on a line card before using line card-specific **show** EXEC commands. Alternatively, you can use the **execute-on** privileged EXEC command to execute a **show** command on a specific line card.

After you connect to the Cisco IOS image on the line card using the **attach** command, the prompt changes to `LC-Slotx#`, where *x* is the slot number of the line card.

The commands executed on the line card use the Cisco IOS image on that line card.

You can also use the **execute-on slot** privileged EXEC command to execute commands on one or all line cards.

Note Do not execute the **config** EXEC command from the Cisco IOS software image on the line card.

Cisco 7600 Series and Catalyst 6500 Series

Caution After you enter the **attach** or **remote login** command to access another console from your switch, if you enter global or interface configuration mode commands, the switch might reset.

The valid values for the *module-number* argument depend on the chassis that is used. For example, if you have a 13-slot chassis, valid values for the module number are from 1 to 13.

This command is supported on Distributed Forwarding Card (DFC)-equipped modules, FlexWan modules, and the supervisor engine only.

When you execute the **attach** *module-number* command, the prompt changes to Router-dfcx# or Switch-sp#, depending on the type of module to which you are connecting.

The behavior of the **attach** command is identical to that of the **remote login module** *num* command.

There are two ways to end this session:

- You can enter the **exit** command as follows:

```
Router-dfc3# exit

[Connection to Switch closed by foreign host]
Router#
```

- You can press **Ctrl-C** three times as follows:

```
Router-dfc3# ^C
Router-dfc3# ^C
Router-dfc3# ^C
Terminate remote login session? [confirm] y
[Connection to Switch closed by local host]
Router#
```

Examples

In the following example, the user connects to the Cisco IOS image running on the line card in slot 9, gets a list of valid **show** commands, and returns the Cisco IOS image running on the GRP:

```
Router# attach 9

Entering Console for 4 Port Packet Over SONET OC-3c/STM-1 in Slot: 9
Type exit to end this session

Press RETURN to get started!

LC-Slot9# show ?

  cef       Cisco Express Forwarding
  clock     Display the system clock
  context   Show context information about recent crash(s)
  history   Display the session command history
  hosts     IP domain-name, lookup style, nameservers, and host table
  ipc       Interprocess communications commands
  location  Display the system location
  sessions  Information about Telnet connections
  terminal  Display terminal configuration parameters
  users     Display information about terminal lines
  version   System hardware and software status

LC-Slot9# exit

Disconnecting from slot 9.
```

```
Connection Duration: 00:01:04
Router#
```

Note Because not all statistics are maintained on line cards, the output from some of **show** commands may be inconsistent.

The following example shows how to log in remotely to the DFC-equipped module:

```
Console# attach 3

Trying Switch ...
Entering CONSOLE for Switch
Type "^C^C^C" to end this session


Router-dfc3#
```

Related Commands

Command	Description
attach shelf	Connects you to a specific (managed) shelf for the purpose of remotely executing commands on that shelf only.
execute-on slot	Executes commands remotely on a specific line card, or on all line cards simultaneously.
remote login	Accesses the Cisco 7600 series router console or a specific module.

autobaud

To set the line for automatic baud rate detection (autobaud), use the **autobaud** command in line configuration mode. To disable automatic baud detection, use the **no** form of this command.

autobaud

no autobaud

Syntax Description

This command has no arguments or keywords.

Defaults

Autobaud detection is disabled. Fixed speed of 9600 bps.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The autobaud detection supports a range from 300 to 19200 baud. A line set for autobaud cannot be used for outgoing connections, nor can you set autobaud capability on a line using 19200 baud when the parity bit is set (because of hardware limitations).

Note Automatic baud detection must be disabled by using the **no autobaud** command prior to setting the **txspeed**, **rxspeed**, or **speed** commands.

Examples

In the following example, the auxiliary port is configured for autobaud detection:

```
Router(config)# line aux
Router(config-line)# autobaud
```

auto-sync

To enable automatic synchronization of the configuration files in NVRAM, use the **auto-sync** command in main-cpu redundancy configuration mode. To disable automatic synchronization, use the **no** form of this command.

auto-sync {**startup-config** | **config-register** | **bootvar** | **running-config** | **standard**}

no auto-sync {**startup-config** | **config-register** | **bootvar** | **standard**}

Syntax Description

startup-config	Specifies synchronization of the startup configuration files.
config-register	Specifies synchronization of the configuration register values.
bootvar	Specifies synchronization of the following boot variables: • BOOT—Set by the **boot system** *device:filename* command. • CONFIG_FILE—Set by the **boot config** *device:filename* command. • BOOTLDR—Set by the **boot bootldr** *device:filename* command.
running-config	Specifies synchronization of the running configuration files.
standard	Specifies synchronization of all of the system files (startup configuration, boot variables, and config configuration registers).

Defaults

For the Performance Routing Engines (PREs) on the Cisco uBR10012 universal broadband router, the system defaults to synchronizing all system files on the (**auto-sync standard**).

For the Supervisor Engines on the Cisco 7600 series routers, the system defaults to synchronizing the running configuration. (**running-config**).

Command Modes

Main-cpu redundancy configuration

Command History

Release	Modification
12.2(4)XF1	This command was introduced on the Cisco uBR10012 universal broadband router.
12.2(14)SX	This command was integrated into the Supervisor Engine 720.
12.2(17d)SXB	Support was added for the Supervisor Engine 2.
12.2(18)SXD	Support for this command on the Cisco 7600 series routers was removed.
12.3BC	This command was integrated into Cisco IOS Release 12.3BC for the Cisco uBR10012 router.
12.2(33)SCA	This command is obsolete on the Cisco uBR10012 universal broadband router.

Usage Guidelines

Cisco 7600 Series Routers

If you enter the **no auto-sync standard** command, no automatic synchronizations occur. If you want to enable any of the keywords, you have to enter the appropriate command for each keyword.

The **auto-sync** command is not supported in RPR+ mode.

Cisco uBR10012 Universal Broadband Router

By default, the system synchronizes all system files, which is the typical setting for most applications. However, you might want exclude certain files from synchronization for specialized applications.

For example, if you have configured the active and standby PRE1 (or PRE2) modules to run different versions of Cisco IOS software, you might want to use different configuration files as well. In this case, you would not synchronize the startup configuration file.

Examples

Cisco 7600 Series Routers

The following example shows how (from the default configuration) to enable automatic synchronization of the configuration register in the main CPU:

```
Router# configure terminal
Router (config)# redundancy
Router (config-r)# main-cpu
Router (config-r-mc)# no auto-sync standard
Router (config-r-mc)# auto-sync config-register
```

Cisco uBR10012 Universal Broadband Router

The following example shows the system being configured to synchronize only the startup configuration file:

```
router(config)# redundancy
router(config-r)# main-cpu
router(config-r-mc)# auto-sync startup-config
router(config-r-mc)# exit
router(config-r)# exit
```

The following example shows how to configure the system to synchronize all system files except for the startup configuration file. This typically is done when the two PRE1 (or PRE2) modules are running different software images.

```
router(config)# redundancy
router(config-r)# main-cpu
router(config-r-mc)# no auto-sync startup-config
router(config-r-mc)# auto-sync config-register
router(config-r-mc)# auto-sync bootvar
router(config-r-mc)# exit
router(config-r)# exit
```

Related Commands

Command	Description
redundancy	Enters redundancy configuration mode.
main-cpu	Enters main CPU redundancy configuration mode.

autoupgrade disk-cleanup

To configure the Cisco IOS Auto-Upgrade Manager disk cleanup utility, use the **autoupgrade disk-cleanup** command in global configuration mode. To disable this configuration, use the **no** form of this command.

autoupgrade disk-cleanup [**crashinfo** | **core** | **image** | **irrecoverable**]

no autoupgrade disk-cleanup [**crashinfo** | **core** | **image** | **irrecoverable**]

Syntax Description

crashinfo	(Optional) Deletes crashinfo files during disk-cleanup before an image is downloaded.
core	(Optional) Deletes core files during disk-cleanup before an image is downloaded.
image	(Optional) Deletes the Cisco IOS images, except the default boot image and the current image, during disk-cleanup before an image is downloaded.
irrecoverable	(Optional) Deletes files irretrievably (in a file-system that supports the undelete operation) during disk-cleanup before an image is downloaded.

Command Default

By default, the crashinfo files, the core files, and the Cisco IOS software images are deleted by the Cisco IOS Auto-Upgrade Manager disk cleanup utility, and the filesystems that support the undelete operation are not cleaned up.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.4(15)T	This command was introduced.

Examples

The following example shows how to clean-up filesystems that support undelete operation:

```
Router(config)# autoupgrade disk-cleanup irrecoverable
```

The following example shows how to avoid deleting the Cisco IOS software images:

```
Router(config)# no autoupgrade disk-cleanup image
```

Related Commands

Command	Description
autoupgrade ida url	Configures the URL of the server on www.cisco.com where the image download requests will be sent by Auto-Upgrade Manager.
autoupgrade status email	Configures the address to which the status email is to be sent.
upgrade automatic getversion	Downloads a Cisco IOS software image directly from www.cisco.com or from a non-Cisco server.

autoupgrade ida url

To configure the URL of the Intelligent Download Application (IDA) running on www.cisco.com, use the **autoupgrade ida url** command in global configuration mode. The router will send the image download requests to the configured URL. To disable this URL, use the **no** form of this command.

autoupgrade ida url *url*

no autoupgrade ida url *url*

Syntax Description

url	URL of the IDA server.

Command Default

Default URL: https://www.cisco.com/cgi-bin/ida/locator/locator.pl

Command Modes

Global configuration (config)

Command History

Release	Modification
12.4(15)T	This command was introduced.

Usage Guidelines

Use the **autoupgrade ida url** command to configure a new URL for the IDA server, if it is not present in the default location.

Examples

The following example shows how to configure the URL for the IDA server:

```
Router(config)# autoupgrade ida url https://www.cisco.com/cgi-bin/ida/locator/locator.pl
```

Related Commands

Command	Description
autoupgrade disk-cleanup	Configures the Cisco IOS Auto-Upgrade Manager disk cleanup utility.
autoupgrade status email	Configures the address to which the status email is to be sent.
upgrade automatic getversion	Downloads a Cisco IOS software image directly from www.cisco.com or from a non-Cisco server.

autoupgrade status email

To configure the address to which status email is to be sent and the outgoing email server, use the **autoupgrade status email** command in global configuration mode. To disable status email, use the **no** form of this command.

autoupgrade status email [**recipient** [*email-address*]] [**smtp-server**[*smtp-server*]]

no autoupgrade status email [**recipient** [*email-address*]] [**smtp-server**[*smtp-server*]]

Syntax Description

recipient	The address to which the Cisco IOS Auto-Upgrade Manager (AUM) status is to be sent.
smtp-server	The outgoing email server to which the AUM email is sent.
email-address	The email address to which the AUM status is to be sent.

Command Default

Status email is not sent unless the address is configured. The recipient email address and SMTP server have to be configured in order to receive AUM status email.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.4(15)T	This command was introduced.

Usage Guidelines

Use this command to configure the email-address where AUM status email can be sent.

Examples

The following example shows how to configure the address to which status email is to be sent:

```
Router(config)# autoupgrade status email recipient tree@abc.com

Router(config)# autoupgrade status email smtp-server smtpserver.abc.com
```

Related Commands

Command	Description
autoupgrade disk-cleanup	Configures the Cisco IOS Auto-Upgrade Manager disk cleanup utility.
autoupgrade ida url	Configures the URL of the server running on www.cisco.com to which the router sends the image download requests.
upgrade automatic getversion	Downloads a Cisco IOS software image directly from www.cisco.com or from a non-Cisco server.

banner exec

To specify and enable a message to be displayed when an EXEC process is created (an EXEC banner), use the **banner exec** command in global configuration mode. To delete the existing EXEC banner, use the **no** form of this command.

banner exec *d message d*

no banner exec

Syntax Description

d	Delimiting character of your choice—a pound sign (#), for example. You cannot use the delimiting character in the banner message.
message	Message text. You can include tokens in the form $(*token*) in the message text. Tokens will be replaced with the corresponding configuration variable. Tokens are described in Table 13.

Defaults

Disabled (no EXEC banner is displayed).

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
11.3(7.5)AA	Token functionality was introduced.
12.0(3)T	Token functionality was integrated into Cisco IOS Release 12.0(3)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command specifies a message to be displayed when an EXEC process is created (a line is activated, or an incoming connection is made to a vty). Follow this command with one or more blank spaces and a delimiting character of your choice. Then enter one or more lines of text, terminating the message with the second occurrence of the delimiting character.

When a user connects to a router, the message-of-the-day (MOTD) banner appears first, followed by the login banner and prompts. After the user logs in to the router, the EXEC banner or incoming banner will be displayed, depending on the type of connection. For a reverse Telnet login, the incoming banner will be displayed. For all other connections, the router will display the EXEC banner.

To disable the EXEC banner on a particular line or lines, use the **no exec-banner** line configuration command.

To customize the banner, use tokens in the form $(*token*) in the message text. Tokens will display current Cisco IOS configuration variables, such as the router's host name and IP address. The tokens are described in Table 13.

Table 13 banner exec Tokens

Token	Information Displayed in the Banner
$(hostname)	Displays the host name for the router.
$(domain)	Displays the domain name for the router.
$(line)	Displays the vty or tty (asynchronous) line number.
$(line-desc)	Displays the description attached to the line.

Examples

The following example sets an EXEC banner that uses tokens. The percent sign (%) is used as a delimiting character. Notice that the $(*token*) syntax is replaced by the corresponding configuration variable.

```
Router(config)# banner exec %
Enter TEXT message.  End with the character '%'.
Session activated on line $(line), $(line-desc). Enter commands at the prompt.
%
```

When a user logs on to the system, the following output is displayed:

```
User Access Verification

Username: joeuser
Password: <password>

 Session activated on line 50, vty default line. Enter commands at the prompt.

Router>
```

Related Commands

Command	Description
banner incoming	Defines a customized banner to be displayed when there is an incoming connection to a terminal line from a host on the network.
banner login	Defines a customized banner to be displayed before the username and password login prompts.
banner motd	Defines a customized message-of-the-day banner.
banner slip-ppp	Defines a customized banner to be displayed when a serial-line IP or point-to-point connection is made.
exec-banner	Controls (enables or disables) the display of EXEC banners and message-of-the-day banners on a specified line or lines.

banner incoming

To define and enable a banner to be displayed when there is an incoming connection to a terminal line from a host on the network, use the **banner incoming** command in global configuration mode. To delete the incoming connection banner, use the **no** form of this command.

banner incoming *d message d*

no banner incoming

Syntax Description

d	Delimiting character of your choice—a pound sign (#), for example. You cannot use the delimiting character in the banner message.
message	Message text. You can include tokens in the form $(*token*) in the message text. Tokens will be replaced with the corresponding configuration variable. Tokens are described in Table 14.

Defaults

Disabled (no incoming banner is displayed).

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
11.3(7.5)AA	Token functionality was introduced.
12.0(3)T	Token functionality was integrated into Cisco IOS Release 12.0(3)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Follow the **banner incoming** command with one or more blank spaces and a delimiting character of your choice. Then enter one or more lines of text, terminating the message with the second occurrence of the delimiting character.

An *incoming connection* is one initiated from the network side of the router. Incoming connections are also called reverse Telnet sessions. These sessions can display MOTD banners and incoming banners, but they do not display EXEC banners. Use the **no motd-banner** line configuration command to disable the MOTD banner for reverse Telnet sessions on asynchronous lines.

When a user connects to the router, the message-of-the-day (MOTD) banner (if configured) appears first, before the login prompt. After the user successfully logs in to the router, the EXEC banner or incoming banner will be displayed, depending on the type of connection. For a reverse Telnet login, the incoming banner will be displayed. For all other connections, the router will display the EXEC banner.

Incoming banners cannot be suppressed. If you do not want the incoming banner to appear, you must delete it with the **no banner incoming** command.

To customize the banner, use tokens in the form $(*token*) in the message text. Tokens will display current Cisco IOS configuration variables, such as the router's host name and IP address. The tokens are described in Table 14.

Table 14 banner incoming Tokens

Token	Information Displayed in the Banner
$(hostname)	Displays the host name for the router.
$(domain)	Displays the domain name for the router.
$(line)	Displays the vty or tty (asynchronous) line number.
$(line-desc)	Displays the description attached to the line.

Examples

The following example sets an incoming connection banner. The pound sign (#) is used as a delimiting character.

```
Router(config)# banner incoming #
This is the Reuses router.
#
```

The following example sets an incoming connection banner that uses several tokens. The percent sign (%) is used as a delimiting character.

```
darkstar(config)# banner incoming %
Enter TEXT message.  End with the character '%'.
You have entered $(hostname).$(domain) on line $(line) ($(line-desc)) %
```

When the incoming connection banner is executed, the user will see the following banner. Notice that the $(*token*) syntax is replaced by the corresponding configuration variable.

```
You have entered darkstar.ourdomain.com on line 5 (Dialin Modem)
```

Related Commands

Command	Description
banner exec	Defines a customized banner to be displayed whenever the EXEC process is initiated.
banner login	Defines a customized banner to be displayed before the username and password login prompts.
banner motd	Defines a customized message-of-the-day banner.
banner slip-ppp	Defines a customized banner to be displayed when a serial-line IP or point-to-point connection is made.

banner login

To define and enable a customized banner to be displayed before the username and password login prompts, use the **banner login** command in global configuration mode. To disable the login banner, use **no** form of this command.

banner login *d message d*

no banner login

Syntax Description

d	Delimiting character of your choice—a pound sign (#), for example. You cannot use the delimiting character in the banner message.
message	Message text. You can include tokens in the form *$(token)* in the message text. Tokens will be replaced with the corresponding configuration variable. Tokens are described in Table 15.

Defaults

Disabled (no login banner is displayed).

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
11.3(7.5)AA	Token functionality was introduced.
12.0(3)T	Token functionality was integrated into Cisco IOS Release 12.0(3)T.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Follow the **banner login** command with one or more blank spaces and a delimiting character of your choice. Then enter one or more lines of text, terminating the message with the second occurrence of the delimiting character.

When a user connects to the router, the message-of-the-day (MOTD) banner (if configured) appears first, followed by the login banner and prompts. After the user successfully logs in to the router, the EXEC banner or incoming banner will be displayed, depending on the type of connection. For a reverse Telnet login, the incoming banner will be displayed. For all other connections, the router will display the EXEC banner.

To customize the banner, use tokens in the form $(*token*) in the message text. Tokens will display current Cisco IOS configuration variables, such as the router's host name and IP address. The tokens are described in Table 15.

Table 15 banner login Tokens

Token	Information Displayed in the Banner
$(hostname)	Displays the host name for the router.
$(domain)	Displays the domain name for the router.
$(line)	Displays the vty or tty (asynchronous) line number.
$(line-desc)	Displays the description attached to the line.

Examples

The following example sets a login banner. Double quotes (") are used as the delimiting character.

```
Router# banner login " Access for authorized users only. Please enter your username and
password. "
```

The following example sets a login banner that uses several tokens. The percent sign (%) is used as the delimiting character.

```
darkstar(config)# banner login %
Enter TEXT message. End with the character '%'.
You have entered $(hostname).$(domain) on line $(line) ($(line-desc)) %
```

When the login banner is executed, the user will see the following banner. Notice that the $(token) syntax is replaced by the corresponding configuration variable.

```
You have entered darkstar.ourdomain.com on line 5 (Dialin Modem)
```

Related Commands

Command	Description
banner exec	Defines a customized banner to be displayed whenever the EXEC process is initiated.
banner incoming	Defines a customized message to be displayed when there is an incoming connection to a terminal line from a host on the network.
banner motd	Defines a customized message-of-the-day banner.
banner slip-ppp	Defines a customized banner to be displayed when a serial-line IP or point-to-point connection is made.

banner motd

To define and enable a message-of-the-day (MOTD) banner, use the **banner motd** command in global configuration mode. To delete the MOTD banner, use the **no** form of this command.

banner motd *d message d*

no banner motd

Syntax Description

d	Delimiting character of your choice—a pound sign (#), for example. You cannot use the delimiting character in the banner message.
message	Message text. You can include tokens in the form $(*token*) in the message text. Tokens will be replaced with the corresponding configuration variable.

Defaults

Disabled (no MOTD banner is displayed).

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
11.3(7.5)AA	Token functionality was introduced.
12.0(3)T	Token functionality was integrated into Cisco IOS Release 12.0(3)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Follow this command with one or more blank spaces and a delimiting character of your choice. Then enter one or more lines of text, terminating the message with the second occurrence of the delimiting character.

This MOTD banner is displayed to all terminals connected and is useful for sending messages that affect all users (such as impending system shutdowns). Use the **no exec-banner** or **no motd-banner** command to disable the MOTD banner on a line. The **no exec-banner** command also disables the EXEC banner on the line.

When a user connects to the router, the MOTD banner appears before the login prompt. After the user logs in to the router, the EXEC banner or incoming banner will be displayed, depending on the type of connection. For a reverse Telnet login, the incoming banner will be displayed. For all other connections, the router will display the EXEC banner.

To customize the banner, use tokens in the form $(*token*) in the message text. Tokens will display current Cisco IOS configuration variables, such as the router's host name and IP address. The tokens are described in Table 16.

Table 16 banner motd Tokens

Token	Information Displayed in the Banner
$(hostname)	Displays the host name for the router.
$(domain)	Displays the domain name for the router.
$(line)	Displays the vty or tty (asynchronous) line number.
$(line-desc)	Displays the description attached to the line.

Examples

The following example configures an MOTD banner. The pound sign (#) is used as a delimiting character.

```
Router# banner motd # Building power will be off from 7:00 AM until 9:00 AM this coming
Tuesday. #
```

The following example configures an MOTD banner with a token. The percent sign (%) is used as a delimiting character.

```
darkstar(config)# banner motd %
Enter TEXT message.  End with the character '%'.
Notice: all routers in $(domain) will be upgraded beginning April 20
%
```

When the MOTD banner is executed, the user will see the following. Notice that the $(*token*) syntax is replaced by the corresponding configuration variable.

```
Notice: all routers in ourdomain.com will be upgraded beginning April 20
```

Related Commands

Command	Description
banner exec	Defines and enables a customized banner to be displayed whenever the EXEC process is initiated.
banner incoming	Defines and enables a customized message to be displayed when there is an incoming connection to a terminal line from a host on the network.
banner login	Defines and enables a customized banner to be displayed before the username and password login prompts.
banner slip-ppp	Defines and enables a customized banner to be displayed when a serial-line IP or point-to-point connection is made.
exec-banner	Controls (enables or disables) the display of EXEC banners and message-of-the-day banners on a specified line or lines.
motd-banner	Controls (enables or disables) the display of message-of-the-day banners on a specified line or lines.

banner slip-ppp

To customize the banner that is displayed when a Serial Line Internet Protocol (SLIP) or PPP connection is made, use the **banner slip-ppp** command in global configuration mode. To restore the default SLIP or PPP banner, use the **no** form of this command.

banner slip-ppp *d message d*

no banner slip-ppp

Syntax Description

d	Delimiting character of your choice—a pound sign (#), for example. You cannot use the delimiting character in the banner message.
message	Message text. You can include tokens in the form $(*token*) in the message text. Tokens will be replaced with the corresponding configuration variable.

Defaults

The default SLIP or PPP banner message is:

```
Entering encapsulation mode.
Async interface address is unnumbered (Ethernet0)
Your IP address is 10.000.0.0 MTU is 1500 bytes
```

The banner message when using the **service old-slip-prompt** command is:

```
Entering encapsulation mode.
Your IP address is 10.100.0.0 MTU is 1500 bytes
```

where *encapsulation* is SLIP or PPP.

Command Modes

Global configuration

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Follow this command with one or more blank spaces and a delimiting character of your choice. Then enter one or more lines of text, terminating the message with the second occurrence of the delimiting character.

Use this command to define a custom SLIP or PPP connection message. This is useful when legacy client applications require a specialized connection string. To customize the banner, use tokens in the form $(*token*) in the message text. Tokens will display current Cisco IOS configuration variables, such as the routers host name, IP address, encapsulation type, and Maximum Transfer Unit (MTU) size. The banner tokens are described in Table 17.

Table 17 banner slip-ppp Tokens

Token	Information Displayed in the Banner
$(hostname)	Displays the host name of the router.
$(domain)	Displays the domain name of the router.
$(peer-ip)	Displays the IP address of the peer machine.
$(gate-ip)	Displays the IP address of the gateway machine.
$(encap)	Displays the encapsulation type (SLIP, PPP, and so on).
$(encap-alt)	Displays the encapsulation type as SL/IP instead of SLIP.
$(mtu)	Displays the MTU size.

Examples

The following example sets the SLIP/PPP banner using several tokens and the percent sign (%) as the delimiting character:

```
Router(config)# banner slip-ppp %
Enter TEXT message.  End with the character '%'.
Starting $(encap) connection from $(gate-ip) to $(peer-ip) using a maximum packet size of
$(mtu) bytes... %
```

The new SLIP/PPP banner will now be displayed when the **slip** EXEC command is used. Notice that the $(*token*) syntax is replaced by the corresponding configuration variable.

```
Router# slip
Starting SLIP connection from 172.16.69.96 to 192.168.1.200 using a maximum packet size of
1500 bytes...
```

Related Commands

Command	Description
banner exec	Defines and enables a customized banner to be displayed whenever the EXEC process is initiated.
banner incoming	Defines and enables a customized message to be displayed when there is an incoming connection to a terminal line from a host on the network.
banner motd	Defines and enables a customized message-of-the-day banner.
ppp	Initiates a connection to a remote host using PPP.
slip	Initiates a connection to a remote host using SLIP.

boot

To boot the router manually, use the **boot** command in ROM monitor mode. The syntax of this command varies according to the platform and ROM monitor version.

boot

boot *file-url*

boot *filename* [*tftp-ip-address*]

boot flash [*flash-fs***:**][*partition-number***:**][*filename*]

Cisco 7000 Series, 7200 Series, 7500 Series Routers

boot *flash-fs***:**[*filename*]

Cisco 1600 and Cisco 3600 Series Routers

boot [*flash-fs***:**][*partition-number***:**][*filename*]

Cisco 1800 Series, 2800 Series, and 3800 Series Routers

boot usbflash0[**:***filename*]

Syntax Description

file-url	URL of the image to boot (for example, `boot tftp://172.16.15.112/routertest`).
filename	When used in conjunction with the *ip-address* argument, the *filename* argument is the name of the system image file to boot from a network server. The filename is case sensitive. When used in conjunction with the **flash** keyword, the *filename* argument is the name of the system image file to boot from Flash memory. On all platforms except the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family routers, the system obtains the image file from internal Flash memory. On the Cisco 1600 series, Cisco 3600 series and Cisco 7000 family routers, the *flash-fs***:** argument specifies the Flash memory device from which to obtain the system image. (See the *flash-fs***:** argument later in this table for valid device values.) The filename is case sensitive. Without the *filename* argument, the first valid file in Flash memory is loaded. If the *filename* is not specified, the first file in the partition or file system is used. (A USB Flash uses the first image in (compact) Flash as the boot loader and loads the image from USB Flash.)
tftp-ip-address	(optional) IP address of the TFTP server on which the system image resides. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.

flash	Boots the router from Flash memory. Note that this keyword is required in some boot images.
usbflash0	Boot the first file in USB Flash 0. If the optional filename argument is used, the router boots the specified image from USB Flash. **Note** This option uses the first image in (compact) Flash as the boot loader and loads the image from USB Flash.
*flash-fs***:**	(Optional) Specifying the Flash file system is optional for all platforms except the Cisco 7500 series routers. Possible file systems are: • **flash:**—Internal Flash memory. • **bootflash:**—Internal Flash memory on the Cisco 7000 family. • **slot0:**—Flash memory card in the first PCMCIA slot on the Cisco 7000 family and Cisco 3600 series routers. • **slot1:**—Flash memory card in the second PCMCIA slot on the Cisco 7000 family and Cisco 3600 series routers.
*partition-number***:**	(Optional) Specifies the partition number of the file system the file should be loaded from. This argument is not available on all platforms. If the *partition-number* is not specified, the first partition is used.

Defaults

For most platforms, if you enter the **boot** command and press Enter, the router boots from ROM by default. However, for some platforms, such as the Cisco 3600 series routers, if you enter the **boot** command and press Enter, the router boots the first image in Flash memory. Refer to the documentation for your platform for information about the default image.

Command Modes

ROM monitor

Command History

Release	Modification
10.3	The command was introduced.
12.3(14)T	The **usbflash0** keyword was added to support booting an image from an external USB Flash drive.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

To determine which form of this command to use, refer to the documentation for your platform or use the CLI help (**?**) feature.

Use this command only when your router cannot find the boot configuration information needed in NVRAM. To enter ROM monitor mode, use one of the following methods:

- Enter the **reload** EXEC command, then press the **Break** key during the first 60 seconds of startup.
- Set the configuration register bits 0 to 3 to zero (for example, set the configuration register to 0x0) and enter the **reload** command.

The ROM Monitor prompt is either “>” or, for newer platforms, “rommon *x*>”. Enter only lowercase commands.

These commands work only if there is a valid image to boot. Also, from the ROM monitor prompt, issuing a prior reset command is necessary for the boot to be consistently successful.

In Cisco IOS Release 12.3(4)T, MONLIB was modified to search in media for a valid Cisco IOS image. This change prevents boot failures that result when the first file read in disk or flash is not a valid Cisco IOS image.

Refer to your hardware documentation for information on correct jumper settings for your platform.

Note For some platforms the **flash** keyword is now required. If your attempts to use the boot command are failing using the older **boot flash:***x***:**[*filename*] syntax, try using the **boot flash flash:***x***:**[*filename*] syntax.

Examples

In the following example, a router is manually booted from ROM:

```
> boot
F3:
(ROM Monitor copyrights)
```

In the following example, a router boots the file named routertest from a network server with the IP address 172.16.15.112 using the *file-url* syntax:

```
> boot tftp://172.16.15.112/routertest
F3
(ROM Monitor copyrights)
```

The following example shows the **boot flash** command without the *filename* argument. The first valid file in Flash memory is loaded.

```
> boot flash
F3: 1858656+45204+166896 at 0x1000
Booting gs7-k from flash memory RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR [OK - 1903912/13765276 bytes]
F3: 1858676+45204+166896 at 0x1000
(ROM Monitor copyrights)
```

The following example boots from Flash memory using the file named gs7-k:

```
> boot flash gs7-k
F3: 1858656+45204+166896 at 0x1000

Booting gs7-k from flash memory RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
RRRRRRRRRRRRRR [OK - 1903912/13765276 bytes]
F3: 1858676+45204+166896 at 0x1000

(ROM Monitor copyrights)
```

In the following example, the **boot flash flash:** command boots the relocatable image file named igs-bpx-l from partition 2 in Flash memory:

```
> boot flash flash:2:igs-bpx-l
F3: 3562264+98228+303632 at 0x30000B4

(ROM Monitor copyrights)
```

In the following command, the Cisco 7000 family router accepts the **flash** keyword for compatibility but ignores it, and boots from slot 0:

```
> boot flash slot0:gs7-k-mz.103-9
F3: 8468+3980384+165008 at 0x1000
```

In the following example, the command did not function because it must be entered in lowercase:

```
rommon 10 > BOOT
command "BOOT" not found
```

The following example boots the first file in the first partition of internal Flash memory of a Cisco 3600 series router:

```
> boot flash:
```

The following example boots the first image file in the first partition of the Flash memory card in slot 0 of a Cisco 3600 series router:

```
> boot slot0:
```

The following example shows the ROM monitor booting the first file in the first Flash memory partition on a Cisco 1600 series router:

```
> boot flash:
```

Related Commands

Command	Description
continue	Returns to EXEC mode from ROM monitor mode by completing the boot process.

boot bootldr

To specify the location of the boot image that ROM uses for booting, use the **boot bootldr** command in global configuration mode. To remove this boot image specification, use the **no** form of this command.

boot bootldr *file-url*

no boot bootldr

Syntax Description

file-url	URL of the boot image on a Flash file system.

Defaults

Refer to your platform documentation for the location of the default boot image.

Command Modes

Global configuration (config)

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **boot bootldr** command sets the BOOTLDR variable in the current running configuration. You must specify both the Flash file system and the filename.

Note When you use this global configuration command, you affect only the running configuration. You must save the variable setting to your startup configuration to place the information under ROM monitor control and to have the variable function as expected. Use the **copy system:running-config nvram:startup-config** command to save the variable from your running configuration to your startup configuration.

Note The default length of the bootstring filename is 64 characters. Depending on the platform a longer bootstring filename can be used and supported.

The **no** form of the command sets the BOOTLDR variable to a null string. On the Cisco 7000 family routers, a null string causes the first image file in boot Flash memory to be used as the boot image that ROM uses for booting.

Use the **show boot** command to display the current value for the BOOTLDR variable.

Examples

In the following example, the internal Flash memory contains the boot image:

```
boot bootldr bootflash:boot-image
```

The following example specifies that the Flash memory card inserted in slot 0 contains the boot image:

```
boot bootldr slot0:boot-image
```

Related Commands

Command	Description
copy system:running-config nvram:startup-config	Copies any file from a source to a destination.
show (flash file system)	Displays the layout and contents of a Flash memory file system.
show bootvar	Displays the contents of the BOOT variable, the name of the configuration file pointed to by the CONFIG_FILE variable, the contents of the BOOTLDR variable, and the configuration register setting.

boot bootstrap

To configure the filename that is used to boot a secondary bootstrap image, use the **boot bootstrap** command in global configuration mode. To disable booting from a secondary bootstrap image, use the **no** form of this command.

boot bootstrap *file-url*

no boot bootstrap *file-url*

boot bootstrap flash [*filename*]

no boot bootstrap flash [*filename*]

boot bootstrap [**tftp**] *filename* [*ip-address*]

no boot bootstrap [**tftp**] *filename* [*ip-address*]

Syntax Description

file-url	URL of the bootstrap image.
flash	Boots the router from Flash memory.
filename	(Optional with **flash**) Name of the system image to boot from a network server or from Flash memory. If you omit the filename when booting from Flash memory, the router uses the first system image stored in Flash memory.
tftp	(Optional) Boots the router from a system image stored on a TFTP server.
ip-address	(Optional) IP address of the TFTP server on which the system image resides. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.

Defaults

No secondary bootstrap

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **boot bootstrap** command causes the router to load a secondary bootstrap image from the specied URL, such as from a remote server. After the bootstrap image is loaded, the bootstrap image loads the specified system image file. See the appropriate hardware installation guide for details on the setting the configuration register and secondary bootstrap filename.

Use this command when you have attempted to load a system image but have run out of memory even after compressing the system image. Secondary bootstrap images allows you to load a larger system image through a smaller secondary image.

Examples

In the following example, the system image file named sysimage-2 will be loaded by using a secondary bootstrap image:

```
Router(config)# boot bootstrap bootflash:sysimage-2
```

boot config

To specify the device and filename of the configuration file from which the system configures itself during initialization (startup), use the **boot config** command in global configuration mode. To return to the default location for the configuration file, use the **no** form of this command.

Platforms Other than Cisco 7600 Series Router

boot config *file-system-prefix***:**[*directory/*]*filename* [**nvbypass**]

no boot config

Cisco 7600 Series Router

boot config *device***:***filename* [**nvbypass**]

no boot config

Syntax Description

*file-system-prefix***:**	File system, followed by a colon (for example, **nvram:**, **flash:**, **slot0:**, **usbflash**[**0**-**9**]**:**, or **usbtoken**[**0**-**9**]**:**). The default is **nvram:**.
directory/	(Optional) File system directory where the configuration file is located, followed by a forward slash (/).
filename	Name of the configuration file.
*device***:**	Device identification, followed by a colon; see the "Usage Guidelines" section for a list of the valid values.
nvbypass	(Optional) Specifies that the distilled configuration is not written to nonvolatile random access memory (NVRAM).

Command Default

The default location for the configuration file is NVRAM (**nvram:**).

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(14)SX	Support for this command was added for the Cisco 7600 Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the cisco 7600 Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
11.0	This command was introduced.
12.3(14)T	Support for Class B file system platforms and the following file system prefix options were added: **usbflash**[**0**-**9**]**:** and **usbtoken**[**0**-**9**]**:**.

Supported Platforms Other than Cisco 7600 Series Router

This command is available only on Class A and Class B file system platforms.

You set the CONFIG_FILE environment variable in the current running memory when you use the **boot config** command. This variable specifies the configuration file used for initialization (startup). The configuration file must be an ASCII file located in either NVRAM or flash memory.

Cisco 7600 Series Router

The valid values for the *device***:** argument and colon are as follows:

- For systems that are configured with a Supervisor Engine 2, the valid values are **bootflash:**, **const_nvram:**, **flash:**, **nvram:**, **slot0:**, **sup-slot0:**, and **sup-bootflash:**.
- For systems that are configured with a Supervisor Engine 720, the valid values are **disk0:** and **disk1:**.

The configuration file must be an ASCII file that is located in the specified file system.

The **disk0:** and **disk1:** keywords are for Class C file systems.

The **bootflash:**, **slot0:**, and **sup-bootflash:** keywords are for Class A file systems.

For Class A flash file systems, the CONFIG_FILE environment variable specifies the file system and filename of the configuration file to use for initialization (startup). You set the CONFIG_FILE environment variable in the current running memory when you use the **boot config** command. This variable specifies the configuration file used for initialization (startup).

All Supported Platforms

When you use the **boot config** command, you affect only the running configuration. You must save the environment variable setting to your startup configuration to place the information under ROM monitor control and to have the environment variable function as expected. Use the **copy system:running-config nvram:startup-config** command to save the environment variable from your running configuration to your startup configuration.

The software displays an error message and does not update the CONFIG_FILE environment variable in the following situations:

- You specify **nvram:** as the file system, and it contains only a distilled version of the configuration. (A distilled configuration is one that does not contain access lists.)
- You specify a configuration file in the *filename* argument that does not exist or is not valid.

The router uses the NVRAM configuration during initialization when the CONFIG_FILE environment variable does not exist or when it is null (such as at first-time startup). If the software detects a problem with NVRAM or the configuration it contains, the device enters setup mode.

When you use the **no** form of this command, the router returns to using the default NVRAM configuration file as the startup configuration.

You can display the contents of the BOOT, BOOTLDR, and the CONFIG_FILE environment variables using the **show bootvar** command. This command displays the settings for these variables as they exist in the startup configuration and in the running configuration if a running configuration setting differs from a startup configuration setting.

When the **boot config** command is used, the distilled configuration is written into NVRAM and the system configuration is written into the file specified by the **boot config** command. If the distilled configuration exceeds the size of NVRAM, the system configuration gets truncated. Use the **nvbypass** keyword to prevent the system configuration from being truncated when the distilled configuration is larger than the size of NVRAM.

Examples

The following example shows how to set the configuration file that is located in internal flash memory to configure itself during initialization. The third line copies the specification to the startup configuration, ensuring that this specification will take effect upon the next reload.

```
Router(config)# boot config flash:router-config
Router(config)# end
Router# copy system:running-config nvram:startup-config
```

The following example instructs a Cisco 7500 series router to use the configuration file named router-config located on the flash memory card inserted in the second Personal Computer Memory Card Industry Association (PCMCIA) slot of the Route Switch Processor (RSP) card during initialization. The third line copies the specification to the startup configuration, ensuring that this specification will take effect upon the next reload.

```
Router (config)# boot config slot1:router-config
Router (config)# end
Router# copy system:running-config nvram:startup-config
```

Related Commands

Command	Description
copy system:running-config nvram:startup-config	Saves the environment variable from the running configuration to the startup configuration.
show bootvar	Displays the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, the contents of the BOOTLDR environment variable, and the configuration register setting.

boot host

To specify the host-specific configuration file to be used at the next system startup, use the **boot host** command in global configuration mode. To restore the host configuration filename to the default, use the **no** form of this command.

boot host *remote-url*

no boot host *remote-url*

Syntax Description

remote-url	Location of the configuration file. Use the following syntax: • **ftp:**[[[//[*username*[**:***password*]**@**]*location*]/*directory*]/*filename*] • **rcp:**[[[//[*username***@**]*location*]/*directory*]/*filename*] • **tftp:**[[[//*location*]/*directory*]/*filename*]

Defaults

If you do not specify a *filename* using this command, the router uses its configured host name to request a configuration file from a remote server. To form the configuration filename, the router converts its name to all lowercase letters, removes all domain information, and appends *-confg* or *-config*.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command instructs the system to "Boot using host-specific configuration file *x*," where *x* is the filename specified in the *remote-url* argument. In other words, this command specifies the remote location and filename of the host-specific configuration file to be used at the next system startup, as well as the protocol to be used to obtain the file.

Before using the **boot host** command, use the **service config** global configuration command to enable the loading of the specified configuration file at reboot time. Without this command, the router ignores the **boot host** command and uses the configuration information in NVRAM. If the configuration information in NVRAM is invalid or missing, the **service config** command is enabled automatically.

The network server will attempt to load two configuration files from remote hosts. The first is the network configuration file containing commands that apply to all network servers on a network. Use the **boot network** command to identify the network configuration file. The second is the host configuration file containing commands that apply to one network server in particular. Use the **boot host** command to identify the host configuration file.

Note Usually, the **service config** command is used in conjunction with the **boot host** or **boot network** command. You must enter the **service config** command to enable the router to automatically configure the system from the file specified by the **boot host** or **boot network** command.

With IOS software versions 12.3(2)T , 12.3(1)B, and later, you no longer have to specify the **service config** command for the **boot host** or **boot network** command to be active.

If you specify both the **no service config** command and the **boot host** command, the router attempts to find the specified host configuration file. The **service config** command can also be used without the **boot host** or **boot network** command. If you do not specify host or network configuration filenames, the router uses the default configuration files. The default network configuration file is network-confg. The default host configuration file is host-confg, where host is the hostname of the router. If the Cisco IOS software cannot resolve its hostname, the default host configuration file is router-confg.

Loading a Configuration File Using rcp

The rcp software requires that a client send the remote username on each rcp request to the network server. If the server has a directory structure (such as UNIX systems), the rcp implementation searches for the configuration files starting in the directory associated with the remote username.

When you load a configuration file from a server using rcp, the Cisco IOS software sends the first valid username in the following list:

1. The username specified in the file-URL, if a username is specified.
2. The username set by the **ip rcmd remote-username** command, if the command is configured.
3. The router host name.

Note An account for the username must be defined on the destination server. If the network administrator of the destination server did not establish an account for the username, this command will not execute successfully.

Loading a Configuration File Using FTP

The FTP protocol requires a client to send a remote username and password on each FTP request to a server. The username and password must be associated with an account on the FTP server. If the server has a directory structure, the configuration file or image copied from the directory is associated with the username on the server. Refer to the documentation for your FTP server for more details.

When you load a configuration file from a server using FTP, the Cisco IOS software sends the first valid username in the following list:

1. The username specified in the **boot host** command, if a username is specified.
2. The username set by the **ip ftp username** command, if the command is configured.
3. Anonymous.

The router sends the first valid password in the following list:

1. The password specified in the **boot host** command, if a password is specified.
2. The password set by the **ip ftp password** command, if the command is configured.

3. The router forms a password *username@routername.domain*. The variable *username* is the username associated with the current session, *routername* is the configured host name, and *domain* is the domain of the router.

Examples

The following example sets the host filename to wilma-confg at address 192.168.7.19:

```
Router(config)# boot host tftp://192.168.7.19/usr/local/tftpdir/wilma-confg
Router(config)# service config
```

Related Commands

Command	Description
boot network	Specifies the remote location and filename of the network configuration file to be used at the next system boot (startup).
service config	Enables autoloading of configuration files from a network server.

boot network

To change the default name of the network configuration file from which to load configuration commands, use the **boot network** command in global configuration mode. To restore the network configuration filename to the default, use the **no** form of this command.

boot network *remote-url*

no boot network *remote-url*

Syntax Description

remote-url	Location of the configuration file. Use the following syntax: • **ftp:**[[[//[*username*[**:***password*]**@**]*location*]/*directory*]/*filename*] • **rcp:**[[[//[*username***@**]*location*]/*directory*]/*filename*] • **tftp:**[[[//*location*]/*directory*]/*filename*]

Defaults

The default *filename* is network-config.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command instructs the system to "Boot using network configuration file *x*," where *x* is the filename specified in the *remote-url* argument. This command specifies the remote location and filename of the network configuration file to be used at the next system startup, as well as the protocol to be used to obtain the file.

When booting from a network server, routers ignore routing information, static IP routes, and bridging information. As a result, intermediate routers are responsible for handling FTP, rcp, or TFTP requests. Before booting from a network server, verify that a server is available by using the **ping** command.

Use the **service config** command to enable the loading of the specified configuration file at reboot time. Without this command, the router ignores the **boot network** command and uses the configuration information in NVRAM. If the configuration information in NVRAM is invalid or missing, the **service config** command is enabled automatically.

The network server will attempt to load two configuration files from remote hosts. The first is the network configuration file containing commands that apply to all network servers on a network. Use the **boot network** command to identify the network configuration file. The second is the host configuration file containing commands that apply to one network server in particular. Use the **boot host** command to identify the host configuration file.

Note Usually, the **service config** command is used in conjunction with the **boot host** or **boot network** command. You must enter the **service config** command to enable the router to automatically configure the system from the file specified by the **boot host** or **boot network** command.

With IOS software versions 12.3(2)T , 12.3(1)B, and later, you no longer have to specify the **service config** command for the **boot host** or **boot network** command to be active.

If you specify both the **no service config** command and the **boot host** command, the router attempts to find the specified host configuration file. The **service config** command can also be used without the **boot host** or **boot network** command. If you do not specify host or network configuration filenames, the router uses the default configuration files. The default network configuration file is network-confg. The default host configuration file is host-confg, where host is the hostname of the router. If the Cisco IOS software cannot resolve its hostname, the default host configuration file is router-confg.

Loading a Configuration File Using rcp

The rcp software requires that a client send the remote username on each rcp request to the network server. If the server has a directory structure (such as UNIX systems), the rcp implementation searches for the configuration files starting in the directory associated with the remote username.

When you load a configuration file from a server using rcp, the Cisco IOS software sends the first valid username in the following list:

1. The username specified in the file-URL, if a username is specified.
2. The username set by the **ip rcmd remote-username** command, if the command is configured.
3. The router host name.

Note An account for the username must be defined on the destination server. If the network administrator of the destination server did not establish an account for the username, this command will not execute successfully.

Loading a Configuration File Using FTP

The FTP protocol requires a client to send a remote username and password on each FTP request to a server. The username and password must be associated with an account on the FTP server. If the server has a directory structure, the configuration file or image copied from the directory associated with the username on the server. Refer to the documentation for your FTP server for more details.

When you load a configuration file from a server using FTP, the Cisco IOS software sends the first valid username in the following list:

1. The username specified in the **boot network** command, if a username is specified.
2. The username set by the **ip ftp username** command, if the command is configured.
3. Anonymous.

The router sends the first valid password in the following list:

1. The password specified in the **boot network** command, if a password is specified.
2. The password set by the **ip ftp password** command, if the command is configured.

3. The router forms a password *username@routername.domain*. The variable *username* is the username associated with the current session, *routername* is the configured host name, and *domain* is the domain of the router.

Examples

The following example changes the network configuration filename to bridge_9.1 and uses the default broadcast address:

```
Router(config)# boot network tftp:bridge_9.1
Router(config)# service config
```

The following example changes the network configuration filename to bridge_9.1, specifies that rcp is to be used as the transport mechanism, and gives 172.16.1.111 as the IP address of the server on which the network configuration file resides:

```
Router(config)# service config
Router(config)# boot network rcp://172.16.1.111/bridge_9.1
```

Related Commands

Command	Description
boot host	Specifies the remote location and filename of the host-specific configuration file to be used at the next system boot (startup).
service config	Enables autoloading of configuration files from a remote host.

boot system

To specify the system image that the router loads at startup, use one of the following **boot system** command in global configuration mode. To remove the startup system image specification, use the **no** form of this command.

Loading System Image from a URL or a TFTP File

boot system {*file-url* | *filename*}

no boot system {*file-url* | *filename*}

Booting from a System Image in Internal Flash

boot system flash [*flash-fs***:**] [*partition-number***:**] [*filename*]

no boot system flash [*flash-fs***:**] [*partition-number***:**] [*filename*]

Booting from a MOP Server

boot system mop *filename* [*mac-address*] [*interface*]

no boot system mop *filename* [*mac-address*] [*interface*]

Booting from ROM

boot system rom

no boot system rom

Booting a System Image from a Network, TFTP, or FTP Server

boot system {**rcp** | **tftp** | **ftp**} *filename* [*ip-address*]

no boot system {**rcp** | **tftp** | **ftp**} *filename* [*ip-address*]

Syntax Description

file-url	The URL of the system image to load at system startup.
filename	The TFTP filename of the system image to load at system startup.
flash	On all platforms except the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family routers, this keyword boots the router from internal flash memory. If you omit all arguments that follow this keyword, the system searches internal Flash for the first bootable image. On the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family routers, this keyword boots the router from the flash system specified by the *flash-fs***:** argument. On the Cisco 1600 series and Cisco 3600 series routers, if you omit all optional arguments, the router searches internal flash memory for the first bootable image. On the Cisco 7000 family routers, when you omit all arguments that follow this keyword, the system searches the Personal Computer Memory Card Industry Association (PCMCIA) slot 0 for the first bootable image.

*flash-fs***:**	(Optional) Flash file system containing the system image to load at startup. The colon is required. Valid file systems are as follows: • **flash:**—Internal flash memory on the Cisco 1600 series and Cisco 3600 series routers. For the Cisco 1600 series and Cisco 3600 series routers, this file system is the default if you do not specify a file system. This is the only valid file system for the Cisco 1600 series. • **bootflash:**—Internal flash memory in the Cisco 7000 family. • **slot0:**—First PCMCIA slot on the Cisco 3600 series and Cisco 7000 family routers. For the Cisco 7000 family routers, this file system is the default if you do not specify a file system. • **slot1:**—Flash memory card in the second PCMCIA slot on the Cisco 3600 series and Cisco 7000 family routers. On the Cisco 2600 series routers, a file system should be specified. Otherwise, the router may attempt to load the Cisco IOS software twice with unexpected results.
*partition-number***:**	(Optional) Number of the flash memory partition that contains the system image to boot, specified by the optional *filename* argument. If you do not specify a filename, the router loads the first valid file in the specified partition of flash memory. This argument is valid only on routers that can be partitioned.
filename	(Optional when used with the **boot system flash** command) Name of the system image to load at startup. This argument is case sensitive. If you do not specify a value for the *filename* argument, the router loads the first valid file in the following: • The specified flash file system • The specified partition of flash memory • The default flash file system if you also omitted the *flash-fs***:** argument
mop	Boots the router from a system image stored on a DECNET Maintenance Operations Protocol (MOP) server. Do not use this keyword with the Cisco 3600 series or Cisco 7000 family routers.
mac-address	(Optional) MAC address of the MOP server containing the specified system image file. If you do not include the MAC address argument, the router sends a broadcast message to all MOP boot servers. The first MOP server to indicate that it has the specified file is the server from which the router gets the boot image.
interface	(Optional) Interface the router uses to send out MOP requests to the MOP server. The interface options are **async**, **dialer**, **ethernet**, **serial**, and **tunnel**. If you do not specify the *interface* argument, the router sends a request out on all interfaces that have MOP enabled. The interface that receives the first response is the interface the router uses to load the software.
rom	Boots the router from ROM. Do not use this keyword with the Cisco 3600 series or the Cisco 7000 family routers.
rcp	Boots the router from a system image stored on a network server using rcp.
tftp	Boots the router from a system image stored on a TFTP server.

ftp	Boots the router from a system image stored on an FTP server.
ip-address	(Optional) IP address of the server containing the system image file. If omitted, this value defaults to the IP broadcast address of 255.255.255.255.

Command Default

If you configure the router to boot from a network server but do not specify a system image file with the **boot system** command, the router uses the configuration register settings to determine the default system image filename. The router forms the default boot filename by starting with the word *cisco* and then appending the octal equivalent of the boot field number in the configuration register, followed by a hyphen (-) and the processor type name (cisco*nn-cpu*). Refer to the appropriate hardware installation guide for details on the configuration register and default filename. See also the **config-register** or **confreg** command.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(14)SX	Support for this command was added for the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

For this command to work, the **config-register** command must be set properly.

Enter several **boot system** commands to provide a fail-safe method for booting your router. The router stores and executes the **boot system** commands in the order in which you enter them in the configuration file. If you enter multiple boot commands of the same type—for example, if you enter two commands that instruct the router to boot from different network servers—then the router tries them in the order in which they appear in the configuration file. If a **boot system** command entry in the list specifies an invalid device, the router omits that entry. Use the **boot system rom** command to specify use of the ROM system image as a backup to other **boot** system commands in the configuration.

For some platforms, the boot image must be loaded before the system image is loaded. However, on many platforms, the boot image is loaded only if the router is booting from a network server or if the flash file system is not specified. If the file system is specified, the router will boot faster because it need not load the boot image first.

This section contains the following topics:

- Changing the List of Boot System Commands
- Booting Compressed Images
- Understanding rcp
- Understanding TFTP
- Understanding FTP

- Stopping Booting and Entering ROM Monitor Mode
- Cisco 1600 Series, Cisco 3600 Series, Cisco 7000 Family, and Cisco 7600 Series Router Notes

Changing the List of Boot System Commands

To remove a single entry from the bootable image list, use the **no** form of the command with an argument. For example, to remove the entry that specifies a bootable image on a flash memory card inserted in the second slot, use the **no boot system flash slot1:**[*filename*] command. All other entries in the list remain.

To eliminate all entries in the bootable image list, use the **no boot system** command. At this point, you can redefine the list of bootable images using the previous **boot system** commands. Remember to save your changes to your startup configuration by issuing the **copy system:running-config nvram:startup-config** command.

Each time you write a new software image to flash memory, you must delete the existing filename in the configuration file with the **no boot system flash** *filename* command. Then add a new line in the configuration file with the **boot system flash** *filename* command.

Note If you want to rearrange the order of the entries in the configuration file, you must first issue the **no boot system** command and then redefine the list.

Booting Compressed Images

You can boot the router from a compressed image on a network server. When a network server boots software, both the image being booted and the running image must be able to fit into memory. Use compressed images to ensure that enough memory is available to boot the router. You can compress a software image on any UNIX platform using the **compress** command. Refer to your UNIX platform's documentation for the exact usage of the **compress** command. (You can also uncompress data with the UNIX **uncompress** command.)

Understanding rcp

The rcp requires that a client send the remote username in an rcp request to a server. When the router executes the **boot system rcp** command, the Cisco IOS software sends the hostname as both the remote and local usernames by default. Before the rcp can execute properly, an account must be defined on the network server for the remote username configured on the router.

If the server has a directory structure, the rcp software searches for the system image to boot from the remote server relative to the directory of the remote username.

By default, the router software sends the hostname as the remote username. You can override the default remote username by using the **ip rcmd remote-username** command. For example, if the system image resides in the home directory of a user on the server, you can specify that user's name as the remote username.

Understanding TFTP

You need a TFTP server running to retrieve the router image from the host.

Understanding FTP

You need an FTP server running to retrieve the router image from the host. You also need an account on the server or anonymous file access to the server.

Stopping Booting and Entering ROM Monitor Mode

During the first 60 seconds of startup, you can force the router to stop booting by pressing the Break key. The router will enter ROM monitor mode, where you can change the configuration register value or boot the router manually.

Cisco 1600 Series, Cisco 3600 Series, Cisco 7000 Family, and Cisco 7600 Series Router Notes

For the Cisco 3600 series and Cisco 7000 family, the **boot system** command modifies the BOOT variable in the running configuration. The BOOT variable specifies a list of bootable images on various devices.

Note When you use the **boot system** command on the Cisco 1600 series, Cisco 3600 series, Cisco 7000 family, and Cisco 7600 series, you affect only the running configuration. You must save the BOOT variable settings to your startup configuration to place the information under ROM monitor control and to have the variable function as expected. Use the **copy system:running-config nvram:startup-config** privileged EXEC command to save the variable from your running configuration to your startup configuration.

To display the contents of the BOOT variable, use the **show bootvar** EXEC command.

Examples

The following example illustrates a configuration that specifies two possible internetwork locations for a system image, with the ROM software being used as a backup:

```
Router(config)# boot system tftp://192.168.7.24/cs3-rx.90-1
Router(config)# boot system tftp://192.168.7.19/cs3-rx.83-2
Router(config)# boot system rom
```

The following example boots the system boot relocatable image file named igs-bpx-l from partition 2 of the flash device:

```
Router(config)# boot system flash:2:igs-bpx-l
```

The following example instructs the router to boot from an image located on the flash memory card inserted in slot 0:

```
Router(config)# boot system slot0:new-config
```

The following example specifies the file named new-ios-image as the system image for a Cisco 3600 series router to load at startup. This file is located in the fourth partition of the flash memory card in slot 0.

```
Router(config)# boot system slot0:4:dirt/images/new-ios-image
```

This example boots from the image file named c1600-y-l in partition 2 of flash memory of a Cisco 1600 series router:

```
Router(config)# boot system flash:2:c1600-y-l
```

Related Commands

Command	Description
boot	Boots the router manually.
config-register	Changes the configuration register settings.

Command	Description
confreg	Changes the configuration register settings while in ROM monitor mode.
copy	Copies any file from a source to a destination.
copy system:running-config nvram:startup-config	Copies the running configuration to the startup configuration.
ip rcmd remote username	Configures the remote username to be used when requesting a remote copy using rcp.
show bootvar	Displays the contents of the BOOT variable, the name of the configuration file pointed to by the CONFIG_FILE variable, the contents of the BOOTLDR variable, and the configuration register setting.

boot-end-marker

The **boot-start-marker** and **boot-end-marker** flags, which can be seen in Cisco IOS software configuration files, are not CLI commands. These markers are written to configuration files automatically to flag the beginning and end of the boot commands (boot statements). By flagging boot statements, these markers allow the router to more reliably load Cisco IOS images during bootup.

A boot statement is one or more lines in a configuration file that tells the router which software image to load after a powercycling (reboot). The boot-start-marker and boot-end-marker flags will appear around any boot commands, including:

- **boot bootstrap**
- **boot config**
- **boot host**
- **boot network**
- **boot system**

Note, however, that these markers will always appear in the output of the **show running-config** or **more system:running-config** commands, regardless of whether any actual boot commands have been entered. This means that no boot commands will appear between the markers if no boot commands have been entered, or if all boot commands have been removed from the configuration, as shown in the "Examples" section.

The **boot-start-marker** and **boot-end-marker** flags cannot be removed or modified using the CLI. These markers are written to the startup configuration file whenever a **copy running-config startup-config** command is issued.

These flags were also introduced to circumvent errors in the configuration file, such as a leading space before a boot command (such as those sometimes introduced by manually edited configuration files), or the use of text strings that include the word "boot" in banners or other user-specified text.

If the "boot start-marker" flag is not found in the configuration file, the system will use the traditional method to identify the boot commands. However, if you are manually creating configuration files, or copying from older Cisco IOS software releases, the addition of these markers is recommended.

Command History

Release	Modification
12.3(3), 12.3(4)T, 12.0(26)S, 12.0(27)SV, 12.3(3)B,	The **boot-start-marker** and **boot-end-marker** flags were introduced.

Examples

In the following example, a **boot** command is entered, and the boot-start-marker and boot-end-marker flags are shown in the context of the startup configuration file:

```
Router# configure terminal
Enter configuration commands, one per line.  End with the end command.

Router(config)# boot system slot0:
Router(config)# end
Router# copy running-config startup-config
Router# show startup-config

Using 1398 out of 129016 bytes
!
```

```
version 12.3
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname C3660-2
!
boot-start-marker
boot system slot0:
boot-end-marker
!
logging count
 .
 .
 .
```

In the following example, the boot-start-marker and boot-end-marker flags appear in the configuration file even though no **boot** commands have been entered:

```
Router# show running-configuration

Current configuration :3055 bytes
!
! No configuration change since last restart
!
version 12.3
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
boot-start-marker
boot-end-marker
!
 .
 .
 .
```

Related Commands

Command	Description
boot bootstrap	Specifies the filename and location of a secondary bootstrap image (to be used if a valid software image cannot be loaded).
boot config	Specifies the device and filename of the configuration file from which the router boots during startup (for Class A filesytems).
boot host	Specifies a remote host location for the host-specific (router-specific) configuration file to be used at the next system startup.
boot network	Specifies a remote location for the network (network-wide) configuration file to be used at the next system startup.
boot system	Specifies the system software image that the router loads at startup.

boot-start-marker

The **boot-start-marker** and **boot-end-marker** flags, which can be seen in Cisco IOS software configuration files, are not CLI commands. These markers are written to configuration files automatically to flag the beginning and end of the boot commands (boot statements). By flagging boot statements, these markers allow the router to more reliably load Cisco IOS images during bootup.

A boot statement is one or more lines in a configuration file that tells the router which software image to load after a powercycling (reboot). The boot-start-marker and boot-end-marker flags will appear around any boot commands, including:

- **boot bootstrap**
- **boot config**
- **boot host**
- **boot network**
- **boot system**

Note, however, that these markers will always appear in the output of the **show running-config** or **more system:running-config** commands, regardless of whether any actual boot commands have been entered. This means that no boot commands will appear between the markers if no boot commands have been entered, or if all boot commands have been removed from the configuration, as shown in the "Examples" section.

The **boot-start-marker** and **boot-end-marker** flags cannot be removed or modified using the CLI. These markers are written to the startup configuration file whenever a **copy running-config startup-config** command is issued.

These flags were also introduced to circumvent errors in the configuration file, such as a leading space before a boot command (such as those sometimes introduced by manually edited configuration files), or the use of text strings that include the word "boot" in banners or other user-specified text.

If the "boot start-marker" flag is not found in the configuration file, the system will use the traditional method to identify the boot commands. However, if you are manually creating configuration files, or copying from older Cisco IOS software releases, the addition of these markers is recommended.

Command History

Release	Modification
12.3(3), 12.3(4)T, 12.0(26)S, 12.0(27)SV, 12.3(3)B	The **boot-start-marker** and **boot-end-marker** flags were introduced.

Examples

In the following example, a **boot** command is entered, and the boot-start-marker and boot-end-marker flags are shown in the context of the startup configuration file:

```
Router# configure terminal
Enter configuration commands, one per line.  End with the end command.

Router(config)# boot system slot0:
Router(config)# end
Router# copy running-config startup-config
Router# show startup-config

Using 1398 out of 129016 bytes
!
```

```
version 12.3
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname C3660-2
!
boot-start-marker
boot system slot0:
boot-end-marker
!
logging count
 .
 .
 .
```

In the following example, the boot-start-marker and boot-end-marker flags appear in the configuration file even though no **boot** commands have been entered:

```
Router# show running-configuration

Current configuration :3055 bytes
!
! No configuration change since last restart
!
version 12.3
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
boot-start-marker
boot-end-marker
!
 .
 .
 .
```

Related Commands

Command	Description
boot bootstrap	Specifies the filename and location of a secondary bootstrap image (to be used if a valid software image cannot be loaded).
boot config	Specifies the device and filename of the configuration file from which the router boots during startup (for Class A filesytems).
boot host	Specifies a remote host location for the host-specific (router-specific) configuration file to be used at the next system startup.
boot network	Specifies a remote location for the network (network-wide) configuration file to be used at the next system startup.
boot system	Specifies the system software image that the router loads at startup.

cd

To change the default directory or file system, use the **cd** command in user EXEC or privileged EXEC mode.

cd [*filesystem***:**][*directory*]

Syntax Description

*filesystem***:**	(Optional) The URL or alias of the directory or file systems followed by a colon.
directory	(Optional) Name of the directory.

Defaults

The initial default file system is **flash:**. For platforms that do not have a physical device named **flash:**, the keyword **flash:** is aliased to the default Flash device.

For the Supervisor Engine, the initial default file system is **disk0:**.

If you do not specify a directory on a file system, the default is the root directory on that file system.

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
11.0	This command was introduced.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX, and support was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support was added for the Supervisor Engine 2.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The valid values for *filesystem***:** are as follows:

- For systems that are configured with a Supervisor Engine 2, valid values are **bootflash:**, **const_nvram:**, **disk0:**, **flash:**, **nvram:**, **slot0:**, **sup-slot0:**, and **sup-bootflash:**.
- For systems that are configured with a Supervisor Engine 720, valid values are **disk0:** and **disk1:**.

For all EXEC commands that have an optional *filesystem* argument, the system uses the file system specified by the **cd** command when you omit the optional *filesystem* argument. For example, the **dir** command, which displays a list of files on a file system, contains an optional *filesystem* argument. When you omit this argument, the system lists the files on the file system specified by the **cd** command.

If you do not specify a directory on a file system, the default is the root directory on that file system.

Examples

In the following example, the **cd** command is used to set the default file system to the Flash memory card inserted in slot 0:

```
Router# pwd
```

```
bootflash:/
Router# cd slot0:
Router# pwd
slot0:/
```

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This example sets the default file system to the Flash PC card that is inserted in disk 0:

```
Router# cd disk0:
Router# pwd
disk0:/
```

Related Commands

Command	Description
copy	Copies any file from a source to a destination.
delete	Deletes a file on a Flash memory device.
dir	Displays a list of files on a file system.
mkdir disk0:	Creates a new directory in a Flash file system.
pwd	Displays the current setting of the **cd** command.
show file systems	Lists available file systems and their alias prefix names.
undelete	Recovers a file marked “deleted” on a Class A or Class B Flash file system.

clear archive log config

To purge the configuration logging database entries, use the **clear archive log config** command in privileged EXEC mode.

clear archive log config [**force** | **persistent**]

Syntax Description

force	(Optional) Eliminates the confirm step before the contents of the archive log are cleared.
persistent	(Optional) Purges the configuration logging persistent-command database entries.

Command Default

If this command is not used, the database entries accumulate in the archive log.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRA	This command was introduced.
12.4(11)T	This command was integrated into Cisco IOS Release 12.4(11)T.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.

Usage Guidelines

When the **clear archive log config** command is entered, only the entries in the configuration logging database file are deleted. The file itself is not deleted; it will be used in the future to log new entries as they occur.

Examples

The following example clears the database entries that have been saved to the config log without asking you to confirm the action before the entries are cleared:

```
Router# clear archive log config force
```

Related Commands

Command	Description
show archive log config all persistent	Displays the persisted commands in configlet format.

clear catalyst6000 traffic-meter

To clear the traffic meter counters, use the **clear catalyst6000 traffic-meter** command in privileged EXEC mode.

clear catalyst6000 traffic-meter

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(17a)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to clear the traffic meter counters:

```
Router# clear catalyst6000 traffic-meter
Router#
```

clear configuration lock

To clear the lock on the running configuration file, use the **clear configuration lock** command in privileged EXEC mode.

clear configuration lock

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(25)S	This command was introduced.
12.3(14)T	This command was enhanced to allow the exclusive configuration lock to be cleared during erratic or abnormal behavior.
12.0(31)S	This command was integrated into Cisco IOS Release 12.0(31)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(31)SXH.

Examples

The following is sample output from the **clear configuration lock** command when the running configuration file is not locked by the **configure replace** command:

```
Router# clear configuration lock

Parser Config not locked.
```

The following is sample output from the **clear configuration lock** command when the running configuration file is locked by the **configure replace** command:

```
Router# clear configuration lock

Process <3> is holding the EXCLUSIVE lock !
Do you want to clear the lock?[confirm] y
```

The following example shows how to use the **clear configuration lock** command to display the owner or process ID of the lock and prompt the user for confirmation:

```
Router# clear configuration lock
Process <46> is holding the EXCLUSIVE lock.
Do you want to clear the lock?[confirm] y
```

After the lock is cleared, a message will be sent to the terminal if the owner of the lock is a TTY user:

```
Router(config)# The configuration lock was cleared by user <steve> from terminal <5>
```

Related Commands

Command	Description
configuration mode exclusive	Enables single-user (exclusive) access functionality for the Cisco IOS CLI.
debug configuration lock	Enables debugging of the Cisco IOS configuration lock.
show configuration lock	Displays information about the lock status of the running configuration file during a configuration replace operation.

clear ip http client cache

To remove information from the HTTP client cache, use the **clear ip http client cache** command in privileged EXEC mode.

clear ip http client cache {**all** | **session** *session-name* | **url** *complete-url*}

Syntax Description

cache all	Removes all HTTP client cache entries.
cache session *session-name*	Removes HTTP client cache entries of the HTTP client application session specified by the *session-name* argument.
cache url *complete-url*	Removes the HTTP client cache entry whose location is specified by the *complete-url* argument, a Cisco IOS File System (IFS) Uniform Resource Locator (URL), and that consists of HTML files used by an HTTP server.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(31)SB2	This command was introduced.

Usage Guidelines

Use this command to clear entries from the HTTP client cache pool: all the entries, all the entries owned by a specific session, or only the entry associated with a specific request from an HTTP server.

Examples

The following example clears all entries in the HTTP client cache:

```
Router# clear ip http client cache all
```

The following example removes HTTP client cache entries that belong to the HTTP Client File System (CFS) application:

```
Router# clear ip http client cache session HTTP CFS
```

The following example removes HTTP client cache entries at the location http://myrouter.cisco.com/flash:/:

```
Router# clear ip http client cache url http://myrouter.cisco.com/flash:/
```

Related Commands

Command	Description
ip http path	Specifies the base path used to locate files for use by the HTTP server.
show ip http client	Displays a report about the HTTP client.

clear logging

To clear messages from the logging buffer, use the **clear logging** command in privileged EXEC mode.

clear logging

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

In the following example, the logging buffer is cleared:

```
Router# clear logging

Clear logging buffer [confirm]
Router#
```

Related Commands

Command	Description
logging buffered	Logs messages to an internal buffer.
show logging	Displays the state of logging (syslog).

clear logging system

To clear event records stored in the System Event Archive (SEA) log file sea_log.dat, use the **clear logging system** command in user EXEC mode.

clear logging system [**disk** *name*]

Syntax Description

disk *name*	(Optional) Stores the system event log in the specified disk.

Command Default

This command has no default settings.

Command Modes

User EXEC (>)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.
12.2(33)SCC	This command was introduced for the Cisco uBR10012 router in the Cisco IOS Software Release 12.2(33)SCC.

Usage Guidelines

SEA is supported on switches that have a Supervisor Engine 32 or Supervisor Engine 720 with a compact flash adapter and a Compact Flash card (WS-CF-UPG= for Supervisor Engine 720).

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The SEA feature is used to address debug trace and system console constraints. SEA is a logging feature that allows the modules in the system to report major and critical events to the route processor (RP). The events occurring on the line card or jacket card are also sent to the RP using Inter-Process Communication (IPC) capability. Use the **clear logging system** command to clear the event records stored in the SEA log file.

Note To store the system event logs, the SEA requires either the PCMCIA ATA disk or Compact Flash Disk in compact flash adapter for PRE2.

Examples

This example shows how to clear the SEA:

```
Router# clear logging system

Clear logging system operation will take a while.
Do you want to continue? [no]: yes
Router#
```

Related Commands

copy logging system	Copies the archived system events to another location.

logging system	Enables or disables the SEA logging system.
show logging system	Displays the SEA logging system disk.

clear logging xml

To clear the contents of the XML system message logging (syslog) buffer, use the **clear logging xml** command in User EXEC or Priviledged EXEC mode..

clear logging xml

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRE	This command was integrated into Cisco IOS Release 12.2(33)SRE .

Usage Guidelines

This command clears the contents of the XML-formatted logging buffer, but does not clear the contents of the standard logging buffer. The system will prompt you to confirm the action before clearing the buffer.

Examples

In the following example, the XML-specific buffer is cleared:

```
Router# clear logging xml
Clear XML logging buffer [confirm]?y
```

Related Commands

Command	Description
logging buffered xml	Enables system message logging (syslog) to the XML-specific buffer in XML format.
show logging xml	Displays the state of XML-formatted system message logging, followed by the contents of the XML-specific buffer.

clear mls statistics

To reset the Multilayer Switching (MLS) statistics counters, use the **clear mls statistics** command in privileged EXEC mode.

clear mls statistics [**module** *num*]

Syntax Description

module *num*	(Optional) Specifies the module number.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(17d)SXB1	This command was introduced on the Supervisor Engine 720 and the Supervisor Engine 2.
12.2(17d)SXB5	The **module** *num* keyword and argument pair were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command replaces the **clear mls stats** command, which was introduced on the Supervisor Engine 720 in Cisco IOS Release 12.2(17a)SX, and on the Supervisor Engine 2 in Cisco IOS Release 12.2(17d)SXB.

Examples

This example shows how to reset the MLS statistics counters for all modules:

```
Router# clear mls statistics
Router#
```

This example shows how to reset the MLS statistics counters for a specific module:

```
Router# clear mls statistics module 5
Router#
```

Related Commands

Command	Description
show mls statistics	Displays the MLS statistics for the IP, IPX, multicast, Layer 2 protocol, and QoS.

clear parser cache

To clear the parse cache entries and hit/miss statistics stored for the Parser Cache feature, use the **clear parser cache** command in privileged EXEC mode.

clear parser cache

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The Parser Cache feature optimizes the parsing (translation and execution) of Cisco IOS software configuration command lines by remembering how to parse recently encountered command lines, decreasing the time required to process large configuration files.

The **clear parser cache** command will free the system memory used by the Parser Cache feature and will erase the hit/miss statistics stored for the output of the **show parser statistics** EXEC command. This command is only effective when the Parser Cache feature is enabled.

Examples

The following example shows the clearing of the parser cache:

```
Router# show parser statistics

Last configuration file parsed:Number of Commands:1484, Time:820 ms

Parser cache:enabled, 1460 hits, 26 misses
Router# clear parser cache
Router# show parser statistics
Last configuration file parsed:Number of Commands:1484, Time:820 ms

Parser cache:enabled, 0 hits, 1 misses
```

Related Commands

Command	Description
parser cache	Enables or disables the Parser Cache feature.
show parser statistics	Displays statistics about the last configuration file parsed and the status of the Parser Cache feature.

clear platform netint

To clear the interrupt-throttling counters for the platform, use the **clear platform netint** command in privileged EXEC mode.

clear platform netint

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(17b)SXA	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to clear the interrupt-throttling counters for the platform:

```
Router# clear platform netint
Router#
```

Related Commands

Command	Description
show platform netint	Displays the platform network-interrupt information.

clear processes interrupt mask

To clear interrupt mask details for all processes in the interrupt mask buffer, use the **clear processes interrupt mask detail** command in privileged EXEC mode.

clear processes interrupt mask detail

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(2)T	This command was introduced as part of the *Process Interrupt Mask Profiler Enhancement* feature.

Usage Guidelines

See the documentation of the **scheduler interrupt mask** commands (listed in the Related Commands table) for further details on process interrupt mask profiling.

Examples

The following example demonstrates how to the clear interrupt mask statistics from system memory for all processes:

```
Router# clear processes interrupt mask detail
```

Related Commands

Command	Description
scheduler interrupt mask profile	Starts interrupt mask profiling for all processes running on the system
scheduler interrupt mask size	Configures the maximum number of entries that can exist in the interrupt mask buffer.
scheduler interrupt mask time	Configures the maximum time that a process can run with interrupts masked.
show process interrupt mask buffer	Displays the information stored in the interrupt mask buffer.
show processes interrupt mask detail	Displays interrupt masked details for the specified processes or all processes in the system.

clear tcp

To clear a TCP connection, use the **clear tcp** command in privileged EXEC mode.

clear tcp {**line** *line-number* | **local** *hostname port* **remote** *hostname port* | **tcb** *address*}

Syntax Description

line *line-number*	Line number of the TCP connection to clear.
local *hostname port* **remote** *hostname port*	Host name of the local router and port and host name of the remote router and port of the TCP connection to clear.
tcb *address*	Transmission Control Block (TCB) address of the TCP connection to clear. The TCB address is an internal identifier for the endpoint.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **clear tcp** command is particularly useful for clearing hung TCP connections.

The **clear tcp line** *line-number* command terminates the TCP connection on the specified tty line. Additionally, all TCP sessions initiated from that tty line are terminated.

The **clear tcp local** *hostname port* **remote** *hostname port* command terminates the specific TCP connection identified by the host name and port pair of the local and remote router.

The **clear tcp tcb** *address* command terminates the specific TCP connection identified by the TCB address.

Examples

The following example clears a TCP connection using its tty line number. The **show tcp** command displays the line number (tty2) that is used in the **clear tcp** command.

```
Router# show tcp

    tty2, virtual tty from host router20.cisco.com
    Connection state is ESTAB, I/O status: 1, unread input bytes: 0
    Local host: 171.69.233.7, Local port: 23
    Foreign host: 171.69.61.75, Foreign port: 1058

    Enqueued packets for retransmit: 0, input: 0, saved: 0

    Event Timers (current time is 0x36144):
    Timer          Starts    Wakeups            Next
    Retrans             4          0             0x0
    TimeWait            0          0             0x0
    AckHold             7          4             0x0
    SendWnd             0          0             0x0
    KeepAlive           0          0             0x0
    GiveUp              0          0             0x0
```

```
    PmtuAger            0          0             0x0

    iss: 4151109680  snduna: 4151109752  sndnxt: 4151109752     sndwnd:  24576
    irs: 1249472001  rcvnxt: 1249472032  rcvwnd:       4258  delrcvwnd:     30

    SRTT: 710 ms, RTTO: 4442 ms, RTV: 1511 ms, KRTT: 0 ms
    minRTT: 0 ms, maxRTT: 300 ms, ACK hold: 300 ms

Router# clear tcp line 2
    [confirm]
     [OK]
```

The following example clears a TCP connection by specifying its local router host name and port and its remote router host name and port. The **show tcp brief** command displays the local (Local Address) and remote (Foreign Address) host names and ports to use in the **clear tcp** command.

```
Router# show tcp brief

TCB       Local Address           Foreign Address        (state)
    60A34E9C  router1.cisco.com.23      router20.cisco.1055  ESTAB

Router# clear tcp local router1 23 remote router20 1055
    [confirm]
     [OK]
```

The following example clears a TCP connection using its TCB address. The **show tcp brief** command displays the TCB address to use in the **clear tcp** command.

```
Router# show tcp brief

    TCB       Local Address           Foreign Address        (state)
    60B75E48  router1.cisco.com.23      router20.cisco.1054  ESTAB

Router# clear tcp tcb 60B75E48
    [confirm]
     [OK]
```

Related Commands

Command	Description
show tcp	Displays the status of TCP connections.
show tcp brief	Displays a concise description of TCP connection endpoints.

clear vlan counters

To clear the software-cached counter values to start from zero again for a specified VLAN or all existing VLANs, use the **clear vlan counters** command in privileged EXEC mode.

clear vlan [*vlan-id*] **counters**

Syntax Description

vlan-id	(Optional) The ID of a specific VLAN. Range: 1 to 4094.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If you do not specify a *vlan-id*; the software-cached counter values for all existing VLANs are cleared.

Examples

This example shows how to clear the software-cached counter values for a specific VLAN:

```
Router# clear vlan 10 counters
Clear "show vlan" counters on this vlan [confirm]y
Router#
```

Related Commands

Command	Description
show vlan counters	Displays the software-cached counter values.

clock

To configure the port clocking mode for the 1000BASE-T transceivers, use the **clock** command in interface configuration mode. To return to the default settings,use the **no** form of this command.

clock {**auto** | **active** [**prefer**] | **passive** [**prefer**]}

no clock

Syntax Description

auto	Enables the automatic-clock configuration.
active	Enables the active operation.
prefer	(Optional) Negotiates the specified mode with the far end of the link.
passive	Enables the passive operation.

Defaults

auto

Command Modes

Interface configuration

Command History

Release	Modification
12.2(17a)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is supported on the 1000BASE-T transceivers only.

If the clock mode of the near end of a link does not match the clock mode of the far end, the line protocol does not come up.

The active and passive clock status is determined during the auto negotiation process before the transmission link is established.

The **clock** command supports the following configurations:

- **auto**—Auto negotiates with the far end of the link but preference is given to the active-clock switch.
- **active**—Uses a local clock to determine transmitter-operation timing.
- **passive**—Recovers the clock from the received signal and uses the recovered clock to determine transmitter-operation timing.
- **active prefer**—Auto negotiates with the far end of the link but preference is given to the active-clock switch.
- **passive prefer**—Auto negotiates with the far end of the link but preference is given to the passive-clock switch.

Enter the **show running-config interface** command to display the current clock mode.

Enter the **show interfaces** command to display the clock mode that is negotiated by the firmware.

Examples

This example shows how to enable the active-clock operation:

```
Router(config-if)# clock active
Router(config-if)#
```

Related Commands

Command	Description
show interfaces	Displays traffic that is seen by a specific interface.
show running-config interface	Displays the status and configuration of the module or Layer 2 VLAN.

clock initialize nvram

To restart the system clock from the last known system clock value, use the **clock initialize nvram** command in global configuration mode. To disable the restart of the system clock from the last known system clock value, use the **no** form of this command.

clock initialize nvram

no clock initialize nvram

Syntax Description

This command has no arguments or keywords.

Command Default

By default, the system clock is set to restart from the last known system clock value for platforms that have no hardware calendar.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.3(4)T	This command was introduced.

Usage Guidelines

For platforms that have hardware calendars, the **clock initialize nvram** command is not available. When the **no** form of the command is configured, the system clock gets initialized to default standard values. The default values can be either 1MAR1993 or 1MAR2002.

Examples

The following example shows how to set the system clock to restart from the last known system clock value:

```
Router(config)# clock initialize nvram
```

config-register

To change the configuration register settings, use the **config-register** command in global configuration mode.

config-register *value*

Syntax Description

value	Hexadecimal or decimal value that represents the 16-bit configuration register value that you want to use the next time the router is restarted. The value range is from 0x0 to 0xFFFF (0 to 65535 in decimal).

Command Default

Refer to the documentation for your platform for the default configuration register value. For many newer platforms, the default is 0x2102, which causes the router to boot from Flash memory and the Break key to be ignored.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(31)SXH.

Usage Guidelines

This command applies only to platforms that use a software configuration register.

The lowest four bits of the configuration register (bits 3, 2, 1, and 0) form the boot field. The boot field determines if the router boots manually, from ROM, or from Flash or the network.

To change the boot field value and leave all other bits set to their default values, follow these guidelines:

- If you set the configuration register boot field value to 0x0, you must boot the operating system manually with the **boot** command.
- If you set the configuration register boot field value to 0x1, the router boots using the default ROM software.
- If you set the configuration register boot field to any value from 0x2 to 0xF, the router uses the boot field value to form a default boot filename for booting from a network server.

For more information about the configuration register bit settings and default filenames, refer to the appropriate router hardware installation guide.

Note In a virtual switch application, If you have configured your config-register with a value that would skip file parsing during the bootup process, your change to either a standalone or virtual switch will not take place until you reconfigure your config-register. The config-register must be allowed to parse files in order to ensure the conversion from either a standalone or virtual switch.

Examples

In the following example, the configuration register is set to boot the system image from Flash memory:

```
config-register 0x2102
```

Related Commands

Command	Description
boot system	Specifies the system image that the router loads at startup.
confreg	Changes the configuration register settings while in ROM monitor mode.
o	Lists the value of the boot field (bits 0 to 3) in the configuration register.
show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

configuration mode exclusive

To enable single-user (exclusive) access functionality for the Cisco IOS command-line interface (CLI), use the **configuration mode exclusive** command in global configuration mode. To disable the single-user access (configuration locking) feature, use the **no** form of this command.

Syntax for Releases 12.3T/12.2S:

configuration mode exclusive {**auto** | **manual**}

no configuration mode exclusive {**auto** | **manual**}

Syntax for Release 12.0(31)S, 12.2(33)SRA, and Later Releases:

configuration mode exclusive {**auto** | **manual**} [**expire** *seconds*] [**lock-show**] [**interleave**] [**terminate**] [**config_wait** *seconds*] [**retry_wait** *seconds*]

Syntax Description

auto	Automatically limits configuration to single-user mode.
manual	Allows you to manually limit the configuration file to single-user mode.
expire *seconds*	(Optional) Specifies the number of seconds in which the configuration lock is released after the user stops making configuration changes.
lock-show	(Optional) Gives priority to configuration commands being executed from the exclusive configuration session, and prevents the execution of **show** commands.
interleave	(Optional) Allows **show** commands from sessions that are not holding the configuration lock to be executed when the user in the session holding the configuration lock is not making configuration changes. **Note** If you entered **lock-show**, you should enter this keyword.
terminate	(Optional) Causes the configuration command executed from the exclusive configuration session to terminate **show** and **clear** commands being executed in other sessions.
config_wait *seconds*	(Optional) Amount of time, in seconds, that a configuration command entered by a user in single user mode waits for **show** commands entered by other users to finish being executed. If the **show** command is still being executed when the timer expires and if the **terminate** option is set, the configuration command terminates the **show** command. If the configuration command completes execution before the specified number of seconds, the **show** command begins execution.
retry_wait *seconds*	(Optional) Specifies the amount of time, in seconds, that **show** and **clear** EXEC commands will wait for a configuration command entered by a user in exclusive configuration mode to complete execution. If the configuration command is still being executed when the specified amount of time has passed, the EXEC commands generate an error message and are terminated. If execution of the configuration command is completed before the specified number of seconds, the EXEC commands are executed.

Defaults Single-user mode is disabled.

Command Modes Global configuration

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.0(31)S	This command was integrated into Cisco IOS Release 12.0(31)S. The following keywords were added: **expire**, **lock-show**, **interleave**, **terminate**, **config_wait**, and **retry_wait**. New functionality was added, including Access Session Locking.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.

Usage Guidelines The **configuration mode exclusive** command enables the exclusive configuration lock feature. The exclusive configuration lock allows single-user access to configuration modes using single-user configuration mode. While the device configuration is locked, no other users can enter configuration commands.

Users accessing the device using the state-full, session-based transports (telnet, SSH) are able to enter single-user configuration mode. The user enters single-user configuration mode by acquiring the exclusive configuration lock using the **configure terminal lock** privileged EXEC mode command. The configuration lock is released when the user exits configuration mode by using the **end** or **exit** command, or by pressing Ctrl-Z. While a user is in single-user configuration mode, no other users can configure the device. Users accessing CLI options through stateless protocols (that is, the HTTP web-based user interface) cannot access single-user configuration mode. (However, an API allows the stateless transports to lock the configuration mode, complete its operations, and release the lock.)

Examples The following example shows how to configure the configuration file for single-user autoconfiguration mode by using the **configuration mode exclusive auto** command. Use the **configuration terminal** command to enter global configuration mode and lock the configuration mode exclusively. After the Cisco IOS configuration mode is locked exclusively, you can verify this configuration by entering the **show configuration lock** command.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# configuration mode exclusive auto
Router(config)# end

Router# show running-configuration | include config
Building configuration...
Current configuration : 2296 bytes
configuration mode exclusive auto <========== auto policy
Router#

Router# configure terminal ? <======== lock option not displayed when in auto policy

Router# configure terminal <======= acquires the lock
```

The configuration mode is locked exclusively. The lock is cleared after you exit from configuration mode by entering **end** or **exit**.

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#

Router(config)# show configuration lock
Parser Configure Lock
---------------------
Owner PID : 3
User : unknown
TTY : 0
Type : EXCLUSIVE
State : LOCKED
Class : EXPOSED
Count : 1
Pending Requests : 0
User debug info : configure terminal
Session idle state : TRUE
No of exec cmds getting executed : 0
No of exec cmds blocked : 0
Config wait for show completion : FALSE
Remote ip address : Unknown
Lock active time (in Sec) : 6
Lock Expiration timer (in Sec) : 593
Router(config)#

Router(config)# end <========= releases the lock
Router#

Router# show configuration lock
Parser Configure Lock
---------------------
Owner PID : -1
User : unknown
TTY : -1
Type : NO LOCK
State : FREE
Class : unknown
Count : 0
Pending Requests : 0
User debug info :
Session idle state : TRUE
No of exec cmds getting executed : 0
No of exec cmds blocked : 0
Config wait for show completion : FALSE
Remote ip address : Unknown
Lock active time (in Sec) : 0
Lock Expiration timer (in Sec) : 0
Router#
```

The following example shows how to enable the exclusive locking feature in manual mode by using the **configuration mode exclusive manual** command. Once you have configured manual exclusive mode, you can lock the configuration mode by using the **configure terminal lock** command. In this mode, the **configure terminal** command does not automatically lock the parser configuration mode. The lock is cleared after you exit from configuration mode by entering **end** or **exit**.

```
Router#
Router# configure terminal
Configuration mode locked exclusively. The lock will be cleared once you exit out of
configuration mode using end/exit
```

```
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#

Router(config)# configuration mode exclusive manual
Router(config)# end
Router#
Router# show running-configuration | include configuration
Building configuration...
Current configuration : 2298 bytes
configuration mode exclusive manual <==== 'manual' policy

Router# show configuration lock
Parser Configure Lock
---------------------
Owner PID : -1
User : unknown
TTY : -1
Type : NO LOCK
State : FREE
Class : unknown
Count : 0
Pending Requests : 0
User debug info :
Session idle state : TRUE
No of exec cmds getting executed : 0
No of exec cmds blocked : 0
Config wait for show completion : FALSE
Remote ip address : Unknown
Lock active time (in Sec) : 0
Lock Expiration timer (in Sec) : 0
Router#

Router# configure terminal ?
lock Lock configuration mode <========== 'lock' option displayed in 'manual' policy

Router# configure terminal <============ 'configure terminal' won't acquire lock
automatically
Enter configuration commands, one per line. End with CNTL/Z.

Router(config)# show configuration lock
Parser Configure Lock
---------------------
Owner PID : -1
User : unknown
TTY : -1
Type : NO LOCK
State : FREE
Class : unknown
Count : 0
Pending Requests : 0
User debug info :
Session idle state : TRUE
No of exec cmds getting executed : 0
No of exec cmds blocked : 0
Config wait for show completion : FALSE
Remote ip address : Unknown
Lock active time (in Sec) : 0
Lock Expiration timer (in Sec) : 0
Router(config)# end

Router# show configuration lock
Parser Configure Lock
---------------------
Owner PID : -1
```

```
User : unknown
TTY : -1
Type : NO LOCK
State : FREE
Class : unknown
Count : 0
Pending Requests : 0
User debug info :
Session idle state : TRUE
No of exec cmds getting executed : 0
No of exec cmds blocked : 0
Config wait for show completion : FALSE
Remote ip address : Unknown
Lock active time (in Sec) : 0
Lock Expiration timer (in Sec) : 0
Router#
Router# configure
Router# configure terminal
Router# configure terminal ?
lock Lock configuration mode <======= 'lock' option displayed when in 'manual' policy

Router# configure terminal lock
Router# configure terminal lock <============ acquires exclusive configuration lock

Configuration mode is locked exclusively. The lock is cleared after you exit from
configuration mode by entering the end or exit command.

Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#

Router(config)# show configuration lock
Parser Configure Lock
---------------------
Owner PID : 3
User : unknown
TTY : 0
Type : EXCLUSIVE
State : LOCKED
Class : EXPOSED
Count : 1
Pending Requests : 0
User debug info : configure terminal lock
Session idle state : TRUE
No of exec cmds getting executed : 0
No of exec cmds blocked : 0
Config wait for show completion : FALSE
Remote ip address : Unknown
Lock active time (in Sec) : 5
Lock Expiration timer (in Sec) : 594

Router(config)# end <================ 'end' releases exclusive configuration lock
Router#

Router# show configuration lock
Parser Configure Lock
---------------------
Owner PID : -1
User : unknown
TTY : -1
Type : NO LOCK
State : FREE
Class : unknown
Count : 0
Pending Requests : 0
```

```
User debug info :
Session idle state : TRUE
No of exec cmds getting executed : 0
No of exec cmds blocked : 0
Config wait for show completion : FALSE
Remote ip address : Unknown
Lock active time (in Sec) : 0
Lock Expiration timer (in Sec) : 0
Router#
```

Related Commands

Command	Description
configure terminal	Enters global configuration mode.
debug configuration lock	Enables debugging of the Cisco IOS configuration lock.
show configuration lock	Displays information about the lock status of the running configuration file during a configuration replace operation.

configure confirm

To confirm replacement of the current running configuration with a saved Cisco IOS configuration file, use the **configure confirm** command in privileged EXEC mode.

configure confirm

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2SR.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2SX.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Usage Guidelines

The **configure confirm** command is used only if the **time** *seconds* keyword and argument of the **configure replace** command are specified. If the **configure confirm** command is not entered within the specified time limit, the configuration replace operation is automatically reversed (in other words, the current running configuration file is restored to the configuration state that existed prior to entering the **configure replace** command).

Examples

The following example shows the use of the **configure replace** command with the **time** *seconds* keyword and argument. You must enter the **configure confirm** command within the specified time limit to confirm replacement of the current running configuration file:

```
Router# configure replace nvram:startup-config time 120

This will apply all necessary additions and deletions
to replace the current running configuration with the
contents of the specified configuration file, which is
assumed to be a complete configuration, not a partial
configuration. Enter Y if you are sure you want to proceed. ? [no]: Y

Total number of passes: 1
Rollback Done

Router# configure confirm
```

Related Commands

Command	Description
archive config	Saves a copy of the current running configuration to the Cisco IOS configuration archive.
configure replace	Replaces the current running configuration with a saved Cisco IOS configuration file.
maximum	Sets the maximum number of archive files of the running configuration to be saved in the Cisco IOS configuration archive.
path (config-archive)	Specifies the location and filename prefix for the files in the Cisco IOS configuration archive.
show archive	Displays information about the files saved in the Cisco IOS configuration archive.
time-period	Sets the time increment for automatically saving an archive file of the current running configuration in the Cisco IOS configuration archive.

configure memory

To configure the system from the system memory, use the **configure memory** command in privileged EXEC mode.

configure memory

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

On all platforms except Class A Flash file system platforms, this command executes the commands located in the configuration file in NVRAM (the "startup configuration file").

On Class A Flash file system platforms, if you specify the **configure memory** command, the router executes the commands pointed to by the CONFIG_FILE environment variable. The CONFIG_FILE environment variable specifies the location of the configuration file that the router uses to configure itself during initialization. The file can be located in NVRAM or any of the Flash file systems supported by the platform.

When the CONFIG_FILE environment variable specifies NVRAM, the router executes the NVRAM configuration only if it is an entire configuration, not a distilled version. A distilled configuration is one that does not contain access lists.

To view the contents of the CONFIG_FILE environment variable, use the **show bootvar** EXEC command. To modify the CONFIG_FILE environment variable, use the **boot config** command and then save your changes by issuing the **copy system:running-config nvram:startup-config** command.

Examples

In the following example, a router is configured from the configuration file in the memory location pointed to by the CONFIG_FILE environment variable:

```
Router# configure memory
```

Related Commands

Command	Description
boot config	Specifies the device and filename of the configuration file from which the router configures itself during initialization (startup).

Command	Description
copy system:running-config nvram:startup-config	Saves the running configuration as the startup configuration file.
show bootvar	Displays the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, the contents of the BOOTLDR environment variable, and the configuration register setting.

configure network

The **configure network** command was replaced by the **copy** {**rcp** | **tftp**} **running-config** command in Cisco IOS Release 11.0. To maintain backward compatibility, the **configure network** command continues to function in Cisco IOS Release 12.2(11)T for most systems, but support for this command may be removed in a future release.

The **copy** {**rcp** | **tftp**} **running-config** command was replaced by the **copy** {**ftp:** | **rcp:** | **tftp:**}[*filename*] **system:running-config** command in Cisco IOS Release 12.1.

The **copy** {**ftp:** | **rcp:** | **tftp:**}[*filename*] **system:running-config** command specifies that a configuration file should be copied from a FTP, rcp, or TFTP source to the running configuration. See the description of the **copy** command in this chapter for more information.

configure overwrite-network

The **configure overwrite-network** has been replaced by the **copy** {*ftp-url* | *rcp-url* | *tftp-url*} **nvram:startup-config** command. See the description of the **copy** command in the **"Cisco IOS File System Commands"** chapter for more information.

configure replace

To replace the current running configuration with a saved Cisco IOS configuration file, use the **configure replace** command in privileged EXEC mode.

configure replace *target-url* [**nolock**] [**list**] [**force**] [**ignorecase**] [**revert trigger** [**error**] [**timer** *minutes*] | **time** *minutes*]

Syntax Description

target-url	URL (accessible by the Cisco IOS file system) of the saved Cisco IOS configuration file that is to replace the current running configuration.
nolock	(Optional) Disables the locking of the running configuration file that prevents other users from changing the running configuration during a configuration replace operation.
list	(Optional) Displays a list of the command lines applied by the Cisco IOS software parser during each pass of the configuration replace operation. The total number of passes performed is also displayed.
force	(Optional) Replaces the current running configuration file with the specified saved Cisco IOS configuration file without prompting you for confirmation.
ignorecase	(Optional) Instructs the configuration to ignore the case of the configuration confirmation.
revert trigger	(Optional) Sets the triggers for reverting to the original configuration. • **error**—Reverts to the original configuration upon error. • **timer** *minutes*—Reverts to the original configuration if the specified time elapses.
time *minutes*	(Optional) Time (in minutes) within which you must enter the **configure confirm** command to confirm replacement of the current running configuration file. If the **configure confirm** command is not entered within the specified time limit, the configuration replace operation is automatically reversed (in other words, the current running configuration file is restored to the configuration state that existed prior to entering the **configure replace** command).

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(25)S	The **nolock** keyword was added.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was implemented on the Cisco 10000 series.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.
12.4(20)T	The **revert** and **trigger** keywords were added.

Release	Modification
12.2(33)SRC	The **ignorecase** keyword was added.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Usage Guidelines

When configuring more than one keyword option, the following rules apply:

- The **list** keyword must be entered before the **force** and **time** keywords.
- The **force** keyword must be entered before the **time** keyword.

If the current running configuration is replaced with a saved Cisco IOS configuration file that contains commands unaccepted by the Cisco IOS software parser, an error message is displayed listing the commands that were unaccepted. The total number of passes performed in the configuration replace operation is also displayed.

Note In Cisco IOS Release 12.2(25)S, a locking feature for the configuration replace operation was introduced. When the **configure replace** command is enabled, the Cisco IOS running configuration file is locked by default for the duration of the configuration replace operation. This locking mechanism prevents other users from changing the running configuration while the replace operation is taking place, which might otherwise cause the replace operation to terminate unsuccessfully. You can disable the locking of the running configuration using the **configure replace nolock** command.

The running configuration lock is automatically cleared at the end of the configuration replace operation. It is not expected that you should need to clear the lock manually during the replace operation, but as a protection against any unforeseen circumstances, you can manually clear the lock using the **clear configuration lock** command. You can also display any locks that may be currently applied to the running configuration using the **show configuration lock** command.

Examples

This section contains the following examples:

- Replacing the Current Running Configuration with a Saved Cisco IOS Configuration File
- Reverting to the Startup Configuration File
- Performing a Configuration Replace Operation with the configure confirm Command
- Performing a Configuration Rollback Operation

Replacing the Current Running Configuration with a Saved Cisco IOS Configuration File

The following example shows how to replace the current running configuration with a saved Cisco IOS configuration file named disk0:myconfig. Note that the **configure replace** command interactively prompts you to confirm the operation.

```
Router# configure replace disk0:myconfig

This will apply all necessary additions and deletions
to replace the current running configuration with the
contents of the specified configuration file, which is
assumed to be a complete configuration, not a partial
configuration. Enter Y if you are sure you want to proceed. ? [no]: Y

Total number of passes: 1
```

```
Rollback Done
```

In the following example, the **list** keyword is specified to display the command lines that were applied during the configuration replace operation:

```
Router# configure replace disk0:myconfig list

This will apply all necessary additions and deletions
to replace the current running configuration with the
contents of the specified configuration file, which is
assumed to be a complete configuration, not a partial
configuration. Enter Y if you are sure you want to proceed. ? [no]: Y

!Pass 1

!List of Commands:
no snmp-server community public ro
snmp-server community mystring ro
end

Total number of passes: 1
Rollback Done
```

Reverting to the Startup Configuration File

The following example shows how to revert to the Cisco IOS startup configuration file. This example also shows the use of the optional **force** keyword to override the interactive user prompt.

```
Router# configure replace nvram:startup-config force

Total number of passes: 1
Rollback Done
```

Performing a Configuration Replace Operation with the configure confirm Command

The following example shows the use of the **configure replace** command with the **time** *seconds* keyword and argument. You must enter the **configure confirm** command within the specified time limit to confirm replacement of the current running configuration file. If the **configure confirm** command is not entered within the specified time limit, the configuration replace operation is automatically reversed (in other words, the current running configuration file is restored to the configuration state that existed prior to entering the **configure replace** command).

```
Router# configure replace nvram:startup-config time 120

This will apply all necessary additions and deletions
to replace the current running configuration with the
contents of the specified configuration file, which is
assumed to be a complete configuration, not a partial
configuration. Enter Y if you are sure you want to proceed. ? [no]: Y

Total number of passes: 1
Rollback Done

Router# configure confirm
```

Performing a Configuration Rollback Operation

The following example shows how to make changes to the current running configuration and then roll back the changes. As part of the configuration rollback operation, you must save the current running configuration before making changes to the file. In this example, the **archive config** command is used to save the current running configuration. Note that the generated output of the **configure replace** command indicates that only one pass was performed to complete the rollback operation.

Note The **path** command must be configured before using the **archive config** command.

You first save the current running configuration in the configuration archive as follows:

```
Router# archive config
```

You then enter configuration changes as shown in the following example:

```
Router# configure terminal
Router(config)# user netops2 password rain
Router(config)# user netops3 password snow
Router(config)# exit
```

After making changes to the running configuration file, you might want to roll back these changes and revert to the configuration that existed before the changes were made. The **show archive** command is used to verify the version of the configuration to be used as a target file. The **configure replace** command is then used to revert to the target configuration file as shown in the following example:

```
Router# show archive

There are currently 1 archive configurations saved.
The next archive file will be named disk0:myconfig-2
 Archive #  Name
   0
   1       disk0:myconfig-1 <- Most Recent
   2
   3
   4
   5
   6
   7
   8
   9
   10

Router# configure replace disk0:myconfig-1

Total number of passes: 1
Rollback Done
```

Related Commands

Command	Description
archive config	Saves a copy of the current running configuration to the Cisco IOS configuration archive.
configure confirm	Confirms replacement of the current running configuration with a saved Cisco IOS configuration file.
maximum	Sets the maximum number of archive files of the running configuration to be saved in the Cisco IOS configuration archive.
path	Specifies the location and filename prefix for the files in the Cisco IOS configuration archive.
show archive	Displays information about the files saved in the Cisco IOS configuration archive.
time-period	Sets the time increment for automatically saving an archive file of the current running configuration in the Cisco IOS configuration archive.

configure revert

To cancel the timed rollback and trigger the rollback immediately, or to reset parameters for the timed rollback, use the **configure revert** command in privileged EXEC mode.

configure revert {**now | timer** {*minutes* **| idle** *minutes*}}

Syntax Description

now	Cancels the timed rollback and reverts immediately.
timer	Resets the confirmation timer.
minutes	Time in minutes (1-120).
idle *minutes*	Idle time in minutes (1-120) for which to wait before rollback.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRC	This command was introduced.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Usage Guidelines

In order to use the **configure revert** command to configure a timed rollback, the Configuration Archive functionality must be enable first. The Configuration Archive APIs are used to store the current configuration before applying any changes or rolling back to the previous configuration.

In case of multi-user environments, only the user who enabled the timed rollback functionality will have the permission to perform the following operations:

- Confirm the configuration change
- Reset the timer
- Cancel the timer and trigger rollback immediately

Examples

The following example shows how to cancel the timed rollback and revert to the saved configuration immediately:

```
Rourter(config)# archive
Router(config-archive)# path disk0:abc
Router# configure revert now
```

Related Commands

Command	Description
archive config	Saves a copy of the current running configuration to the Cisco IOS configuration archive.
configure replace	Replaces the current running configuration with a saved Cisco IOS configuration file.
maximum	Sets the maximum number of archive files of the running configuration to be saved in the Cisco IOS configuration archive.
path (config-archive)	Specifies the location and filename prefix for the files in the Cisco IOS configuration archive.
show archive	Displays information about the files saved in the Cisco IOS configuration archive.
time-period	Sets the time increment for automatically saving an archive file of the current running configuration in the Cisco IOS configuration archive.

configure terminal

To enter global configuration mode, use the **configure terminal** command in privileged EXEC mode.

configure terminal

Cisco IOS Releases 12.3(14)T and Subsequent Releases:

configure terminal [**lock**]

Cisco IOS Releases 12.2(33)SRC and Subsequent Releases:

configure terminal [**revert** {**timer** *minutes* | **idle** *minutes*}]

Syntax Description

lock	(Optional) Locks the running configuration into exclusive configuration mode for the duration of your configuration session. This keyword only functions if the **configuration mode exclusive** command was previously enabled.
revert	(Optional) Sets the parameters for reverting the configuration if confirmation of the new configuration is not received.
timer *minutes*	Time in minutes (1-120) for which to wait for confirmation.
idle *minutes*	Idle time in minutes (1-120) for which to wait for confirmation.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
12.3(14)T	The **lock** keyword option was added.
12.0(31)S	This command was integrated into Cisco IOS Release 12.0(31)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(20)T	The **revert** keyword option was added, along with the timer parameters of **idle** and *minutes*.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Usage Guidelines

Use this command to enter global configuration mode. Note that commands in this mode are written to the running configuration file as soon as you enter them (using the Enter key/Carriage Return).

After you enter the **configure terminal** command, the system prompt changes from `<router-name>#` to `<router-name>(config)#`, indicating that the router is in global configuration mode. To leave global configuration mode and return to privileged EXEC mode, type **exit** or press **Ctrl-Z**.

To view the changes to the configuration you have made, use the **more system:running-config** command or **show running-config** command in user EXEC or privileged EXEC mode.

Configuration Locking

The first user to enter the **configure terminal lock** command acquires the configuration lock (exclusive configuration mode).

Examples

The following example shows how to enter global configuration mode and lock the Cisco IOS software in exclusive mode:

```
Router(config)# configure terminal lock
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
```

Related Commands

Command	Description
boot config	Specifies the device and filename of the configuration file from which the router configures itself during initialization (startup).
configuration mode exclusive	Enables locking of the configuration file for single user access.
copy running-config startup-config or **copy system:running-config nvram:startup-config**	Saves the running configuration as the startup configuration file.
show running-config or **more system:running-config**	Displays the currently running configuration.

confreg

To change the configuration register settings while in ROM monitor mode, use the **confreg** command in ROM monitor mode.

confreg [*value*]

Syntax Description

value	(Optional) Hexadecimal value that represents the 16-bit configuration register value that you want to use the next time the router is restarted. The value range is from 0x0 to 0xFFFF.

Defaults

Refer to your platform documentation for the default configuration register value.

Command Modes

ROM monitor

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Not all versions in the ROM monitor support this command. Refer to your platform documentation for more information on ROM monitor mode.

If you use this command without specifying the configuration register value, the router prompts for each bit of the configuration register.

The lowest four bits of the configuration register (bits 3, 2, 1, and 0) form the boot field. The boot field determines if the router boots manually, from ROM, or from Flash or the network.

To change the boot field value and leave all other bits set to their default values, follow these guidelines:

- If you set the configuration register boot field value to 0x0, you must boot the operating system manually with the **boot** command.
- If you set the configuration register boot field value to 0x1, the router boots using the default ROM software.
- If you set the configuration register boot field to any value from 0x2 to 0xF, the router uses the boot field value to form a default boot filename for booting from a network server.

For more information about the configuration register bit settings and default filenames, refer to the appropriate router hardware installation guide.

Examples

In the following example, the configuration register is set to boot the system image from Flash memory:

```
confreg 0x210F
```

In the following example, no configuration value is entered, so the system prompts for each bit in the register:

```
rommon 7 > confreg

     Configuration Summary
enabled are:
console baud: 9600
boot: the ROM Monitor

do you wish to change the configuration? y/n  [n]:  y
enable  "diagnostic mode"? y/n  [n]:  y
enable  "use net in IP bcast address"? y/n  [n]:

enable  "load rom after netboot fails"? y/n  [n]:
enable  "use all zero broadcast"? y/n  [n]:
enable  "break/abort has effect"? y/n  [n]:
enable  "ignore system config info"? y/n  [n]:
change console baud rate? y/n  [n]:  y
enter rate: 0 = 9600, 1 = 4800, 2 = 1200, 3 = 2400  [0]:  0
change the boot characteristics? y/n  [n]:  y
enter to boot:
 0 = ROM Monitor
 1 = the boot helper image
 2-15 = boot system
    [0]:  0

     Configuration Summary
enabled are:
diagnostic mode
console baud: 9600
boot: the ROM Monitor

do you wish to change the configuration? y/n  [n]:

You must reset or power cycle for new config to take effect.
rommon 8>
```

continue (ROM monitor)

To return to EXEC mode from ROM monitor mode, use the **continue** command in ROM monitor mode.

continue

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

ROM monitor

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to return to EXEC mode from ROM monitor mode, to use the system image instead of reloading. On older platforms, the angle bracket (< >) indicates that the router is in ROM monitor mode. On newer platforms, `rommon number>` is the default ROM monitor prompt. Typically, the router is in ROM monitor mode when you manually load a system image or perform diagnostic tests. Otherwise, the router will most likely never be in this mode.

Caution While in ROM monitor mode, the Cisco IOS system software is suspended until you issue either a reset or the **continue** command.

Examples

In the following example, the **continue** command switches the router from ROM monitor to EXEC mode:

```
> continue
Router#
```

Related Commands

Command	Description
boot	Boots the router manually.

copy

To copy any file from a source to a destination, use the **copy** command in privileged EXEC or diagnostic mode.

copy [**/erase**] [**/verify** | **/noverify**] *source-url destination-url*

Syntax Description

/erase	(Optional) Erases the destination file system before copying. **Note** This option is typically provided on platforms with limited memory to allow for an easy way to clear local flash memory space.
/verify	(Optional) Verifies the digital signature of the destination file. If verification fails, the file is deleted from the destination file system. This option applies to Cisco IOS software image files only.
/noverify	(Optional) If the file being copied is an image file, this keyword disables the automatic image verification that occurs after an image is copied. **Note** This keyword is often issued if the **file verify auto** command is enabled, which automatically verifies the digital signature of all images that are copied.
source-url	The location URL (or alias) of the source file or directory to be copied. The source can be either local or remote, depending upon whether the file is being downloaded or uploaded.
destination-url	The destination URL (or alias) of the copied file or directory. The destination can be either local or remote, depending upon whether the file is being downloaded or uploaded.

The exact format of the source and destination URLs varies according to the file or directory location. You may enter either an alias keyword for a particular file or a filename that follows the standard Cisco IOS file system syntax (*filesystem*:[/*filepath*][/*filename*]).

Table 18 shows two keyword shortcuts to URLs.

Table 18 Common Keyword Aliases to URLs

Keyword	Source or Destination
running-config	(Optional) Keyword alias for the **system:running-config** URL. The **system:running-config** keyword represents the current running configuration file. This keyword does not work in **more** and **show file** EXEC command syntaxes.
startup-config	(Optional) Keyword alias for the **nvram:startup-config** URL. The **nvram:startup-config** keyword represents the configuration file used during initialization (startup). This file is contained in NVRAM for all platforms except the Cisco 7000 family, which uses the CONFIG_FILE environment variable to specify the startup configuration. The Cisco 4500 series cannot use the **copy running-config startup-config** command. This keyword does not work in **more** and **show file** EXEC command syntaxes.

The following tables list URL prefix keywords by file system type. The available file systems will vary by platform. If you do not specify a URL prefix keyword, the router looks for a file in the current directory.

Table 19 lists URL prefix keywords for Special (opaque) file systems. Table 20 lists them for remote file systems, and Table 21 lists them for local writable storage.

Table 19 URL Prefix Keywords for Special File Systems

Keyword	Source or Destination
cns:	Source URL for Cisco Networking Services files.
flh:	Source URL for flash load helper log files.
logging	Source URL which copies messages from the logging buffer to a file.
modem:	Destination URL for loading modem firmware on to supported networking devices.
null:	Null destination for copies or files. You can copy a remote file to null to determine its size.
nvram:	Router NVRAM. You can copy the startup configuration to NVRAM or from NVRAM.
obfl:	Source or destination URL for Onboard Failure Logging files.
stby-nvram:	Router NVRAM on the standby hardware. You can copy the startup configuration to NVRAM or from NVRAM.
stby-obfl:	Source or destination URL for Onboard Failure Logging files on the standby hardware.
system:	Source or destination URL for system memory, which includes the running configuration.
tar:	Source URL for the archive file system.
tmpsys:	Source or destination URL for the temporary system files.
xmodem:	Source or destination for a file from a network machine that uses the Xmodem protocol.
ymodem:	Source or destination for a file from a network machine that uses the Ymodem protocol.

Table 20 URL Prefix Keywords for Remote File Systems

Keyword	Source or Destination
ftp:	Source or destination URL for FTP network server. The syntax for this alias is as follows: **ftp:**[[[*//username* [*:password*]*@*]*location*]*/directory*]*/filename.*
http://	Source or destination URL for an HTTP server (also called a web server). The syntax for this alias is as follows: **http://**[[*username*:*password*]*@*]{*hostname* | *host-ip*}[*/filepath*]*/filename*
https://	Source or destination URL for a Secure HTTP (HTTPS) server. HTTPS uses Secure Socket Layer (SSL) encryption. The syntax for this alias is as follows: **https://**[[*username*:*password*]*@*]{*hostname* | *host-ip*}[*/filepath*]*/filename*

Table 20 URL Prefix Keywords for Remote File Systems

Keyword	Source or Destination
rcp:	Source or destination URL for a remote copy protocol (rcp) network server. The syntax for this alias is as follows: **rcp:**[[[*//username@*]*location*]*/directory*]*/filename*
scp:	Source or destination URL for a network server that supports Secure Shell (SSH) and accepts copies of files using the secure copy protocol (scp). The syntax for this alias is as follows: **scp:***//username@location*[*/directory*][*/filename*]
tftp:	Source or destination URL for a TFTP network server. The syntax for this alias is as follows: **tftp:**[[*//location*]*/directory*]*/filename.*

Table 21 URL Prefix Keywords for Local Writable Storage File Systems

Alias	Source or Destination
bootflash:	Source or destination URL for boot flash memory.
disk0: and disk1:	Source or destination URL of disk-based media.
flash:	Source or destination URL for flash memory. This alias is available on all platforms. For platforms that lack a flash: device, note that **flash:** is aliased to **slot0:**, allowing you to refer to the main flash memory storage area on all platforms.
harddisk:	Source or destination URL of the active harddisk file system.
slavebootflash:	Source or destination URL for internal flash memory on the slave RSP card of a router configured for HSA.
slaveram:	NVRAM on a slave RSP card of a router configured for HSA.
slaveslot0:	Source or destination URL of the first Personal Computer Memory Card International Association (PCMCIA) card on a slave RSP card of a router configured for HSA.
slaveslot1:	Source or destination URL of the second PCMCIA slot on a slave RSP card of a router configured for HSA.
slot0:	Source or destination URL of the first PCMCIA flash memory card.
slot1:	Source or destination URL of the second PCMCIA flash memory card.
stby-bootflash:	Source or destination URL for boot flash memory in standby RP.
stby-harddisk:	Source or destination URL for the standby harddisk.
stby-usb[**0-1**]**:**	Source or destination URL for the Universal Serial Bus (USB) flash drive that has been plugged into the router and is located on the standby RP.
usb[**0-1**]**:**	Source or destination URL for the Universal Serial Bus (USB) flash drive that has been plugged into the router and is located on the active RP.
usbflash[**0-9**]**:**	Source or destination URL for the Universal Serial Bus (USB) flash drive that has been plugged into the router.
usbtoken[**0-9**]**:**	Source or destination URL for the USB eToken that has been plugged into the router.

Command Modes

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
11.3T	This command was introduced.
12.3(2)T	• The **http://** and **https://** keywords were added as supported remote source locations (file system URL prefixes) for files. • This command was enhanced to support copying files to servers that support SSH and the scp.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)S	The /**verify** and /**noverify** keywords were added.
12.0(26)S	The /**verify** and /**noverify** keywords were integrated into Cisco IOS Release 12.0(26)S.
12.3(4)T	The /**verify** and /**noverify** keywords were integrated into Cisco IOS Release 12.3(4)T.
12.3(7)T	The **http://** and **https://** keywords were enhanced to support file uploads.
12.3(14)T	The **usbflash**[**0**-**9**]**:** and **usbtoken**[**0**-**9**]**:** keywords were added to support USB storage.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.4(11)T	This command was integrated into the Cisco 7200VXR NPE-G2 platform.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	The Cisco ASR1000 series routers became available, and introduced the **copy** command in diagnostic mode.

Usage Guidelines

The fundamental function of the **copy** command is to allow you to copy a file (such as a system image or configuration file) from one location to another location. The source and destination for the file is specified using a Cisco IOS File System URL, which allows you to specify any supported local or remote file location. The file system being used (such as a local memory source, or a remote server) dictates the syntax used in the command.

You can enter on the command line all necessary source- and destination-URL information and the username and password to use, or you can enter the **copy** command and have the router prompt you for any missing information.

For local file systems, two commonly used aliases exist for the **system:running-config** and **nvram:startup-config** files; these aliases are **running-config** and **startup-config**, respectively.

Timesaver

Aliases are used to reduce the amount of typing you need to perform. For example, it is easier to type **copy run start** (the abbreviated form of the **copy running-config startup-config** command) than it is to type **copy system:r nvram:s** (the abbreviated form of the **copy system:running-config nvram:startup-config** command). These aliases also allow you to continue using some of the common commands used in previous versions of Cisco IOS software.

The entire copying process may take several minutes and differs from protocol to protocol and from network to network.

The colon is required after the file system URL prefix keywords (such as **flash**). In some cases, file system prefixes that did not require colons in earlier software releases are allowed for backwards compatibility, but use of the colon is recommended.

In the URL syntax for **ftp:**, **http:**, **https:**, **rcp:**, **scp:** and **tftp:**, the location is either an IP address or a host name. The filename is specified relative to the directory used for file transfers.

The following sections contain usage guidelines for the following topics:

Understanding Invalid Combinations of Source and Destination

Some invalid combinations of source and destination exist. Specifically, you cannot copy:

- From a running configuration to a running configuration
- From a startup configuration to a startup configuration
- From a device to the same device (for example, the **copy flash: flash:** command is invalid)

Understanding Character Descriptions

Table 22 describes the characters that you may see during processing of the **copy** command.

Table 22 copy Character Descriptions

Character	Description
!	For network transfers, an exclamation point indicates that the copy process is taking place. Each exclamation point indicates the successful transfer of ten packets (512 bytes each).
.	For network transfers, a period indicates that the copy process timed out. Many periods in a row typically mean that the copy process may fail.
O	For network transfers, an uppercase O indicates that a packet was received out of order and the copy process may fail.
e	For flash erasures, a lowercase e indicates that a device is being erased.
E	An uppercase E indicates an error. The copy process may fail.
V	A series of uppercase Vs indicates the progress during the verification of the image checksum.

Understanding Partitions

You cannot copy an image or configuration file to a flash partition from which you are currently running. For example, if partition 1 is running the current system image, copy the configuration file or image to partition 2. Otherwise, the copy operation will fail.

You can identify the available flash partitions by entering the **show file system** EXEC command.

Using rcp

The rcp requires a client to send a remote username upon each rcp request to a server. When you copy a configuration file or image between the router and a server using rcp, the Cisco IOS software sends the first valid username it encounters in the following sequence:

1. The remote username specified in the **copy** command, if a username is specified.
2. The username set by the **ip rcmd remote-username** global configuration command, if the command is configured.
3. The remote username associated with the current tty (terminal) process. For example, if the user is connected to the router through Telnet and was authenticated through the **username** command, the router software sends the Telnet username as the remote username.
4. The router host name.

For the rcp copy request to process, an account must be defined on the network server for the remote username. If the network administrator of the destination server did not establish an account for the remote username, this command will not run. If the server has a directory structure, the configuration file or image is written to or copied from the directory associated with the remote username on the server. For example, if the system image resides in the home directory of a user on the server, specify that username as the remote username.

If you are writing to the server, the rcp server must be properly configured to accept the rcp write request from the user on the router. For UNIX systems, add an entry to the *.rhosts* file for the remote user on the rcp server. Suppose the router contains the following configuration lines:

```
hostname Rtr1
ip rcmd remote-username User0
```

If the router IP address translates to Router1.company.com, then the *.rhosts* file for User0 on the rcp server should contain the following line:

```
Router1.company.com Rtr1
```

Refer to the documentation for your rcp server for more details.

If you are using a personal computer as a file server, the computer must support the remote shell protocol (rsh).

Using FTP

The FTP protocol requires a client to send a username and password with each FTP request to a remote FTP server. Use the **ip ftp username** and **ip ftp password** global configuration commands to specify a default username and password for all copy operations to or from an FTP server. Include the username in the **copy** command syntax if you want to specify a username for that copy operation only.

When you copy a file from the router to a server using FTP, the Cisco IOS software sends the first valid username that it encounters in the following sequence:

1. The username specified in the **copy** command, if a username is specified.
2. The username set by the **ip ftp username** command, if the command is configured.
3. Anonymous.

The router sends the first valid password in the following list:

1. The password specified in the **copy** command, if a password is specified.
2. The password set by the **ip ftp password** command, if the command is configured.
3. The router forms a password *username@routername.domain*. The variable *username* is the username associated with the current session, *routername* is the configured host name, and *domain* is the domain of the router.

The username and password must be associated with an account on the FTP server. If you are writing to the server, the FTP server must be properly configured to accept the FTP write request from the user on the router.

If the server has a directory structure, the configuration file or image is written to or copied from the directory associated with the username on the server. For example, if the system image resides in the home directory of a user on the server, specify that username as the remote username.

Refer to the documentation for your FTP server for details on setting up the server.

Using HTTP or HTTPS

Copying a file to or from a remote HTTP or HTTPS server, to or from a local file system, is performed using the embedded Secure HTTP client that is integrated in Cisco IOS software. The HTTP client is enabled by default.

Downloading files from a remote HTTP or HTTPS server is performed using the HTTP client integrated in Cisco IOS software.

If a username and password are not specified in the **copy** command syntax, the system uses the default HTTP client username and password, if configured.

When you copy a file from a remote HTTP or HTTPS server, the Cisco IOS software sends the first valid username that it encounters in the following sequence:

1. The username specified in the **copy** command, if a username is specified.
2. The username set by the **ip http client username** command, if the command is configured.
3. Anonymous.

The router sends the first valid password in the following list:

1. The password specified in the **copy** command, if a password is specified.
2. The password set by the **ip http client password** command, if the command is configured.
3. The router forms the password *username@routername.domain*. The variable *username* is the username associated with the current session, *routername* is the configured host name, and *domain* is the domain of the router.

Storing Images on Servers

Use the **copy flash:** *destination-url* command (for example, **copy flash: tftp:**) to copy a system image or boot image from flash memory to a network server. You can use the copy of the image as a backup copy. Also, you can also use the image backup file to verify that the image in flash memory is the same as that in the original file.

Copying from a Server to Flash Memory

Use the **copy** *destination-url* **flash:** command (for example, **copy tftp: flash:**) to copy an image from a server to flash memory.

On Class B file system platforms, the system provides an option to erase existing flash memory before writing onto it.

Note Verify the image in flash memory before booting the image.

Verifying Images

When copying a new image to your router, you should confirm that the image was not corrupted during the copy process. You can verify the integrity of the image in any of the following ways:

- Depending on the destination file system type, a checksum for the image file may be displayed when the **copy** command completes. You can verify this checksum by comparing it to the checksum value provided for your image file on Cisco.com.

Caution If the checksum values do not match, do not reboot the router. Instead, reissue the **copy** command and compare the checksums again. If the checksum is repeatedly wrong, copy the original image back into flash memory *before* you reboot the router from flash memory. If you have a corrupted image in flash memory and try to boot from flash memory, the router will start the system image contained in ROM (assuming booting from a network server is not configured). If ROM does not contain a fully functional system image, the router might not function and will need to be reconfigured through a direct console port connection.

- Use the **/verify** keyword.
- Enable automatic image verification by default by issuing the **file verify auto** command. This command will automatically check the integrity of each file that is copied via the **copy** command (without specifying the **/verify** option) to the router unless the **/noverify** keyword is specified.
- Use the UNIX 'diff' command. This method can also be applied to file types other than Cisco IOS images. If you suspect that a file is corrupted, copy the suspect file and the original file to a UNIX server. (The file names may need to be modified if you try to save the files in the same directory.) Then run the UNIX 'diff' command on the two files. If there is no difference, then the file has not been corrupted.

Copying a Configuration File from a Server to the Running Configuration

Use the **copy** {**ftp:** | **rcp:** | **scp:** | **tftp:**} **running-config** command to load a configuration file from a network server to the running configuration of the router. (Note that **running-config** is the alias for the **system:running-config** keyword.) The configuration will be added to the running configuration as if the commands were typed in the command-line interface (CLI). Thus, the resulting configuration file will be a combination of the previous running configuration and the loaded configuration file, with the loaded configuration file having precedence.

You can copy either a host configuration file or a network configuration file. Accept the default value of *host* to copy and load a host configuration file containing commands that apply to one network server in particular. Enter *network* to copy and load a network configuration file containing commands that apply to all network servers on a network.

Copying a Configuration File from a Server to the Startup Configuration

Use the **copy** {**ftp:** | **rcp:** | **scp:** | **tftp:**} **nvram:startup-config** command to copy a configuration file from a network server to the router startup configuration. These commands replace the startup configuration file with the copied configuration file.

Storing the Running or Startup Configuration on a Server

Use the **copy system:running-config** {**ftp:** | **rcp:** | **scp:** | **tftp:**} command to copy the current configuration file to a network server using FTP, rcp, scp, or TFTP. Use the **copy nvram:startup-config** {**ftp:** | **rcp:** | **scp:** | **tftp:**} command to copy the startup configuration file to a network server.

The configuration file copy can serve as a backup copy.

Saving the Running Configuration to the Startup Configuration

Use the **copy system:running-config nvram:startup-config** command to copy the running configuration to the startup configuration.

Note Some specific commands might not get saved to NVRAM. You will need to enter these commands again if you reboot the machine. These commands are noted in the documentation. We recommend that you keep a listing of these settings so you can quickly reconfigure your router after rebooting.

If you issue the **copy system:running-config nvram:startup-config** command from a bootstrap system image, a warning will instruct you to indicate whether you want your previous NVRAM configuration to be overwritten and configuration commands to be lost. This warning does not appear if NVRAM contains an invalid configuration or if the previous configuration in NVRAM was generated by a bootstrap system image.

On all platforms except Class A file system platforms, the **copy system:running-config nvram:startup-config** command copies the currently running configuration to NVRAM.

On the Class A flash file system platforms, the **copy system:running-config nvram:startup-config** command copies the currently running configuration to the location specified by the CONFIG_FILE environment variable. This variable specifies the device and configuration file used for initialization. When the CONFIG_FILE environment variable points to NVRAM or when this variable does not exist (such as at first-time startup), the software writes the current configuration to NVRAM. If the current configuration is too large for NVRAM, the software displays a message and stops executing the command.

When the CONFIG_FILE environment variable specifies a valid device other than **nvram:** (that is, **flash:**, **bootflash:**, **slot0:**, or **slot1:**), the software writes the current configuration to the specified device and filename, and stores a distilled version of the configuration in NVRAM. A distilled version is one that does not contain access list information. If NVRAM already contains a copy of a complete configuration, the router prompts you to confirm the copy.

Using CONFIG_FILE, BOOT, and BOOTLDR Environment Variables

For the Class A flash file system platforms, specifications are as follows:

- The CONFIG_FILE environment variable specifies the configuration file used during router initialization.
- The BOOT environment variable specifies a list of bootable images on various devices.
- The BOOTLDR environment variable specifies the flash device and filename containing the rxboot image that ROM uses for booting.
- Cisco 3600 routers do not use a dedicated boot helper image (rxboot), which many other routers use to help with the boot process. Instead, the BOOTLDR ROM monitor environment variable identifies the flash memory device and filename that are used as the boot helper; the default is the first system image in flash memory.

To view the contents of environment variables, use the **show bootvar** EXEC command. To modify the CONFIG_FILE environment variable, use the **boot config** global configuration command. To modify the BOOTLDR environment variable, use the **boot bootldr** global configuration command. To modify the BOOT environment variable, use the **boot system** global configuration command. To save your modifications, use the **copy system:running-config nvram:startup-config** command.

When the destination of a **copy** command is specified by the CONFIG_FILE or BOOTLDR environment variable, the router prompts you for confirmation before proceeding with the copy. When the destination is the only valid image in the BOOT environment variable, the router also prompts you for confirmation before proceeding with the copy.

Using the Copy Command with the Dual RSP Feature

The Dual RSP feature allows you to install two Route Switch Processor (RSP) cards in a single router on the Cisco 7507 and Cisco 7513 platforms.

On a Cisco 7507 or Cisco 7513 router configured for Dual RSPs, if you copy a file to **nvram:startup-configuration** with automatic synchronization disabled, the system prompts whether you also want to copy the file to the slave startup configuration. The default answer is **yes**. If automatic synchronization is enabled, the system automatically copies the file to the slave startup configuration each time you use a **copy** command with **nvram:startup-configuration** as the destination.

Using the copy command with the ASR1000 Series Routers

The **copy** command is available in both privileged EXEC and diagnostic mode on the Cisco ASR1000 series routers. Because the **copy** command is available in diagnostic mode, it can be used to copy all types of files between directories and remote locations even in the event of an IOS failure.

Examples

The following examples illustrate uses of the **copy** command:

- Verifying the Integrity of the Image Before It Is Copied Example, page 122
- Copying an Image from a Server to Flash Memory Examples, page 122
- Saving a Copy of an Image on a Server Examples, page 124
- Copying a Configuration File from a Server to the Running Configuration Example, page 126

Verifying the Integrity of the Image Before It Is Copied Example

The following example shows how to specify image verification before copying an image:

```
Router# copy /verify tftp://10.1.1.1/cisco/c7200-js-mz disk0:

Destination filename [c7200-js-mz]?
Accessing tftp://10.1.1.1/cisco/c7200-js-mz...
Loading cisco/c7200-js-mz from 10.1.1.1 (via FastEthernet0/0):!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 19879944 bytes]

19879944 bytes copied in 108.632 secs (183003 bytes/sec)
Verifying file integrity of disk0:/c7200-js-mz
.....................................................................................
.....................................................................................
.....................................................................................
.....................Done!
Embedded Hash MD5 :CFA258948C4ECE52085DCF428A426DCD
Computed Hash    MD5 :CFA258948C4ECE52085DCF428A426DCD
CCO Hash            MD5 :44A7B9BDDD9638128C35528466318183

Signature Verified
```

Copying an Image from a Server to Flash Memory Examples

The following examples use a **copy rcp:**, **copy tftp:**, or **copy ftp:** command to copy an image file from a server to flash memory:

Copying an Image from a Server to Flash Memory Example

The following example copies a system image named file1 from the remote rcp server with an IP address of 172.16.101.101 to flash memory. On Class B file system platforms, the Cisco IOS software allows you to first erase the contents of flash memory to ensure that enough flash memory is available to accommodate the system image.

```
Router# copy rcp://netadmin@172.16.101.101/file1 flash:file1

Destination file name [file1]?
Accessing file 'file1' on 172.16.101.101...
Loading file1 from 172.16.101.101 (via Ethernet0): ! [OK]

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]
```

```
Copy 'file1' from server
  as 'file1' into Flash WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee...erased
Loading file1 from 172.16.101.101 (via Ethernet0): !
[OK - 984/8388608 bytes]

Verifying checksum... OK (0x14B3)
Flash copy took 0:00:01 [hh:mm:ss]
```

Copying an Image from a Server to a Flash Memory Using Flash Load Helper Example

The following example copies a system image into a partition of flash memory. The system will prompt for a partition number only if there are two or more read/write partitions or one read-only and one read/write partition and dual flash bank support in boot ROMs. If the partition entered is not valid, the process terminates. You can enter a partition number, a question mark (**?**) for a directory display of all partitions, or a question mark and a number (**?***number*) for directory display of a particular partition. The default is the first read/write partition. In this case, the partition is read-only and has dual flash bank support in boot ROM, so the system uses flash Load Helper.

```
Router# copy tftp: flash:

System flash partition information:
Partition   Size     Used    Free    Bank-Size   State       Copy-Mode
    1       4096K    2048K   2048K   2048K       Read Only   RXBOOT-FLH
    2       4096K    2048K   2048K   2048K       Read/Write  Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 2]

                                **** NOTICE ****
Flash load helper v1.0
This process will accept the copy options and then terminate
the current system image to use the ROM based image for the copy.
Routing functionality will not be available during that time.
If you are logged in via telnet, this connection will terminate.
Users with console access can see the results of the copy operation.
                                ---- ******** ----
Proceed? [confirm]
System flash directory, partition 1:
File  Length   Name/status
  1   3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [255.255.255.255]? 172.16.1.1
Source file name? master/igs-bfpx-100.4.3
Destination file name [default = source name]?

Loading master/igs-bfpx.100-4.3 from 172.16.1.111: !
Erase flash device before writing? [confirm]
Flash contains files. Are you sure? [confirm]
Copy 'master/igs-bfpx.100-4.3' from TFTP server
as 'master/igs-bfpx.100-4.3' into Flash WITH erase? [yes/no] yes
```

Copying an Image from a Server to a Flash Memory Card Partition Example

The following example copies the file c3600-i-mz from the rcp server at IP address 172.23.1.129 to the flash memory card in slot 0 of a Cisco 3600 series router, which has only one partition. As the operation progresses, the Cisco IOS software prompts you to erase the files on the flash memory PC card to accommodate the incoming file. This entire operation takes 18 seconds to perform, as indicated at the end of the example.

```
Router# copy rcp: slot0:

PCMCIA Slot0 flash
```

```
Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1         4096K   3068K     1027K     4096K      Read/Write     Direct
  2         4096K   1671K     2424K     4096K      Read/Write     Direct
  3         4096K      0K     4095K     4096K      Read/Write     Direct
  4         4096K   3825K      270K     4096K      Read/Write     Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 1]

PCMCIA Slot0 flash directory, partition 1:
File  Length   Name/status
  1   3142288  c3600-j-mz.test
[3142352 bytes used, 1051952 available, 4194304 total]
Address or name of remote host [172.23.1.129]?
Source file name? /tftpboot/images/c3600-i-mz
Destination file name [/tftpboot/images/c3600-i-mz]?
Accessing file '/tftpboot/images/c3600-i-mz' on 172.23.1.129...
Connected to 172.23.1.129
Loading 1711088 byte file c3600-i-mz: ! [OK]

Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy '/tftpboot/images/c3600-i-mz' from server
  as '/tftpboot/images/c3600-i-mz' into Flash WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee ...erased
Connected to 172.23.1.129
Loading 1711088 byte file c3600-i-mz:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

Verifying checksum...  OK (0xF89A)
Flash device copy took 00:00:18 [hh:mm:ss]
```

Saving a Copy of an Image on a Server Examples

The following examples use **copy** commands to copy image files to a server for storage:

- Copy an Image from Flash Memory to an rcp Server Example, page 124
- Copy an Image from Flash Memory to an SSH Server Using scp Example, page 125
- Copy an Image from a Partition of Flash Memory to a Server Example, page 125
- Copying an Image from a Flash Memory File System to an FTP Server Example, page 125
- Copying an Image from Boot Flash Memory to a TFTP Server Example, page 126

Copy an Image from Flash Memory to an rcp Server Example

The following example copies a system image from flash Memory to an rcp server using the default remote username. Because the rcp server address and filename are not included in the command, the router prompts for it.

```
Router# copy flash: rcp:

IP address of remote host [255.255.255.255]? 172.16.13.110
Name of file to copy? gsxx
writing gsxx - copy complete
```

Copy an Image from Flash Memory to an SSH Server Using scp Example

The following example shows how to use scp to copy a system image from flash memory to a server that supports SSH:

```
Router# copy flash:c4500-ik2s-mz.scp scp://user1@host1/

Address or name of remote host [host1]?
Destination username [user1]?
Destination filename [c4500-ik2s-mz.scp]?
Writing c4500-ik2s-mz.scp
Password:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
```

Before you can use the server-side functionality, SSH, authentication, and authorization must be properly configured so the router can determine whether a user is at the right privilege level. The scp server-side functionality is configured with the **ip scp server enable** command.

Copy an Image from a Partition of Flash Memory to a Server Example

The following example copies an image from a particular partition of flash memory to an rcp server using a remote username of netadmin1.

The system will prompt if there are two or more partitions. If the partition entered is not valid, the process terminates. You have the option to enter a partition number, a question mark (**?**) for a directory display of all partitions, or a question mark and a number (**?***number*) for a directory display of a particular partition. The default is the first partition.

```
Router# configure terminal
Router# ip rcmd remote-username netadmin1
Router# end
Router# copy flash: rcp:
System flash partition information:
Partition   Size     Used    Free    Bank-Size   State       Copy-Mode
    1       4096K    2048K   2048K   2048K       Read Only   RXBOOT-FLH
    2       4096K    2048K   2048K   2048K       Read/Write  Direct
[Type ?<number> for partition directory; ? for full directory; q to abort]
Which partition? [1] 2

System flash directory, partition 2:
File  Length   Name/status
  1   3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Address or name of remote host [ABC.CISCO.COM]?
Source file name? master/igs-bfpx.100-4.3
Destination file name [master/igs-bfpx.100-4.3]?
Verifying checksum for 'master/igs-bfpx.100-4.3' (file # 1)... OK
Copy 'master/igs-bfpx.100-4.3' from Flash to server
as 'master/igs-bfpx.100-4.3'? [yes/no] yes
!!!!...
Upload to server done
Flash copy took 0:00:00 [hh:mm:ss]
```

Copying an Image from a Flash Memory File System to an FTP Server Example

The following example copies the file c3600-i-mz from partition 1 of the flash memory card in slot 0 to an FTP server at IP address 172.23.1.129:

```
Router# show slot0: partition 1

PCMCIA Slot0 flash directory, partition 1:
File  Length   Name/status
  1   1711088 c3600-i-mz
[1711152 bytes used, 2483152 available, 4194304 total]
```

```
Router# copy slot0:1:c3600-i-mz ftp://myuser:mypass@172.23.1.129/c3600-i-mz

Verifying checksum for '/tftpboot/cisco_rules/c3600-i-mz' (file # 1)...  OK
Copy '/tftpboot/cisco_rules/c3600-i-mz' from Flash to server
  as 'c3700-i-mz'? [yes/no] yes
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Upload to server done
Flash device copy took 00:00:23 [hh:mm:ss]
```

Copying an Image from Boot Flash Memory to a TFTP Server Example

The following example copies an image from boot flash memory to a TFTP server:

```
Router# copy bootflash:file1 tftp://192.168.117.23/file1

Verifying checksum for 'file1' (file # 1)... OK
Copy 'file1' from Flash to server
  as 'file1'? [yes/no]y
!!!!...
Upload to server done
Flash copy took 0:00:00 [hh:mm:ss]
```

Copying a Configuration File from a Server to the Running Configuration Example

The following example copies and runs a configuration filename host1-confg from the netadmin1 directory on the remote server with an IP address of 172.16.101.101:

```
Router# copy rcp://netadmin1@172.16.101.101/host1-confg system:running-config

Configure using host1-confg from 172.16.101.101? [confirm]
Connected to 172.16.101.101
Loading 1112 byte file host1-confg:![OK]
Router#
%SYS-5-CONFIG: Configured from host1-config by rcp from 172.16.101.101
```

Copying a Configuration File from a Server to the Startup Configuration Example

The following example copies a configuration file host2-confg from a remote FTP server to the startup configuration. The IP address is172.16.101.101, the remote username is netadmin1, and the remote password is ftppass.

```
Router# copy ftp://netadmin1:ftppass@172.16.101.101/host2-confg nvram:startup-config

Configure using rtr2-confg from 172.16.101.101?[confirm]
Connected to 172.16.101.101
Loading 1112 byte file rtr2-confg:![OK]
[OK]
Router#
%SYS-5-CONFIG_NV:Non-volatile store configured from rtr2-config by
FTP from 172.16.101.101
```

Copying the Running Configuration to a Server Example

The following example specifies a remote username of netadmin1. Then it copies the running configuration file named rtr2-confg to the netadmin1 directory on the remote host with an IP address of 172.16.101.101.

```
Router# configure terminal
Router(config)# ip rcmd remote-username netadmin1
Router(config)# end
Router# copy system:running-config rcp:
```

```
Remote host[]? 172.16.101.101

Name of configuration file to write [Rtr2-confg]?
Write file rtr2-confg on host 172.16.101.101?[confirm]
Building configuration...[OK]
Connected to 172.16.101.101
```

Copying the Startup Configuration to a Server Example

The following example copies the startup configuration to a TFTP server:

```
Router# copy nvram:startup-config tftp:

Remote host[]? 172.16.101.101

Name of configuration file to write [rtr2-confg]? <cr>
Write file rtr2-confg on host 172.16.101.101?[confirm] <cr>
![OK]
```

Saving the Current Running Configuration Example

The following example copies the running configuration to the startup configuration. On a Class A flash file system platform, this command copies the running configuration to the startup configuration specified by the CONFIG_FILE variable.

```
copy system:running-config nvram:startup-config
```

The following example shows the warning that the system provides if you try to save configuration information from bootstrap into the system:

```
Router(boot)# copy system:running-config nvram:startup-config

Warning: Attempting to overwrite an NVRAM configuration written
by a full system image. This bootstrap software does not support
the full configuration command set. If you perform this command now,
some configuration commands may be lost.
Overwrite the previous NVRAM configuration?[confirm]
```

Enter **no** to escape writing the configuration information to memory.

Moving Configuration Files to Other Locations Examples

On some routers, you can store copies of configuration files on a flash memory device. Five examples follow:

- Copying the Startup Configuration to a Flash Memory Device Example, page 127
- Copying the Running Configuration to a Flash Memory Device Example, page 127
- Copying to the Running Configuration from a Flash Memory Device Example, page 128
- Copying to the Startup Configuration from a Flash Memory Device Example, page 128
- Copying a Configuration File from one Flash Device to Another Example, page 128

Copying the Startup Configuration to a Flash Memory Device Example

The following example copies the startup configuration file (specified by the CONFIG_FILE environment variable) to a flash memory card inserted in slot 0:

```
Router# copy nvram:startup-config slot0:router-confg
```

Copying the Running Configuration to a Flash Memory Device Example

The following example copies the running configuration from the router to the flash memory PC card in slot 0:

```
Router# copy system:running-config slot0:berlin-cfg

Building configuration...

5267 bytes copied in 0.720 secs
```

Copying to the Running Configuration from a Flash Memory Device Example

The following example copies the file named ios-upgrade-1 from the flash memory card in slot 0 to the running configuration:

```
Router# copy slot0:4:ios-upgrade-1 system:running-config

Copy 'ios-upgrade-1' from flash device
  as 'running-config' ? [yes/no] yes
```

Copying to the Startup Configuration from a Flash Memory Device Example

The following example copies the router-image file from the flash memory to the startup configuration:

```
Router# copy flash:router-image nvram:startup-config
```

Copying a Configuration File from one Flash Device to Another Example

The following example copies the file running-config from the first partition in internal flash memory to the flash memory PC card in slot 1. The checksum of the file is verified, and its copying time of 30 seconds is displayed.

```
Router# copy flash: slot1:

System flash

Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1         4096K   3070K     1025K     4096K      Read/Write     Direct
  2        16384K   1671K    14712K     8192K      Read/Write     Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 1]

System flash directory, partition 1:
File  Length   Name/status
  1   3142748  dirt/images/mars-test/c3600-j-mz.latest
  2   850      running-config
[3143728 bytes used, 1050576 available, 4194304 total]

PCMCIA Slot1 flash directory:
File  Length   Name/status
  1   1711088  dirt/images/c3600-i-mz
  2   850      running-config
[1712068 bytes used, 2482236 available, 4194304 total]
Source file name? running-config
Destination file name [running-config]?
Verifying checksum for 'running-config' (file # 2)...  OK
Erase flash device before writing? [confirm]
Flash contains files. Are you sure you want to erase? [confirm]

Copy 'running-config' from flash: device
  as 'running-config' into slot1: device WITH erase? [yes/no] yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee ...erased
!
 [OK - 850/4194304 bytes]

Flash device copy took 00:00:30 [hh:mm:ss]
Verifying checksum...  OK (0x16)
```

Copying a File from a Remote Web Server Examples

In the following example, the file config1 is copied from a remote server to flash memory using HTTP:

```
Router# copy http://www.example.com:8080/configs/config1 flash:config1
```

In the following example, a default username and password for HTTP Client communications is configured, and then the file sample.scr is copied from a secure HTTP server using HTTPS:

```
Router# configure terminal
Router(config)# ip http client username joeuser
Router(config)# ip http client password letmein
Router(config)# end
Router# copy https://www.example_secure.com/scripts/sample.scr flash:
```

In the following example, an HTTP proxy server is specified before using the **copy http:**// command:

```
Router# configure terminal
Router(config)# ip http client proxy-server edge2 proxy-port 29
Router(config)# end
Router# copy http://www.example.com/configs/config3 flash:/configs/config3
```

Copying an Image from the Master RSP Card to the Slave RSP Card Example

The following example copies the router-image file from the flash memory card inserted in slot 1 of the master RSP card to slot 0 of the slave RSP card in the same router:

```
Router# copy slot1:router-image slaveslot0:
```

Related Commands

Command	Description
boot config	Specifies the device and filename of the configuration file from which the router configures itself during initialization (startup).
boot system	Specifies the system image that the router loads at startup.
cd	Changes the default directory or file system.
copy xmodem: flash:	Copies any file from a source to a destination.
copy ymodem: flash:	Copies any file from a source to a destination.
delete	Deletes a file on a flash memory device.
dir	Displays a list of files on a file system.
erase	Erases a file system.
ip rcmd remote-username	Configures the remote username to be used when requesting a remote copy using rcp.
ip scp server enable	Enables scp server-side functionality.
reload	Reloads the operating system.
show bootvar	Displays the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, the contents of the BOOTLDR environment variable, and the configuration register setting.
show (flash file system)	Displays the layout and contents of a flash memory file system.
slave auto-sync config	Turns on automatic synchronization of configuration files for a Cisco 7507 or Cisco 7513 router that is configured for Dual RSP Backup.
verify bootflash:	File system or directory containing the files to list, followed by a colon.

copy erase flash

The **copy erase flash** command has been replaced by the **erase flash:** command. See the description of the **erase** command for more information.

On some platforms, use can use the **copy /erase** *source-url* **flash:** syntax to erase the local Flash file system before copying a new file into Flash. See the desciption of the **copy** command for details on this option.

copy http://

The **copy http://** command is documented as part of the **copy** command.

copy https://

The **copy https://** command is documented as part of the **copy** command.

copy logging system

To copy archived system events to a destination file system, use the **copy logging system** command in privileged EXEC mode. To stop copying the archived system events, use the **no** form of the command.

copy logging system *target***:** *filename*

no copy logging system

Syntax Description

*target***:**	Specifies the destination file system; Valid values are as follows: • **bootflash:** • **disk0:** • **disk1:** • **ftp:** • **http:** • **https:** • **rcp:** • **slavebootflash:** • **slavedisk0:** • **slavedisk1:** • **slavesup-bootdisk:** • **slavesup-bootflash:** • **sup-bootdisk:** • **sup-bootflash:** • **tftp:**
filename	Name of the file.

Command Default

This command has no default settings.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.
12.2(33)SCC	The command was introduced for the Cisco uBR10012 router in the Cisco IOS Software Release 12.2(33)SCC.

Usage Guidelines

Cisco Universal Broadband Router 10012

The System Event Archive (SEA) feature is used to address the debug trace and system console constraints. Use the **copy logging system** command to copy the major and critical events stored in the sea_log.dat file, to the destination file system.

Note To store the system event logs, the SEA requires either the PCMCIA ATA disk or Compact Flash Disk in compact flash adapter for PRE2.

The following example shows how to copy the SEA to the file system of disk0:

```
Router# copy logging system disk0:

Destination filename [sea_log.dat]?
```

The following example shows how to copy the SEA using the remote file copy function (rcp):

```
Router# copy logging system rcp:

Address or name of remote host []? 192.0.2.1

Destination username [Router]? username1

Destination filename [sea_log.dat]? /auto/tftpboot-users/username1/sea_log.dat
```

Related Commands

clear logging system	Clears the event records stored in the SEA.
logging system	Enables or disables SEA logging system.
show logging system	Displays the SEA logging system disk.

copy xmodem:

To copy a Cisco IOS image from a local or remote computer (such as a PC, Macintosh, or UNIX workstation) to Flash memory on a Cisco 3600 series router using the Xmodem protocol, use the **copy xmodem:** command in EXEC mode.

copy xmodem: *flash-filesystem***:**

Syntax Description

*flash-filesystem***:**	Destination of the copied file, followed by a colon.

Command Modes

EXEC

Command History

Release	Modification
11.2 P	This command was introduced.
12.2(15)T	This command is no longer supported in Cisco IOS Mainline or Technology-based (T) releases. It may continue to appear in Cisco IOS 12.2S-family releases.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is a form of the **copy** command. The **copy xmodem:** and **copy xmodem** commands are identical. See the description of the **copy** command for more information.

Copying a file using FTP, rcp, or TFTP is much faster than copying a file using Xmodem. Use the **copy xmodem:** command only if you do not have access to an FTP, TFTP, or rcp server.

This copy operation is performed through the console or AUX port. The AUX port, which supports hardware flow control, is recommended.

No output is displayed on the port over which the transfer is occurring. You can use the **logging buffered** command to log all router messages sent to the console port during the file transfer.

Examples

The following example initiates a file transfer from a local or remote computer to the router's internal Flash memory using the Xmodem protocol:

```
copy xmodem: flash:
```

Related Commands

Command	Description
copy	Copies any file from a source to a destination.
copy ymodem:	Copies a Cisco IOS image from a local or remote computer (such as a PC, Macintosh, or UNIX workstation) to Flash memory on a Cisco 3600 series router using the Ymodem protocol.

copy ymodem:

To copy a Cisco IOS image from a local or remote computer (such as a PC, Macintosh, or UNIX workstation) to Flash memory on a Cisco 3600 series router using the Ymodem protocol, use the **copy ymodem:** command in EXEC mode.

copy ymodem: *flash-filesystem***:**

Syntax Description

*flash-filesystem***:**	Destination of the copied file, followed by a colon.

Command Modes

EXEC

Command History

Release	Modification
11.2 P	This command was introduced.
12.2(15)T	This command is no longer supported in Cisco IOS Mainline or Technology-based (T) releases. It may continue to appear in Cisco IOS 12.2S-family releases.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **copy ymodem:** and **copy ymodem** commands are identical. See the description of the **copy** command for more information.

Copying a file using FTP, rcp, or TFTP is much faster than copying a file using Ymodem. Use the **copy ymodem:** command only if you do not have access to an FTP, rcp, or TFTP server.

This copy operation is performed through the console or AUX port. The AUX port, which supports hardware flow control, is recommended.

No output is displayed on the port over which the transfer is occurring. You can use the **logging buffered** command to log all router messages sent to the console port during the file transfer.

Examples

The following example initiates a file transfer from a local or remote computer to the router's internal Flash memory using the Ymodem protocol:

```
copy ymodem: flash:
```

Related Commands

Command	Description
copy xmodem:	Copies a Cisco IOS image from a local or remote computer (such as a PC, Macintosh, or UNIX workstation) to Flash memory on a Cisco 3600 series router using the Xmodem protocol.

copy /noverify

To disable the automatic image verification for the current copy operation, use the **copy /noverify** command.

copy /noverify *source-url destination-url*

Syntax Description

source-url	Location URL or alias of the source file or directory to be copied; see the "Usage Guidelines" section for additional information.
destination-url	Destination URL or alias of the copied file or directory; see the "Usage Guidelines" section for additional information.

Defaults

Verification is done automatically after completion of a copy operation.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The exact format of the source and destination URLs varies according to the file or directory location. You may enter either an alias keyword for a particular file or an alias keyword for a file system type (not a file within a type).

Timesaver

Aliases are used to cut down on the amount of typing that you need to perform. For example, it is easier to type **copy run start** (the abbreviated form of the **copy running-config startup-config** command) than it is to type **copy system:r nvram:s** (the abbreviated form of the **copy system:running-config nvram:startup-config** command). These aliases allow you to continue using some of the common commands that are used in previous versions of Cisco IOS software.

Table 23 shows two keyword shortcuts to URLs.

Table 23 Common Keyword Aliases to URLs

Keyword	Source or Destination
running-config	(Optional) Specifies the alias for the **system:running-config** URL. This keyword does not work in the **more** and **show file** command syntaxes.
startup-config	(Optional) Specifies the alias for the **nvram:startup-config URL.** The **nvram:startup-config** keyword represents the configuration file that is used during initialization (startup). This file is contained in NVRAM. This keyword does not work in **more** and **show file** EXEC command syntaxes.

Table 24 through Table 26 list aliases by file system type. If you do not specify an alias, the system looks for a file in the current directory.

Table 24 lists the URL prefix aliases for special (opaque) file systems, Table 25 lists the URL prefix aliases for network file systems, and Table 26 lists the URL prefix aliases for local writable storage file systems.

Table 24 URL Prefix Aliases for Special File Systems

Alias	Source or Destination
flh:	Source URL for Flash load helper log files.
nvram:	Router NVRAM. You can copy the startup configuration into or from NVRAM. You can also display the size of a private configuration file.
null:	Null destination for copies or files. You can copy a remote file to null to determine its size.
system:	Source or destination URL for system memory, which includes the running configuration.
xmodem:	Source destination for the file from a network device that uses the Xmodem protocol.
ymodem:	Source destination for the file from a network device that uses the Ymodem protocol.

Table 25 URL Prefix Aliases for Network File Systems

Alias	Source or Destination
ftp:	Source or destination URL for an FTP network server. The syntax for this alias is as follows: **ftp:**[[[*//username* [:*password*]@]*location*]/*directory*]/*filename.*
rcp:	Source or destination URL for an rcp network server. The syntax for this alias is as follows: **rcp:**[[[*//username*@]*location*]/*directory*]/*filename.*
tftp:	Source or destination URL for a TFTP network server. The syntax for this alias is **tftp:**[[*//location*]/*directory*]/*filename.*

Table 26 URL Prefix Aliases for Local Writable Storage File Systems

Alias	Source or Destination
bootflash:	Source or destination URL for boot flash memory.
disk0: and disk1:	Source or destination URL of rotating media.
flash:	Source or destination URL for Flash memory. This alias is available on all platforms. For platforms that lack a Flash: device, note that **flash:** is aliased to **slot0:**, allowing you to refer to the main Flash memory storage area on all platforms.
slavebootflash:	Source or destination URL for internal Flash memory on the slave RSP card of a device that is configured for HSA.
slaveram:	NVRAM on a slave RSP card of a device that is configured for HSA.
slavedisk0:	Source or destination URL of the first PCMCIA card on a slave RSP card of a device that is configured for HSA.
slavedisk1:	Source or destination URL of the second PCMCIA slot on a slave RSP card of a device that is configured for HSA.
slaveslot0:	Source or destination URL of the first PCMCIA card on a slave RSP card of a router configured for HSA—Available on systems that are configured with a Supervisor Engine 2.
slaveslot1:	Source or destination URL of the second PCMCIA slot on a slave RSP card of a router configured for HSA—Available on systems that are configured with a Supervisor Engine 2.
slot0:	Source or destination URL of the first PCMCIA Flash memory card—Available on systems that are configured with a Supervisor Engine 2.
slot1:	Source or destination URL of the second PCMCIA Flash memory card—Available on systems that are configured with a Supervisor Engine 2.

You can enter on the command line all necessary source- and destination-URL information and the username and password to use, or you can enter the **copy** command and have the switch prompt you for any missing information.

If you enter information, choose one of the following three options: **running-config**, **startup-config**, or a file system alias (see Table 23 through Table 26). The location of a file system dictates the format of the source or destination URL.

The colon is required after the alias. However, earlier commands that do not require a colon remain supported but are unavailable in context-sensitive help.

The entire copying process may take several minutes and differs from protocol to protocol and from network to network.

In the alias syntax for **ftp:**, **rcp:**, and **tftp:**, the location is either an IP address or a hostname. The filename is specified for the directory that is used for file transfers.

Enter the **file verify auto** command to set up verification globally.

Examples

This example shows how to disable the automatic image verification for the current copy operation:

```
Router# copy /noverify tftp: sup-bootflash:
.................................................
```

```
[OK - 24301348 bytes]
24301348 bytes copied in 157.328 secs (154463 bytes/sec)
Router#
```

Related Commands

Command	Description
file verify auto	Verifies the compressed Cisco IOS image checksum.
verify	Verifies the checksum of a file on a Flash memory file system or compute an MD5 signature for a file.

databits

To set the number of data bits per character that are interpreted and generated by the router hardware, use the **databits** command in line configuration mode. To restore the default value, use the **no** form of the command.

databits {**5** | **6** | **7** | **8**}

no databits

Syntax Description

5	Five data bits per character.
6	Six data bits per character.
7	Seven data bits per character.
8	Eight data bits per character. This is the default.

Defaults

Eight data bits per character

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **databits** line configuration command can be used to mask the high bit on input from devices that generate 7 data bits with parity. If parity is being generated, specify 7 data bits per character. If no parity generation is in effect, specify 8 data bits per character. The other keywords are supplied for compatibility with older devices and generally are not used.

Examples

The following example sets the number of data bits per character to seven on line 4:

```
Router(config)# line 4
Router(config-line)# databits 7
```

Related Commands

Command	Description
data-character-bits	Sets the number of data bits per character that are interpreted and generated by the Cisco IOS software.

Command	Description
terminal databits	Changes the number of data bits per character for the current terminal line for this session.
terminal data-character-bits	Sets the number of data bits per character that are interpreted and generated by the Cisco IOS software for the current line and session.

data-character-bits

To set the number of data bits per character that are interpreted and generated by the Cisco IOS software, use the **data-character-bits** command in line configuration mode. To restore the default value, use the **no** form of this command.

data-character-bits {**7** | **8**}

no data-character-bits

Syntax Description

7	Seven data bits per character.
8	Eight data bits per character. This is the default.

Defaults

Eight data bits per character

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **data-character-bits** line configuration command is used primarily to strip parity from X.25 connections on routers with the protocol translation software option. The **data-character-bits** line configuration command does not work on hard-wired lines.

Examples

The following example sets the number of data bits per character to seven on virtual terminal line (vty) 1:

```
Router(config)# line vty 1
Router(config-line)# data-character-bits 7
```

Related Commands

Command	Description
terminal data-character-bits	Sets the number of data bits per character that are interpreted and generated by the Cisco IOS software for the current line and session.

default-value exec-character-bits

To define the EXEC character width for either 7 bits or 8 bits, use the **default-value exec-character-bits** command in global configuration mode. To restore the default value, use the **no** form of this command.

default-value exec-character-bits {**7** | **8**}

no default-value exec-character-bits

Syntax Description

7	Selects the 7-bit ASCII character set. This is the default.
8	Selects the full 8-bit ASCII character set.

Defaults

7-bit ASCII character set

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Configuring the EXEC character width to 8 bits allows you to add graphical and international characters in banners, prompts, and so on. However, setting the EXEC character width to 8 bits can also cause failures. If a user on a terminal that is sending parity enters the **help** command, an "unrecognized command" message appears because the system is reading all 8 bits, although the eighth bit is not needed for the **help** command.

Examples

The following example selects the full 8-bit ASCII character set for EXEC banners and prompts:

```
Router(config)# default-value exec-character-bits 8
```

Related Commands

Command	Description
default-value special-character-bits	Configures the flow control default value from a 7-bit width to an 8-bit width.
exec-character-bits	Configures the character widths of EXEC and configuration command characters.
length	Sets the terminal screen length.
terminal exec-character-bits	Locally changes the ASCII character set used in EXEC and configuration command characters for the current session.
terminal special-character-bits	Changes the ASCII character widths to accept special characters for the current terminal line and session.

default-value special-character-bits

To configure the flow control default value from a 7-bit width to an 8-bit width, use the **default-value special-character-bits** command in global configuration mode. To restore the default value, use the **no** form of this command.

default-value special-character-bits {**7** | **8**}

no default-value special-character-bits

Syntax Description

7	Selects the 7-bit character set. This is the default.
8	Selects the full 8-bit character set.

Defaults

7-bit character set

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Configuring the special character width to 8 bits allows you to add graphical and international characters in banners, prompts, and so on.

Examples

The following example selects the full 8-bit special character set:

```
Router(config)# default-value special-character-bits 8
```

Related Commands

Command	Description
default-value exec-character-bits	Defines the EXEC character width for either 7 bits or 8 bits.
exec-character-bits	Configures the character widths of EXEC and configuration command characters.
length	Sets the terminal screen length.
terminal exec-character-bits	Locally changes the ASCII character set used in EXEC and configuration command characters for the current session.
terminal special-character-bits	Changes the ASCII character widths to accept special characters for the current terminal line and session.

define interface-range

To create an interface-range macro, use the **define interface-range** command in global configuration mode.

define interface-range *macro-name interface-range*

Syntax Description

macro-name	Name of the interface range macro; the macro name can contain up to 32 characters.
interface-range	Interface range. For a list of valid values for interface ranges, see the "Usage Guidelines" section.

Defaults

This command has no default settings.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The macro name is a 32-character maximum character string.

Amn interface range for a macro can contain up to five ranges. An interface range cannot span slots. Use this format when entering the *interface-range*:

- *interface-type slot*/*first-interface - last-interface*

Valid values for *card-type* are as follows:

- **ethernet**
- **fastethernet**
- **gigabitethernet**
- loopback
- **tengigabitethernet**
- **tunnel**
- **vlan** *vlan-id* (valid values are from 1 to 4094)
- **port-channel** *interface-number* (valid values are from 1 to 256)
- **ge-wan**—supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2
- **pos**—supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2
- **atm**—supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2

Examples

This example shows how to create a multiple-interface macro:

```
Router(config)# define interface-range macro1 ethernet 1/2 - 5, fastethernet 5/5 - 10
Router(config)#
```

Related Commands

Command	Description
interface range	Executes a command on multiple ports at the same time.

delete

To delete a file on a Flash memory device or NVRAM, use the **delete** command in EXEC, privileged EXEC, or diagnostic mode.

delete *url* [**/force** | **/recursive**]

Syntax Description

url	Cisco IOS File System URL of the file to be deleted. Include the file system prefix, followed by a colon, and, optionally, the name of a file or directory. See Table 27 for list of supported URLs.
/force	(Optional) Deletes the specified file or directory without prompting you for verification. **Note** Use this keyword with caution: the system will not ask you to confirm the file deletion.
/recursive	(Optional) Deletes all files in the specified directory, as well as the directory itself.

Command Modes

EXEC (>)

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
11.0	This command was introduced.
12.3(14)T	The **usbflash**[**0**-**9**]**:** and **usbtoken**[**0**-**9**]**:** options were added to the list of Cisco IOS File System URLs.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers and the following enhancements were introduced: • This command was introduced in diagnostic mode for the first time. The command can be entered in both privileged EXEC and diagnostic mode on the Cisco ASR1000 Series Routers. • The **harddisk:**, **obfl:**, **stby-bootflash:**, **stby-harddisk:**, **stby-nvram:**, **stby-obfl:**, **stby-usb**[**0**-**1**]**:**, and **usb**[**0**-**1**]**:** *url* options were introduced.

Usage Guidelines

If you attempt to delete the configuration file or image specified by the CONFIG_FILE or BOOTLDR environment variable, the system prompts you to confirm the deletion. Also, if you attempt to delete the last valid system image specified in the BOOT environment variable, the system prompts you to confirm the deletion.

When you delete a file in Flash memory, the software simply marks the file as deleted, but it does not erase the file. To later recover a “deleted” file in Flash memory, use the **undelete** EXEC command. You can delete and undelete a file up to 15 times.

To permanently delete all files marked “deleted” on a linear Flash memory device, use the **squeeze** EXEC command.

Table 27 contains a list of Cisco IOS File System URLs.

Table 27 URL File System Prefix Keywords

Prefix	Filesystem
bootflash:	Delete the file from boot Flash memory.
flash:	Delete the file from Flash memory.
harddisk:	Delete the file from the harddisk file system.
nvram:	Delete the from the router NVRAM.
obfl:	Delete the file from the onboard failure logging file system.
slot0:	Delete the file from the first PCMCIA Flash memory card.
stby-bootflash:	Delete the file from the standby bootflash file system.
stby-harddisk:	Delete the file from the standby harddisk file system.
stby-nvram:	Delete the from the router NVRAM on the standby hardware.
stby-obfl:	Delete the file from the onboard failure logging file system on the standby hardware.
stby-usb[**0**-**1**]:	Delete the file from the standby USB Flash drive.
usb[**0**-**1**];	Delete the file from the USB Flash drive.
usbflash[**0**-**9**]**:**	Delete the file from the USB Flash drive.
usbtoken[**0**-**9**]**:**	Delete the file from the USB eToken.

Examples

The following example deletes the file named test from the Flash card inserted in slot 0:

```
Router# delete slot0:test
Delete slot0:test? [confirm]
```

Related Commands

Command	Description
cd	Changes the default directory or file system.
dir	Displays a list of files on a file system.
show bootvar	Displays the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, the contents of the BOOTLDR environment variable, and the configuration register setting.
squeeze	Permanently deletes Flash files by squeezing a Class A Flash file system.
undelete	Recovers a file marked “deleted” on a Class A or Class B Flash file system.

diag

To perform field diagnostics on a line card, on the Gigabit Route Processor (GRP), on the Switch Fabric Cards (SFCs), and on the Clock Scheduler Card (CSC) in Cisco 12000 series Gigabit Switch Routers (GSRs), use the **diag** command in privileged EXEC mode. To disable field diagnostics on a line card, use the **no** form of this command.

diag *slot-number* [**halt** | **previous** | **post** | **verbose** [**wait**] | **wait**]

no diag *slot-number*

Syntax Description

slot-number	Slot number of the line card you want to test. Slot numbers range from 0 to 11 for the Cisco 12012 and 0 to 7 for the Cisco 12008 router. Slot numbers for the CSC are 16 and 17, and for the FSC are 18, 19, and 20.
halt	(Optional) Stops the field diagnostic testing on the line card.
previous	(Optional) Displays previous test results (if any) for the line card.
post	(Optional) Initiates an EPROM-based extended power-on self-test (EPOST) only. The EPOST test suite is not as comprehensive as the field diagnostics, and a pass/fail message is the only message displayed on the console.
verbose [**wait**]	(Optional) Enables the maximum status messages to be displayed on the console. By default, only the minimum status messages are displayed on the console. If you specify the optional **wait** keyword, the Cisco IOS software is not automatically reloaded on the line card after the test completes.
wait	(Optional) Stops the automatic reloading of the Cisco IOS software on the line card after the completion of the field diagnostic testing. If you use this keyword, you must use the **microcode reload** *slot* global configuration command, or manually remove and insert the line card (to power it up) in the slot so that the GRP will recognize the line card and download the Cisco IOS software image to the line card.

Defaults

No field diagnostics tests are performed on the line card.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was introduced to support the Cisco 12000 series GSR.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **diag** command must be executed from the GRP main console port.

Perform diagnostics on the CSC only if a redundant CSC is in the router.

Diagnostics will stop and ask you for confirmation before altering the router's configuration. For example, running diagnostics on a SFC or CSC will cause the fabric to go from full bandwidth to one-fourth bandwidth. Bandwidth is not affected by GRP or line card diagnostics.

The field diagnostic software image is bundled with the Cisco IOS software and is downloaded automatically from the GRP to the target line card prior to testing.

Caution Performing field diagnostics on a line card stops all activity on the line card. Before the **diag** EXEC command begins running diagnostics, you are prompted to confirm the request to perform field diagnostics on the line card.

In normal mode, if a test fails, the title of the failed test is displayed on the console. However, not all tests that are performed are displayed. To view all the tests that are performed, use the **verbose** keyword.

After all diagnostic tests are completed on the line card, a PASSED or TEST FAILURE message is displayed. If the line card sends a PASSED message, the Cisco IOS software image on the line card is automatically reloaded unless the **wait** keyword is specified. If the line card sends a TEST FAILURE message, the Cisco IOS software image on the line card is not automatically reloaded.

If you want to reload the line card after it fails diagnostic testing, use the **microcode reload** *slot* global configuration command.

Note When you stop the field diagnostic test, the line card remains down (that is, in an unbooted state). In most cases, you stopped the testing because you need to remove the line card or replace the line card. If that is not the case, and you want to bring the line card back up (that is, online), you must use the **microcode reload** global configuration command or power cycle the line card.

If the line card fails the test, the line card is defective and should be replaced. In future releases this might not be the case because DRAM and SDRAM SIMM modules might be field replaceable units. For example, if the DRAM test failed you might only need to replace the DRAM on the line card.

For more information, refer to the Cisco 12000 series installation and configuration guides.

Examples

In the following example, a user is shown the output when field diagnostics are performed on the line card in slot 3. After the line card passes all field diagnostic tests, the Cisco IOS software is automatically reloaded on the card. Before starting the diagnostic tests, you must confirm the request to perform these tests on the line card because all activity on the line card is halted. The total/indiv. timeout set to 600/220 sec. message indicates that 600 seconds are allowed to perform all field diagnostics tests, and that no single test should exceed 220 seconds to complete.

```
Router# diag 3

Running Diags will halt ALL activity on the requested slot. [confirm]
Router#
Launching a Field Diagnostic for slot 3
Running DIAG config check
RUNNING DIAG download to slot 3 (timeout set to 400 sec.)
sending cmd FDIAG-DO ALL to fdiag in slot 3
(total/indiv. timeout set to 600/220 sec.)
Field Diagnostic ****PASSED**** for slot 3


Field Diag eeprom values: run 159 fial mode 0 (PASS) slot 3
   last test failed was 0, error code 0
```

```
sending SHUTDOWN FDIAG_QUIT to fdiag in slot 3

Board will reload
.
.
.
Router#
```

In the following example, a user is shown the output when field diagnostics are performed on the line card in slot 3 in verbose mode:

```
Router# diag 3 verbose

Running Diags will halt ALL activity on the requested slot. [confirm]
Router#
Launching a Field Diagnostic for slot 3
Running DIAG config check
RUNNING DIAG download to slot 3 (timeout set to 400 sec.)
sending cmd FDIAG-DO ALL to fdiag in slot 3
(total/indiv. timeout set to 600/220 sec.)
FDIAG_STAT_IN_PROGRESS: test #1 R5K Internal Cache
FDIAG_STAT_PASS test_num 1
FDIAG_STAT_IN_PROGRESS: test #2 Sunblock Ordering
FDIAG_STAT_PASS test_num 2
FDIAG_STAT_IN_PROGRESS: test #3 Dram Datapins
FDIAG_STAT_PASS test_num 3
.
.
.
Field Diags: FDIAG_STAT_DONE
Field Diagnostic ****PASSED**** for slot 3
Field Diag eeprom values: run 159 fial mode 0 (PASS) slot 3
   last test failed was 0, error code 0
sending SHUTDOWN FDIAG_QUIT to fdiag in slot 3

Board will reload
.
.
.
Router#
```

Related Commands

Command	Description
microcode reload	Reloads the Cisco IOS image on a line card on the Cisco 7000 series with RSP7000, Cisco 7500 series, or Cisco 12000 series routers after all microcode configuration commands have been entered.

diagnostic bootup level

To set the diagnostic bootup level, use the **diagnostic bootup level** command in global configuration mode. To skip all diagnostic tests, use the **no** form of this command.

diagnostic bootup level {**minimal** | **complete**}

no diagnostic bootup level

Syntax Description

minimal	Specifies minimal diagnostics. See the Usage Guidelines section for additional information.
complete	Specifies complete diagnostics. See the Usage Guidelines section for additional information.

Command Default

None

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SCC	The command was integrated in this release to support Generic Online Diagnostics (GOLD) functionality for Cisco UBR10012 Universal Broadband Router.

Usage Guidelines

Setting the diagnostic level determines the level of testing that occurs when the system or module is reset. The two levels are as follows:

- Complete—Runs all tests.
- Minimal—Runs only EARL tests for the supervisor engine and loopback tests for all ports in the system.

Note Although the default is **minimal**, you can set the diagnostic level to **complete** for troubleshooting hardware problems.

In certain circumstances, you might want to skip the bootup online diagnostics completely. For example, you might skip the bootup online diagnostics to verify that a port is as bad as online diagnostics reports. To skip online diagnostic testing completely, use the **no diagnostic bootup level** command.

For information on the diagnostic test types, use the **show diagnostic** command.

The new level takes effect at the next reload or the next time that an online insertion and removal is performed.

Examples

The following example shows how to set the diagnostic bootup level:

```
Router(config)# diagnostic bootup level complete
```

Related Commands

Command	Description
show diagnostic bootup level	Displays the coverage level for the configured bootup diagnostics.

diagnostic cns

To configure the Cisco Networking Services (CNS) diagnostics, use the **diagnostic cns** command in global configuration mode. To disable sending diagnostic results to the CNS event bus., use the **no** form of this command.

diagnostic cns {**publish** | **subscribe**} [*subject*]

no diagnostic cns {**publish** | **subscribe**} [*subject*]

Syntax Description

publish	Sends diagnostic results to a remote network application to make decisions and take corrective actions that are based on the diagnostic results.
subscribe	Receives messages from remote network applications to perform diagnostic tests or retrieve diagnostic results.
subject	(Optional) Event subject name.

Defaults

This command has no default settings.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA.	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The online diagnostics receive events by subscribing to an event *subject* name. The *subject* is the event that you subscribe (receive) or publish (generate) through the CNS bus.

The **diagnostic cns publish** command sends diagnostic results to a remote network application to make decisions and take corrective actions that are based on the diagnostic results.

The **diagnostic cns subscribe** command receives messages from remote network applications to perform diagnostic tests or retrieve diagnostic results.

Examples

This example shows how to enable the publishing of diagnostic results:

```
Router(config)# diagnostic cns publish
Router(config)#
```

This example shows how to receive messages from remote network applications to perform diagnostic tests or retrieve diagnostic results:

```
Router(config)# diagnostic cns subscribe
Router(config)#
```

This example shows how to set the default to **publish**:

```
Router(config)# default diagnostic cns publish
Router(config)#
```

Related Commands

Command	Description
show diagnostic cns	Displays the information about the CNS subject.

diagnostic event-log size

To modify the diagnostic event log size dynamically, use the **diagnostic event-log size** command in global configuration mode. To return to the default settings, use the **no** form of this command.

diagnostic event-log size *size*

no diagnostic event-log size

Syntax Description

size	Diagnostic event-log sizes. The valid values range from 1 to 10000 entries.

Command Default

The event log size is **500** entries.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA.	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SCC	The command was integrated in this release to support Generic Online Diagnostics (GOLD) functionality for Cisco UBR10012 Universal Broadband Router.

Usage Guidelines

The events are dynamically allocated and stored in a circular queue.

You can enter either the **default diagnostic event-log size** command or the **no diagnostic event-log size** command to return to the default settings.

Examples

The following example shows how to set the diagnostic event-log size:

```
Router(config)# diagnostic event-log size 600
```

Related Commands

Command	Description
show diagnostic events	Displays the event log for the diagnostic events.

diagnostic level

To turn on power-on diagnostic tests for the network service engines (NSEs) installed in a Cisco 7300 series router, use the **diagnostic level** command in privileged EXEC configuration mode. There is no **no** form of this command.

diagnostic level {**power-on** | **bypass**}

Syntax Description

power-on	Power-on diagnostic tests are performed at system bootup on the NSEs.
bypass	No diagnostic tests are performed. This is the default.

Defaults

No diagnostic tests are performed.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(10)EX2	This command was introduced.
12.2(18)S	This command was introduced on Cisco 7304 routers running Cisco IOS Release 12.2 S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use this command to enable power-on diagnostic tests to run on the installed NSEs of a Cisco 7300 series router when the system is booted. It is recommended that you issue this command only if you are experiencing problems with an NSE and are planning on rebooting the router. Issuing this command causes an increase in the boot time.

Examples

The following example shows how to enable diagnostic power-on tests:

```
diagnostic level power-on
```

The following sample output shows the output that is displayed upon system bootup after a power cycle or router crash:

```
.
.
.
System Power On Diagnostics
DRAM Size .....................128 MB
Testing DRAM...................Passed
Level2 Cache ..................Present
Testing Level2 Cache (256  KB)Passed
Level3 Cache ..................Present
```

```
Testing Level3 Cache (1024 KB)Passed

System Power On Diagnostics Complete
```

Note This output is displayed when the system is booting, not when the command is issued.

Related Commands

Command	Description
debug redundancy	Enables NSE redundancy debugging.
show c7300	Displays the types of cards (NSE and line cards) installed in a Cisco 7300 series router.
show redundancy (7300)	Displays redundancy information for the active and standby NSEs.

diagnostic monitor

To configure health-monitoring diagnostic testing, use the **diagnostic monitor** command in global configuration mode. To disable testing, use the **no** form of this command.

diagnostic monitor interval {**module** *num*} **test** {*test-id* | *test-id-range* | **all**} [**hour** *hh*] [**min** *mm*] [**second** *ss*] [**millisec** *ms*] [**day** *day*]

diagnostic monitor syslog

diagnostic monitor {**module** *num*} **test** {*test-id* | *test-id-range* | **all**}

no diagnostic monitor {**interval** | **syslog**}

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diagnostic monitor {**bay** *slot/bay* | **slot** *slot-no* | **subslot** *slot/sub-slot*} **test** {*test-id* | *test-id-range* | **all**}

diagnostic monitor interval {**bay** *slot/bay* | **slot** *slot-no* | **subslot** *slot/sub-slot*} **test** {*test-id* | *test-id-range* | **all**} {*hh:mm:ss*} {*milliseconds*} {*number-of-days*}

diagnostic monitor syslog

diagnostic monitor threshold {**bay** *slot/bay* | **slot** *slot-no* | **subslot** *slot/sub-slot*} **test** {*test-id* | *test-id-range* | **all**} {**failure count** *no-of-allowed-failures*}

Syntax Description

interval	Sets the interval between testing.
module *num*	Specifies the module number.
test	Specifies a test to run.
test-id	Identification number for the test to run. See the Usage Guidelines section for additional information.
test-id-range	Range of identification numbers for tests to be run. run. See the Usage Guidelines section for additional information.
all	Runs all the diagnostic tests.
hour *hh*	(Optional) Specifies the number of hours between tests. See the Usage Guidelines section for formatting guidelines.
min *mm*	(Optional) Specifies the number of minutes between tests. See the Usage Guidelines section for formatting guidelines.
second *ss*	(Optional) Specifies the number of seconds between tests. See the Usage Guidelines section for formatting guidelines.
millisec *ms*	(Optional) Specifies the number of milliseconds between tests; see the “Usage Guidelines” section for formatting guidelines.
day *day*	(Optional) Specifies the number of days between tests. See the Usage Guidelines section for formatting guidelines.
syslog	Enables system logging messages when a health-monitoring test fails.

bay *slot/bay*	Indicates the card slot and bay number where the diagnostic test is run periodically and monitored. The **bay** keyword is used to refer a SPA on the router. The valid range for the slot number is from 1 to 8 and 0 to 3 for the bay number.
slot *slot-no*	Indicates the slot number of the full-height line card where the diagnostic test is run periodically and monitored. The **slot** keyword is used to refer a full-height line card on the router. The valid range for the slot is from 1 to 8.
subslot *slot/sub-slot*	Indicates the slot and subslot number of half-height line card on which the diagnostic test is run periodically and monitored. The **subslot** keyword is used to refer a half-height line card on the router. The valid range for the slot number is from 1 to 8 and 0 to 1 for the subslot number.
threshold	Configures the failure threshold value for the specified bay, slot, or subslot.
failure count *no-of-allowed-failures*	Configures the count for maximum failures allowed after which the failed test results are displayed in the output of the **show diagnostic results** command. The range for number of allowed failures is 0 to 99.
hh:mm:ss	Hours, minutes, and seconds interval configured to run the test again.
milliseconds	Number of milliseconds between tests.
no-of -days	Number of days between tests.

Command Default

The defaults are as follows:

- Depending on the test run, monitoring may be enabled or disabled.
- Depending on the test run, the default monitoring interval varies.
- **syslog** is enabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SCC	The command was integrated in this release to support Generic Online Diagnostics (GOLD) functionality for Cisco UBR10012 Universal Broadband Router. The keywords **bay**, **slot**, and **subslot** were added for the Cisco UBR10012 Universal Broadband Router.

Usage Guidelines

Use these guidelines when scheduling testing:

- *test-id*—Enter the **show diagnostic content** command to display the test ID list.
- *test-id-range*—Enter the **show diagnostic content** command to display the test ID list. Enter the range as integers separated by a comma and a hyphen (for example, 1,3-6 specifies test IDs 1, 3, 4, 5, and 6).
- *hh*—Enter the hours from 1 to 24.

- *mm*—Enter the minutes from 1 to 60.
- *day*—Enter the day of the week as a number from 1 to 7 (**1** is Sunday).
- *ss*—Enter the seconds from 1 to 60.
- *ms*—Enter the milliseconds from 1 to 1000.

Enter the [**no**] **diagnostic monitor test** {*test-id* | *test-id-range* | **all**} command to enable or disable the specified health monitoring test.

When entering the **diagnostic monitor** {**module** *num*} **test** {*test-id* | *test-id-range* | **all**} command, observe the following:

- Required
  - Isolate network traffic by disabling all connected ports and do not pump test packets during the test.
  - Remove all modules for testing FIB TCAM and SSRAM memory on the PFC of the supervisor engine.
  - Reset the system or the test module before putting the system back into the normal operating mode.
- Recommended
  - If the DFC module is present, remove all modules, and then reboot the system before starting the memory test on the central PFC3B of the supervisor engine.
  - Turn off all background health-monitoring tests on the supervisor engine and the modules using the **no diagnostic monitor** {**module** *num*} **test** {*test-id* | *test-id-range* | **all**} command.

The FIB TCAM test for central PFC3BXL or PFC3B (on the supervisor engine) takes approximately 4 hours and 30 minutes.

The FIB TCAM test for the distributed PFC3BXL or PFC3B (on the DFC module) takes approximately 16 hours.

You can run the FIB TCAM test on multiple DFC3BX modules simultaneously.

Cisco UBR10012 Router

The command syntax to refer a line card or SPAs is different on Cisco UBR10012 Router. The keyword is **slot x** for a full-height line card, **slot x/y** for a half-height card, and **bay x/y** for a SPA.

To monitor a diagnostic test periodically, you first need to configure the hours, minutes, and seconds interval to run the diagnostic test using the **diagnostic monitor interval** command. An error message is displayed, if the interval is not configured before enabling the monitoring.

To store log details for failed tests, execute the **diagnostic monitor syslog** command. A threshold value to specify the maximum count for allowed failures is configured using the **diagnostic monitor threshold** command. The failed test results can be viewed using the **show diagnostic results** command, after the number of failed test reaches the maximum number of allowed failures configured using the **diagnostic monitor threshold** command.

Examples

The following example shows how to run the specified test every 3 days, 10 hours, and 2 minutes:

```
Router(config)# diagnostic monitor interval module 1 test 1 day 3 hours 10 min 2
```

The following example shows how to enable the generation of a syslog message when any health-monitoring test fails:

```
Router(config)# diagnostic monitor syslog
```

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The following example shows a sample output of an error message displayed when monitoring is enabled before configuring the test interval:

```
Router(config)# diagnostic monitor bay 1/0 test 2
Aug 12 18:04:56.280: %DIAG-3-MONITOR_INTERVAL_ZERO: Bay 1/0: Monitoring interval
 is 0. Cannot enable monitoring for Test #2
```

The following example shows how to configure the periodic interval for running diagnostic tests on the the router before enabling monitoring:

```
Router(config)# diagnostic monitor interval bay 1/0 test 2 06:00:00 100 10
```

The following example shows how to enable the diagnostic monitoring on bay 1/0:

```
Router(config)# diangostic monitor bay 1/0 test 2
```

The following example shows how to enable logging of failed messages to syslog:

```
Router(config)# diangostic monitor syslog
```

The following example shows how to configure the failure threshold value after which the failed test results are displayed in the command output for **show diagnostic results**:

```
Router(config)# diagnostic monitor threshold bay 1/0 test 2 failure count 10
```

Related Commands

Command	Description
show diagnostic content	Displays test information including test ID, test attributes, and supported coverage test levels for each test and for all modules.

diagnostic ondemand

To configure the on-demand diagnostics, use the **diagnostic ondemand** command in privileged EXEC mode.

diagnostic ondemand {**iteration** *iteration-count* | **action-on-failure** {**continue** *error-count* | **stop**}}

Syntax Description

iteration *iteration-count*	Sets the number of times the same test to rerun when the command is issued. The valid range for iteration-count is between 1 to 999.
action-on-failure	Sets the execution action when a failure is detected.
continue	Continues testing when a test failure is detected.
stop	Stops testing when a test failure is detected.
error-count	(Optional) Number of errors that are allowed before stopping. This argument is used with the **continue** option. The valid range for error-count is from 0 to 65534.

Command Default

The default settings are as follows:

- *iteration-count* is **1**.
- **action-on-error** is **continue**.
- *error-count* is **0**.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SCC	The command was integrated in this release to support Generic Online Diagnostics (GOLD) functionality for Cisco UBR10012 Universal Broadband Router.

Usage Guidelines

Entering **0** for the *error-count* sets the number of errors that are allowed to unlimited.

Examples

The following example shows how to set the ondemand testing iteration count:

```
Router# diagnostic ondemand iteration 4
Router#
```

The following example shows how to set the execution action when an error is detected:

```
Router# diagnostic ondemand action-on-failure continue 2
Router#
```

Related Commands

Command	Description
show diagnostic ondemand settings	Displays the settings for on-demand diagnostics.

diagnostic schedule test

To set the scheduling of test-based diagnostic testing for a specific module or schedule a supervisor engine switchover, use the **diagnostic schedule test** command in global configuration mode. To remove the scheduling, use the **no** form of this command.

diagnostic schedule module {*num* | *active-sup-slot*} **test** {*test-id* | *test-id-range* | **all**} [**port** {*num* | *num-range* | **all**}] {**on** *mm dd yyyy hh*:*mm* | **daily** *hh*:*mm*} | **weekly** *day-of-week hh*:*mm*}

no diagnostic schedule test

Syntax Description

module *num*	Specifies the module number.
module *active-sup-slot*	Specifies the slot number of the active supervisor engine.
test-id	Identification number for the test to be run; see the "Usage Guidelines" section for additional information.
test-id-range	Range of identification numbers for tests to be run; see the "Usage Guidelines" section for additional information.
all	Runs all diagnostic tests.
port	(Optional) Specifies the port to schedule testing.
num	(Optional) Port number.
num-range	(Optional) Range of port numbers, separated by a hyphen.
all	Specifies all ports.
on *mm dd yyyy hh*:*mm*	Specifies the scheduling of a test-based diagnostic task; see the "Usage Guidelines" section for formatting guidelines.
daily *hh*:*mm*	Specifies the daily scheduling of a test-based diagnostic task; see the "Usage Guidelines" section for formatting guidelines.
weekly *day-of-week hh*:*mm*	Specifies the weekly scheduling of a test-based diagnostic task; see the "Usage Guidelines" section for formatting guidelines.

Defaults

This command has no default settings.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17b)SXA	This command was changed to support scheduled switchover for supervisor engines.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use these guidelines when scheduling testing:

- *test-id*—Enter the **show diagnostic content** command to display the test ID list.
- *test-id-range*—Enter the **show diagnostic content** command to display the test ID list. Enter the range as integers separated by a comma and a hyphen (for example, 1,3-6 specifies test IDs 1, 3, 4, 5, and 6).
- *num-range*—Enter the range as integers separated by a comma and a hyphen (for example, you can enter 1,3-6 to specify ports 1, 3, 4, 5, and 6).
- *mm*—Spell out the month such as january, february ... december (either uppercase or lowercase characters).
- *dd*—Enter the day as a 2-digit number.
- *yyyy*—Enter the year as a 4-digit number.
- *hh***:***mm*—Enter the time as a 2-digit number (for a 24-hour clock) for hours:minutes; the colon (**:**) is required.
- *day-of-week*—Spell out the day of the week, such as monday, tuesday... sunday (either uppercase or lowercase characters).
- **port** {*num* | *num-range* | **all**}—Is not supported when specifying a scheduled switchover.

Enter the **show diagnostic content** command to display the test ID list.

You can use the **diagnostic schedule module** *active-sup-slot* **test** *test-id* command to schedule a switchover from the active supervisor engine to the standby supervisor engine.

Enter the **show diagnostic content** *active-sup-slot* command to display the test ID list and look for the test ID in the ScheduleSwitchover field.

You can specify a periodic switchover (daily or weekly) or a single switchover occurrence at a specific time using these commands:

- **diagnostic schedule module** *active-sup-slot* **test** *test-id* **on** *mm dd yyyy hh***:***mm*
- **diagnostic schedule module** *active-sup-slot* **test** *test-id* **daily** *hh***:***mm*
- **diagnostic schedule module** *active-sup-slot* **test** *test-id* **weekly** *day-of-week hh***:***mm*

Note To avoid system downtime in the event that the standby supervisor engine cannot switch over the system, we recommend that you schedule a switchover from the standby supervisor engine to the active supervisor engine 10 minutes after the switchover occurs. See the "Examples" section for additional information.

Examples

This example shows how to schedule the diagnostic testing on a specific date and time for a specific module and port:

```
Router(config)# diagnostic schedule module 1 test 1,2,5-9 port 3 on january 3 2003 23:32
Router(config)#
```

This example shows how to schedule the diagnostic testing to occur daily at a certain time for a specific port and module:

```
Router(config)# diagnostic schedule module 1 test 1,2,5-9 port 3 daily 12:34
Router(config)#
```

This example shows how to schedule the diagnostic testing to occur weekly on a certain day for a specific port and module:

```
Router(config)# diagnostic schedule module 1 test 1,2,5-9 port 3 weekly friday 09:23
Router(config)#
```

This example shows how to schedule a switchover for the active supervisor engine every Friday at 10:00 pm, and switch the standby supervisor engine back to the active supervisor engine 10 minutes after the switchover occurs. For this example, these conditions apply:

- *test-id* is 32.
- The active supervisor engine is in slot 5.
- The standby supervisor engine is in slot 6.

Related Commands

Command	Description
show diagnostic content	Displays test information including test ID, test attributes, and supported coverage test levels for each test and for all modules.
show diagnostic schedule	Displays the current scheduled diagnostic tasks.

diagnostic start

To run the specified diagnostic test, use the **diagnostic start** command in privileged EXEC mode.

diagnostic start module *num* **test** {*test-id* | *test-id-range* | **minimal** | **complete** | **basic** | **per-port** | **non-disruptive** | **all**} [**port** {*num* | *port#-range* | **all**}]

diagnostic start system test all

Cisco UBR10012 Universal Broadband Router

diagnostic start {**bay** *slot/bay* | **slot** *slot-no*} **test** {*test-id* | *test-id-range* | **all** | **complete** | **minimal** | **non-disruptive**}

diagnostic start {**subslot** *slot/sub-slot*} **test** {*test-id* | *test-id-range* | **all** | **complete** | **minimal** | **non-disruptive | per-port** [**port** {num | *port#-range* | **all**}]}

Syntax Description

module *num*	Specifies the module number.
test	Specifies a test to run.
test-id	Identification number for the test to run. See the Usage Guidelines section for additional information.
test-id-range	Range of identification numbers for tests to run. See the Usage Guidelines section for additional information.
minimal	Runs minimal bootup diagnostic tests.
complete	Runs complete bootup diagnostic tests.
basic	Runs basic on-demand diagnostic tests.
per-port	Runs per-port level tests.
non-disruptive	Runs the non disruptive health-monitoring tests.
all	Runs all diagnostic tests.
port *num*	(Optional) Specifies the interface port number.
port *port#-range*	(Optional) Specifies the interface port number range. See the Usage Guidelines section for additional information.
port all	(Optional) Specifies all ports.
system test all	Runs all disruptive and nondisruptive diagnostic tests at once. All test dependencies are handled automatically.
bay *slot/bay*	Indicates the card slot and bay number where the diagnostic test is executed. The **bay** keyword is used to refer a SPA on the router. The valid range for the slot number is from 1 to 8 and 0 to 3 for the bay number.
slot *slot-no*	Indicates the slot number of the full-height line card where the diagnostic test is executed. The **slot** keyword is used to refer a full-height line card on the router. The valid range for slot is from 1 to 8.
subslot *slot/sub-slot*	Indicates the slot and subslot number of half-height line card where the diagnostic test is executed. The **subslot** keyword is used to refer a half-height line card on the router. The valid range for the slot number is from 1 to 8 and 0 to 1 for the subslot number.

Command Default None

Command Modes Privileged EXEC (#)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17a)SX	This command was changed to include the **complete** and **basic** keywords.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2.(33)SXH	This command was changed to include the **system test all** keywords.
12.2(33)SCC	The command was integrated in this release to support Generic Online Diagnostics (GOLD) functionality for Cisco UBR10012 Universal Broadband Router. The keywords **bay**, **slot**, and **subslot** were added for the Cisco UBR10012 Universal Broadband Router.

Usage Guidelines

Note Running all online diagnostic tests disrupts normal system operation. Reset the system after the **diagnostic start system test all** command has completed.
Do not insert, remove, or power down line cards or the supervisor while the system test is running.
Do not issue any diagnostic command other than the **diagnostic stop system test all** command while the system test is running.
Make sure no traffic is running in background.

Note Do not enter the **diagnostic start module** *x* **test all** command on systems that are configured with a DFC3A because this command causes the TCAM test to fail.

Enter the **show diagnostic content** command to display the test ID list.

Enter the *test-id-range* or *port#-range* as integers separated by a comma and a hyphen (for example, 1,3-6 specifies test IDs 1, 3, 4, 5, and 6).

Use **diagnostic stop** command to stop the testing process.

Cisco UBR10012 Router

The command syntax to refer a line card or SPAs is different on Cisco UBR10012 Router. The keyword is **slot x** for a full-height line card, **slot x/y** for a half-height card, and **bay x/y** for a SPA.

Note To start a diagnostic test on the Cisco UBR10012 Router execute the command **diagnostic stop** with the **bay**, **slot** or **subslot** keyword respectively.

The GOLD test cases used to poll for system errors in Cisco IOS Software Release 12.2(33)SCC are Low Latency Queueing (LLQ) drop, Cable Line Card (CLC) memory leak, and Guardian index leak tests.

Examples

The following example shows how to run the specified diagnostic test at the specified slot:

```
Router# diagnostic start module 1 test 5
Module 1:Running test(s) 5 may disrupt normal system operation
Do you want to run disruptive tests? [no] yes
00:48:14:Running OnDemand Diagnostics [Iteration #1] ...
00:48:14:%DIAG-SP-6-TEST_RUNNING:Module 1:Running TestNewLearn{ID=5} ...
00:48:14:%DIAG-SP-6-TEST_OK:Module 1:TestNewLearn{ID=5} has completed successfully
00:48:14:Running OnDemand Diagnostics [Iteration #2] ...
00:48:14:%DIAG-SP-6-TEST_RUNNING:Module 1:Running TestNewLearn{ID=5} ...
00:48:14:%DIAG-SP-6-TEST_OK:Module 1:TestNewLearn{ID=5} has completed successfully
Router#
```

This example shows how to start all online diagnostic tests:

```
Router# diagnostic start system test all
**************************************************************************
* WARNING: *
* 'diagnostic start system test all' will disrupt normal system *
* operation. The system requires RESET after the command *
* 'diagnostic start system test all' has completed prior to *
* normal use. *
* *
* IMPORTANT: *
* 1. DO NOT INSERT, OIR, or POWER DOWN Linecards or *
* Supervisor while system test is running. *
* *
* 2. DO NOT ISSUE ANY DIAGNOSTIC COMMAND except *
* "diagnostic stop system test all" while system test *
* is running. *
* *
* 3. PLEASE MAKE SURE no traffic is running in background. *
**************************************************************************
Do you want to continue? [no]:
```

Cisco UBR10012 Router

The following example shows how to run a diagnostic test with test id 2 on a SPA:

```
ubr-122s-1# diagnostic start bay 1/0 test 2
ubr-122s-1#
Aug  5 09:24:42.019: %DIAG-6-TEST_RUNNING: Bay 1/0: Running TestModenaLLQDrops{I
D=2} ...
Aug  5 09:24:42.019: %DIAG-6-TEST_OK: Bay 1/0: TestModenaLLQDrops{ID=2} has comp
leted successfully
```

Related Commands

Command	Description
diagnostic schedule	Sets the diagnostic test schedule for a particular bay, slot, or subslot.
show diagnostic description	Provides the description for the diagnostic tests.
diagnostic stop	Runs the specified diagnostic test.
show diagnostic content module	Displays the available diagnostic tests.

Command	Description
diagnostic bootup level	Configures the diagnostic bootup level.
diagnostic event-log size	Modifies the diagnostic event-log size dynamically.
diagnostic monitor	Configures the health-monitoring diagnostic testing.
diagnostic ondemand	Configures the on-demand diagnostics.
show diagnostic bootup	Displays the configured diagnostics level at bootup.
show diagnostic events	Displays the diagnostic event log.
show diagnostic ondemand settings	Displays the settings for the on-demand diagnostics.
show diagnostic result	Displays the diagnostic test results for a module.
show diagnostic schedule	Displays the current scheduled diagnostic tasks.
show diagnostic status	Displays the running diagnostics tests.

diagnostic stop

To stop the testing process, use the **diagnostic stop** command in privileged EXEC mode.

diagnostic stop module *num*

Cisco UBR10012 Universal Broadband Router

diagnostic stop {**bay** *slot/bay* | **slot** *slot-no* | **subslot** *slot/subslot*}

Syntax Description

module *num*	Module number.
bay *slot/bay*	Indicates the card slot and bay number of the SPA for which the diagnostic test has stopped. The **bay** keyword is used to refer a SPA on the router. The valid range for the slot number is from 1 to 8 and 0 to 3 for the bay number.
slot *slot-no*	Indicates the slot number of full height line card for which the diagnostic test has to be stopped. The **slot** keyword is used to refer a full-height line card on the router. Valid range for the slot is from 1 to 8.
subslot *slot/subslot*	Indicates the slot and subslot number of half-height line card for which the diagnostic test has to be stopped. The **subslot** keyword is used to refer a half-height line card on the router. The valid range for the slot number is from 1 to 8 and 0 to 1 for the subslot number.

Command Default

None

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SCC	The command was integrated in this release to support Generic Online Diagnostics (GOLD) functionality for Cisco UBR10012 Universal Broadband Router. The keywords **bay**, **slot**, and **subslot** were added for the Cisco UBR10012 Universal Broadband Router.

Usage Guidelines

Use the **diagnostic start** command to start the testing process.

Cisco UBR10012 Router

The command syntax to refer a line card or SPAs is different on Cisco UBR10012 Router. The keyword is **slot x** for a full-height line card, **slot x/y** for a half-height card, and **bay x/y** for a SPA.

Note To stop a diagnostic test on the Cisco UBR10012 Router execute the command **diagnostic stop** with the **bay**, **slot** or **subslot** keyword respectively.

The GOLD test cases used to poll for system errors in Cisco IOS Software Release 12.2(33)SCC are Low Latency Queueing (LLQ) drop, Cable Line Card (CLC) memory leak, and line card index leak tests.

Examples

This example shows how to stop the diagnostic test process:

```
Router# diagnostic stop module 3
Router#
```

This example shows how to stop the diagnostic test process for subslot 5/0 on the Cisco UBR10012 Universal Broadband Router:

```
Router# diagnostic stop subslot 5/0
Router#
```

Related Commands

Command	Description
diagnostic schedule	Sets the diagnostic test schedule for a particular bay, slot, or subslot.
show diagnostic description	Provides the description for the diagnostic tests.
diagnostic start	Stops the specified diagnostic test.
show diagnostic content module	Displays the available diagnostic tests.
diagnostic bootup level	Configures the diagnostic bootup level.
diagnostic event-log size	Modifies the diagnostic event-log size dynamically.
diagnostic monitor	Configures the health-monitoring diagnostic testing.
diagnostic ondemand	Configures the on-demand diagnostics.
show diagnostic bootup	Displays the configured diagnostics level at bootup.
show diagnostic events	Displays the diagnostic event log.
show diagnostic ondemand settings	Displays the settings for the on-demand diagnostics.
show diagnostic result	Displays the diagnostic test results for a module.
show diagnostic schedule	Displays the current scheduled diagnostic tasks.
show diagnostic status	Displays the running diagnostics tests.

dir

To display a list of files on a file system, use the **dir** command in EXEC, privileged EXEC, or diagnostic mode.

dir [/**all**] [/**recursive**] [**all-filesystems**] [*filesystem***:**][*file-url*]

Syntax Description

/all	(Optional) Lists deleted files, undeleted files, and files with errors.
/**recursive**	(Optional) Lists files recursively.
all-filesystems	(Optional) Lists all files in all filesystems on the router.
*filesystem***:**	(Optional) File system or directory containing the files to list, followed by a colon.
file-url	(Optional) The name of the files to display on a specified device. The files can be of any type. You can use wildcards in the filename. A wildcard character (*) matches all patterns. Strings after a wildcard are ignored.

Defaults

The default file system is specified by the **cd** command. When you omit the **/all** keyword, the Cisco IOS software displays only undeleted files.

Command Modes

EXEC (>)
Privileged EXEC (#)
Diagnostic (diag)

Command History

Release	Modification
11.0	This command was introduced.
12.3	A timestamp that shows the offset from Coordinated Universal Time (UTC) was added to the **dir** command display.
12.3(14)T	The **usbflash**[**0**-**9**]**:** and **usbtoken**[**0**-**9**]**:** options were added as available file systems.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(11)T	This command was integrated into the Cisco 7200VXR NPE-G2 platform.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers, and the following enhancements were introduced: • The command was made available in diagnostic mode. • The /**recursive** option was introduced. • The file systems available with the Cisco ASR 1000 Series Routers became available as *filesystem*: options.

Usage Guidelines

Use the **show** (flash file system) command to display more detail about the files in a particular file system.

Examples

The following is sample output from the **dir** command:

```
Router# dir slot0:

Directory of slot0:/

1  -rw-     4720148   Dec 29 2003 17:49:36  -08:00 hampton/nitro/c7200-j-mz
  2  -rw-     4767328   Jan 02 2004 18:42:53  -08:00 c7200-js-mz
  5  -rw-         639   Jan 03 2004 12:09:32  -08:00 rally
  7  -rw-         639   Jan 03 2004 12:37:13  -08:00 the_time

20578304 bytes total (3104544 bytes free)

Router# dir /all slot0:

Directory of slot0:/

1  -rw-     4720148   Dec 15 2003 17:49:36  -08:00 hampton/nitro/c7200-j-mz
  2  -rw-     4767328   Jan 02 2004 18:42:53  -08:00 c7200-js-mz
  3  -rw-     7982828   Jan 02 2004 18:48:14  -08:00 [rsp-jsv-mz]
  4  -rw-         639   Jan 03 2004 12:09:17  -08:00 the_time]
  5  -rw-         639   Jan 03 1994 12:09:32  -08:00 rally
  6  -rw-         639   Jan 03 1994 12:37:01  -08:00 [the_time]
  7  -rw-         639   Jan 03 1994 12:37:13  -08:00
```

Table 28 describes the significant fields shown in the output.

Table 28 dir Field Descriptions

Field	Description
1	Index number of the file.
-rw-	Permissions. The file can be any or all of the following: • d—directory • r—readable • w—writable • x—executable
4720148	Size of the file.
Dec 15 2003 17:49:36	Last modification date.
-08:00	Conversion to local time in hours from Coordinated Universal Time (UTC). In the example, -08:00 indicates that the given time is 8 hours behind UTC or Pacific Standard Time (PST).
hampton/nitro/c7200-j-mz	Filename. Deleted files are indicated by square brackets around the filename.

Related Commands

Command	Description
cd	Changes the default directory or file system.
delete	Deletes a file on a Flash memory device.
undelete	Recovers a file marked “deleted” on a Class A or Class B Flash file system.

disable

To exit privileged EXEC mode and return to user EXEC mode, or to exit to a lower privilege level, enter the **disable** command in EXEC, privileged EXEC, or diagnostic mode.

disable [*privilege-level*]

Syntax Description

privilege-level	(Optional) Specific privilege level (other than user EXEC mode).

Command Modes

EXEC (>)
Privileged EXEC (#)
Diagnostic (diag)

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers, and became available in diagnostic mode.

Usage Guidelines

Up to 16 security levels can be configured using Cisco IOS software. If such levels are configured on a system, using this command with the *privilege-level* option allows you to exit to a lower security level. If a level is not specified, the user will exit to the user EXEC mode, which is the default.

Note Five EXEC commands are associated with privilege level 0: **disable**, **enable**, **exit**, **help**, and **logout**. If you configure a privilege level greater than 0, these five commands will not be included in the command set for that privilege level.

Examples

In the following example, the user enters privileged EXEC mode using the **enable** command, then exits back to user EXEC mode using the **disable** command. Note that the prompt for user EXEC mode is >, and the prompt for privileged EXEC mode is #.

```
Router> enable
Password: <letmein>
Router# disable
Router>
```

Related Commands

Command	Description
enable	Enables higher privilege level access, such as privileged EXEC mode.

disconnect-character

To define a character to disconnect a session, use the **disconnect-character** command in line configuration mode. To remove the disconnect character, use the **no** form of this command.

disconnect-character *ascii-number*

no disconnect-character

Syntax Description

ascii-number	Decimal representation of the session disconnect character.

Defaults

No disconnect character is defined.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

See the "ASCII Character Set and Hex Values" appendix for a list of ASCII characters.

The Break character is represented by zero; NULL cannot be represented.

To use the session-disconnect character in normal communications, precede it with the escape character.

Examples

The following example defines the disconnect character for virtual terminal line 4 as Escape, which is decimal character 27:

```
Router(config)# line vty 4
Router(config-line)# disconnect-character 27
```

dispatch-character

To define a character that causes a packet to be sent, use the **dispatch-character** command in line configuration mode. To remove the definition of the specified dispatch character, use the **no** form of this command.

dispatch-character *ascii-number1* [*ascii-number2 . . . ascii-number*]

no dispatch-character *ascii-number1* [*ascii-number2 . . . ascii-number*]

Syntax Description

ascii-number1	Decimal representation of the desired dispatch character.
ascii-number2 . . . ascii-number	(Optional) Additional decimal representations of characters. This syntax indicates that you can define any number of characters as dispatch characters.

Defaults

No dispatch character is defined.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

See the "ASCII Character Set and Hex Values" appendix for a list of ASCII characters.

The **dispatch-character** command defines one or more dispatch characters that cause a packet to be sent even if the dispatch timer has not expired. Use of a dispatch character causes the Cisco IOS software to attempt to buffer characters into larger-sized packets for transmission to the remote host.

Enable the **dispatch-character** command from the session that initiates the connection, not from the incoming side of a streaming Telnet session.

This command can take multiple arguments, so you can define any number of characters as dispatch characters.

Examples

The following example defines the Return character (decimal 13) as the dispatch character for virtual terminal line (vty) line 4:

```
Router(config)# line vty 4
Router(config-line)# dispatch-character 13
```

Related Commands

Command	Description
dispatch-machine	Specifies an identifier for a TCP packet dispatch state machine on a particular line.
dispatch-timeout	Sets the character dispatch timer.
state-machine	Specifies the transition criteria for the state of a particular state machine.
terminal dispatch-character	Defines a character that causes a packet to be sent for the current session.

dispatch-machine

To specify an identifier for a TCP packet dispatch state machine on a particular line, use the **dispatch-machine** command in line configuration mode. To disable a state machine on a particular line, use the **no** form of this command.

dispatch-machine *name*

no dispatch-machine

Syntax Description

name	Name of the state machine that determines when to send packets on the asynchronous line.

Defaults

No dispatch state machine identifier is defined.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

When the **dispatch-timeout** command is specified, a packet being built will be sent when the timer expires, and the state will be reset to zero.

Any dispatch characters specified using the **dispatch-character** command are ignored when a state machine is also specified.

If a packet becomes full, it will be sent regardless of the current state, but the state will not be reset. The packet size depends on the traffic level on the asynchronous line and the dispatch-timeout value. There is always room for 60 data bytes. If the dispatch-timeout value is greater than or equal to 100 milliseconds, a packet size of 536 (data bytes) is allocated.

Examples

The following example specifies the name linefeed for the state machine:

```
Router(config)# state-machine linefeed 0 0 9 0
Router(config)# state-machine linefeed 0 11 255 0
Router(config)# state-machine linefeed 0 10 10 transmit
Router(config)# line 1
Router(config-line)# dispatch-machine linefeed
```

Related Commands

Command	Description
dispatch-character	Defines a character that causes a packet to be sent.

Command	Description
dispatch-timeout	Sets the character dispatch timer.
state-machine	Specifies the transition criteria for the state of a particular state machine.

dispatch-timeout

To set the character dispatch timer, use the **dispatch-timeout** command in line configuration mode. To remove the timeout definition, use the **no** form of this command.

dispatch-timeout *milliseconds*

no dispatch-timeout

Syntax Description

milliseconds	Integer that specifies the number of milliseconds (ms) that the Cisco IOS software waits after putting the first character into a packet buffer before sending the packet. During this interval, more characters can be added to the packet, which increases the processing efficiency of the remote host.

Defaults

No dispatch timeout is defined.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to increase the processing efficiency for the remote host.

The **dispatch-timeout** line configuration command causes the software to buffer characters into packets for transmission to the remote host. The Cisco IOS software sends a packet a specified amount of time after the first character is put into the buffer. You can use the **dispatch-timeout** and **dispatch-character** line configuration commands together. In this case, the software dispatches a packet each time the dispatch character is entered, or after the specified dispatch timeout interval, depending on which condition is met first.

Note The system response time might appear intermittent if the timeout interval is greater than 100 milliseconds and remote echoing is used. For lines with a reverse-Telnet connection, use a dispatch-timeout value less than 10 milliseconds.

Examples

The following example sets the dispatch timer to 80 milliseconds for virtual terminal line (vty) lines 0 through 4:

```
Router(config)# line vty 0 4
Router(config-line)# dispatch-timeout 80
```

Related Commands

Command	Description
buffer-length	Specifies the maximum length of data streams forwarded on a line.
dispatch-character	Defines a character that causes a packet to be sent.
dispatch-machine	Specifies an identifier for a TCP packet dispatch state machine on a particular line.
state-machine	Specifies the transition criteria for the state of a particular state machine.
terminal dispatch-timeout	Sets the character dispatch timer for the current session.

do

To execute user EXEC or privileged EXEC commands from global configuration mode or other configuration modes or submodes, use the **do** command in any configuration mode.

do *command*

Syntax Description

command	The user EXEC or privileged EXEC command to be executed.

Command Default

A user EXEC or privileged EXEC command is not executed from a configuration mode.

Command Modes

All configuration modes

Command History

Release	Modification
12.2(8)T	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(14)SX	Support for this command was added for the Supervisor Engine 720.
12.2(17a)SX	This command was changed to support the **copy** command restriction.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to execute user EXEC or privileged EXEC commands (such as **show**, **clear**, and **debug** commands) while configuring your routing device. After the EXEC command is executed, the system will return to the configuration mode you were using.

Tip This command can be useful for saving your configuration to the startup-config file without having to return to the user EXEC mode or privileged EXEC mode (**do copy running-config startup-config**) or for checking the status of a feature (using a **do show** command) while configuring the feature.

Caution Do not enter the **do** command in user EXEC mode or privileged EXEC mode. Interruption of service might occur.

You cannot use the **do** command to execute the **configure terminal** command because entering the **configure terminal** command changes the user EXEC mode or privileged EXEC mode to the global configuration mode.

You cannot use the **do** command to execute **copy** or **write** commands in the global configuration or any other configuration mode or submode.

Examples

The following example shows how to enter the **show interfaces serial** privileged EXEC command from within global configuration mode:

```
Router(config)# do show interfaces serial 3/0

Serial3/0 is up, line protocol is up
  Hardware is M8T-RS232
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
  Last input never, output 1d17h, output hang never
  Last clearing of "show interface" counters never
.
.
.
```

The following example shows how to enter the **clear vpdn tunnel** user EXEC or privileged EXEC command from within VPDN configuration mode:

```
Router(config-vpdn)# do clear vpdn tunnel
```

Related Commands

Command	Description
clear vpdn tunnel	Shuts down a specified VPDN tunnel and all sessions within the tunnel.
configure terminal	Enters global configuration mode.
copy	Copies any file from a source to a destination.
show interfaces	Displays statistics for all interfaces configured on the router or access server.
write core	Tests the configuration of a core dump setup.

downward-compatible-config

To generate a configuration that is compatible with an earlier Cisco IOS release, use the **downward-compatible-config** command in global configuration mode. To disable this function, use the **no** form of this command.

downward-compatible-config *version*

no downward-compatible-config

Syntax Description

version	Cisco IOS release number, not earlier than Release 10.2.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

In Cisco IOS Release 10.3, IP access lists changed format. Use the **downward-compatible-config** command to regenerate a configuration in a format prior to Release 10.3 if you are going to downgrade from your software version to version 10.2 or 10.3. The earliest *version* value this command accepts is 10.2.

When this command is configured, the router attempts to generate a configuration that is compatible with the specified version. Note that this command affects only IP access lists.

Under some circumstances, the software might not be able to generate a fully backward-compatible configuration. In such a case, the software issues a warning message.

Examples

The following example generates a configuration file compatible with Cisco IOS Release 10.2 access lists:

```
Router(config)# downward-compatible-config 10.2
```

Related Commands

Command	Description
access-list (extended)	Provides extended access lists that allow more detailed access lists.
access-list (standard)	Defines a standard XNS access list.

editing

To reenable Cisco IOS enhanced editing features for a particular line after they have been disabled, use the **editing** command in line configuration mode. To disable these features, use the **no** form of this command.

editing

no editing

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Enhanced editing features are enabled by default. However, there may be situations in which you need to disable these features. The **no** form of this command disables these enhanced editing features, and the plain form of the command can be used to reenable these features.

Table 29 provides a description of the keys used to enter and edit commands when the editing features are enabled. Ctrl indicates the Control key, which must be pressed simultaneously with its associated letter key. Esc indicates the Escape key, which must be pressed first, followed by its associated letter key. A comma is used in the following table to indicate a key sequence (the comma key should not be pressed). Keys are not case sensitive. Many letters used for CLI navigation and editing were chosen to provide an easy way of remembering their functions. In the following table (Table 29), characters are bolded in the “Function Summary” column to indicate the relation between the letter used and the function.

Table 29 Command Editing Keys and Functions

Keys	Function Summary	Function Details
Tab	Complete command	Completes a partial command name entry. When you enter a unique set of characters and press the Tab key, the system completes the command name. If you enter a set of characters that could indicate more than one command, the system beeps to indicate an error. To view the commands which match the set of characters you have entered, enter a question mark (?) immediately following the partial command (no space). The CLI will then list the commands that begin with that string.
Return (at the command line)	Execute	Executes the command.
Return (at the --More-- prompt)	Continue	Displays the next line of output.
Space Bar (at the --More-- prompt)	Continue	Displays the next screen of output. The amount of output you see will depend on the screen depth setting of your terminal.
Delete or Backspace	Backspace	Erases the character to the left of the cursor.
Left Arrow[1] or Ctrl-B	**B**ack character	Moves the cursor one character to the left. When you enter a command that extends beyond a single line, you can press the Left Arrow or Ctrl-B keys repeatedly to scroll back toward the system prompt and verify the beginning of the command entry.
Right Arrow[1] or Ctrl-F	**F**orward character	Moves the cursor one character to the right.
Esc, B	**B**ack word	Moves the cursor back one word.
Esc, F	**F**orward word	Moves the cursor forward one word.
Ctrl-A	Beginning of line	Moves the cursor to the beginning of the line.
Ctrl-E	**E**nd of line	Moves the cursor to the end of the command line.
Ctrl-D	**D**elete character	Deletes the character at the cursor.
Esc, D	**D**elete next word	Deletes from the cursor to the end of the word.
Ctrl-W	Delete previous **w**ord	Deletes the word to the left of the cursor.
Ctrl-K	Delete line forward	Deletes all characters from the cursor to the end of the command line.
Ctrl-U or Ctrl-X	Delete line backward	Deletes all characters from the cursor back to the beginning of the command line.
Ctrl-T	**T**ranspose characters	Transposes the character to the left of the cursor with the character located at the cursor.

Table 29 Command Editing Keys and Functions (continued)

Keys	Function Summary	Function Details
Ctrl-R or Ctrl-L	**R**edisplay **l**ine	Redisplays the system prompt and command line.
Ctrl-V or Esc, Q	Ignore editing	Inserts a code to indicate to the system that the keystroke immediately following should be treated as a command entry, *not* as an editing key.
Up Arrow[1] or Ctrl-P	**P**revious command	Recalls commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Down Arrow[1] or Ctrl-N (next)	**N**ext command	Returns to more recent commands in the history buffer (after recalling commands with the Up Arrow or Ctrl-P). Repeat the key sequence to recall successively more recent commands.
Ctrl-Y	Recall last deleted command	Recalls the most recent entry in the delete buffer. The delete buffer contains the last ten items you have deleted or cut. Ctrl-Y can be used in conjunction with Esc Y.
Esc, Y	Recall next deleted command	Recalls the next entry in the delete buffer. The delete buffer contains the last ten items you have deleted. Press Ctrl-Y first to recall the most recent entry. Then press Esc Y up to nine times to recall the remaining entries in the buffer. If you bypass an entry, continue to press Esc Y to cycle back to it.
Esc, C	**C**apitalize word	Capitalizes the word from the cursor to the end of the word.
Esc, U	Make word **u**ppercase	Changes all letters from the cursor to the next space on the line appear in uppercase letters.
Esc, L	Make word **l**owercase	Changes the word to lowercase from the cursor to the end of the word.

1. The arrow keys function only with ANSI-compatible terminals.

Examples

In the following example, enhanced editing mode is disabled on line 3:

```
Router(config)# line 3
Router(config-line)# no editing
```

Related Commands

Command	Description
terminal editing	Controls CLI enhanced editing feature for the current terminal session.

enable

To change the privilege level for a CLI session or to use a CLI view for a CLI session, use the **enable** command in either user EXEC, privileged EXEC, or diagnostic mode.

enable [*privilege-level*] [**view** [*view-name*]]

Syntax Description

privilege-level	(Optional) Privilege level at which to log in.
view	(Optional) Enters into root view, which enables users to configure CLI views. **Note** This keyword is required if you want to configure a CLI view.
view-name	(Optional) Enters or exits a specified command-line interface (CLI) view. This keyword can be used to switch from one CLI view to another CLI view.

Defaults

Privilege-level 15 (privileged EXEC)

Command Modes

User EXEC (>)

Privileged EXEC (#)

Diagnostic Mode (diag)

Command History

Release	Modification
10.0	This command was introduced.
12.3(7)T	The **view** keyword and *view-name* argument were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	The **view** keyword and *view-name* argument were integrated into Cisco IOS Release 12.2(33)SRB.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(22)SB.
Cisco IOS XE Release 2.1	This command became available on the ASR 1000 Series Routers, and became available in diagnostic mode for the first time.

Usage Guidelines

By default, using the **enable** command without the *privilege-level* argument in user EXEC mode causes the router to enter privileged EXEC mode (privilege-level 15).

Entering privileged EXEC mode enables the use of privileged commands. Because many of the privileged commands set operating parameters, privileged access should be password-protected to prevent unauthorized use. If the system administrator has set a password with the **enable password** global configuration command, you are prompted to enter the password before being allowed access to privileged EXEC mode. The password is case sensitive.

If an **enable** password has not been set, only enable mode can be accessed through the console connection.

Security levels can be set by an administrator using the **enable password** and **privilege level** commands. Up to 16 privilege levels can be specified, using the numbers 0 through 15. Using these privilege levels, the administrator can allow or deny access to specific commands. Privilege level 0 is associated with user EXEC mode, and privilege level 15 is associated with privileged EXEC mode.

For more information on defined privilege levels, see the *Cisco IOS Security Configuration Guide* and the *Cisco IOS Security Command Reference* publications.

If a level is not specified when entering the **enable** command, the user will enter the default mode of privileged EXEC (level 15).

Accessing a CLI View

CLI views restrict user access to specified CLI and configuration information. To configure and access CLI views, users must first enter into root view, which is accomplished via the **enable view** command (without the *view-name* argument). Thereafter, users are prompted for a password, which is the same password as the privilege level 15 password.

The *view-name* argument is used to switch from one view to another view.

To prevent dictionary attacks, a user is prompted for a password even if an incorrect view name is given. The user is denied access only after an incorrect view name and password are given.

Examples

In the following example, the user enters privileged EXEC mode (changes to privilege-level 15) by using the **enable** command without a privilege-level argument. The system prompts the user for a password before allowing access to the privileged EXEC mode. The password is not printed to the screen. The user then exits back to user EXEC mode using the **disable** command. Note that the prompt for user EXEC mode is the greater than symbol (>), and the prompt for privileged EXEC mode is the number sign (#).

```
Router> enable
Password: <letmein>
Router# disable
Router>
```

The following example shows which commands are available inside the CLI view “first” after the user has logged into this view:

```
Router# enable view first

Password:

00:28:23:%PARSER-6-VIEW_SWITCH:successfully set to view 'first'.
Router# ?
Exec commands:
  configure  Enter configuration mode
  enable     Turn on privileged commands
  exit       Exit from the EXEC
  show       Show running system information

Router# show ?

  ip       IP information
  parser   Display parser information
  version  System hardware and software status
```

```
Router# show ip ?

  access-lists            List IP access lists
  accounting              The active IP accounting database
  aliases                 IP alias table
  arp                     IP ARP table
  as-path-access-list     List AS path access lists
  bgp                     BGP information
  cache                   IP fast-switching route cache
  casa                    display casa information
  cef                     Cisco Express Forwarding
  community-list          List community-list
  dfp                     DFP information
  dhcp                    Show items in the DHCP database
  drp                     Director response protocol
  dvmrp                   DVMRP information
  eigrp                   IP-EIGRP show commands
  extcommunity-list       List extended-community list
  flow                    NetFlow switching
  helper-address          helper-address table
  http                    HTTP information
  igmp                    IGMP information
  irdp                    ICMP Router Discovery Protocol
.
.
```

The following example shows how to use the **enable view** command to switch from the root view to the CLI view "first":

```
Router# enable view
Router#
01:08:16:%PARSER-6-VIEW_SWITCH:successfully set to view 'root'.
Router#
! Enable the show parser view command from the root view
Router# show parser view

Current view is 'root'
! Enable the show parser view command from the root view to display all views
Router# show parser view all

Views Present in System:
View Name:   first
View Name:   second
! Switch to the CLI view "first."
Router# enable view first
Router#
01:08:09:%PARSER-6-VIEW_SWITCH:successfully set to view 'first'.
! Enable the show parser view command from the CLI view "first."
Router# show parser view

Current view is 'first'
```

Related Commands

Command	Description
disable	Exits from privileged EXEC mode to user EXEC mode, or, if privilege levels are set, to the specified privilege level.
enable password	Sets a local password to control access to various privilege levels.
privilege level (global)	Sets a privilege level for a command.
privilege level (line)	Sets a privilege level for a command for a specific line.

end

To end the current configuration session and return to privileged EXEC mode, use the **end** command in global configuration mode.

end

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command will bring you back to privileged EXEC mode regardless of what configuration mode or configuration submode you are in.

Note This global configuration command can be used in any configuration mode.

Use this command when you are done configuring the system and you want to return to EXEC mode to perform verification steps.

Examples

In the following example, the **end** command is used to exit from ALPS ASCU configuration mode and return to privileged EXEC mode. A **show** command is used in privileged EXEC mode to verify the configuration.

```
Router# configure terminal
Router(config)# interface serial 1:1
Router(config-if)# alps ascu 4B
Router(config-alps-ascu)# end
Router# show interface serial 1:1
```

Related Commands

Command	Description
exit (global)	Exits from the current configuration mode.

environment-monitor shutdown temperature

To enable monitoring of the environment sensors, use the **environment-monitor shutdown temperature** command in global configuration mode. To disable monitoring of the environment sensors, use the **no** form of this command.

environment-monitor shutdown temperature [**rommon** | **powerdown**]

no environment-monitor shutdown temperature [**rommon** | **powerdown**]

Syntax Description

rommon	(Optional) Places the supervisor engine in ROMMON when a major active alarm is identified.
powerdown	(Optional) Powers down the supervisor engine when a new active major alarm is identified.

Defaults

By default, **rommon** is enabled.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(18)SXF17	Support for **powerdown** keyword added.
12.2(33)SXH6	Support for **powerdown** keyword added.

Examples

This example shows how to place the supervisor engine in ROMMON when a major active alarm occurs:

```
Router(config)# environment-monitor shutdown temperature rommon
Router(config)#
```

This example shows how to power down the supervisor engine when a major active alarm occurs:

```
Router(config)# environment-monitor shutdown temperature powerdown
Router(config)#
```

environment temperature-controlled

To enable the ambient temperature control, use the **environment temperature-controlled** command in global configuration mode. To disable the ambient temperature control, use the **no** form of this command.

environment temperature-controlled

no environment temperature-controlled

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command does not affect temperature monitoring and alarm thresholds; it only affects whether a module may be powered on. The software does not validate the inlet temperature.

If you enter the **no** form of this command and the cooling capacity is reduced below the module cooling requirement, a syslog warning (and SNMP alarm) is generated. This module status does not change, and an environmental alarm is not raised when you enter the **no** form of this command.

Examples

This example shows how to enable the ambient temperature control:

```
Router(config)# environment temperature-controlled
Router(config)#
```

This example shows how to disable the ambient temperature control:

```
Router(config)# no environment temperature-controlled
Router(config)#
```

erase

To erase a file system or all files available on a file system, use the **erase** command in privileged EXEC or diagnostic mode.

erase {**/all nvram:** | **/no-squeeze-reserve-space** | *filesystem***:** | **startup-config**}

Cisco 7600 Series Routers and Cisco ASR1000 Series Routers

erase {**/all nvram:** | *filesystem***:** | **startup-config**}

Syntax Description

/all	Erases all files in the specified file system.
*filesystem***:**	File system name, followed by a colon. For example, **flash:** or **nvram:**.
/no-squeeze-reserve-space	Disables the squeeze operation to conserve memory and makes the **erase** command compatible with older file systems.
startup-config	Erases the contents of the configuration memory.

Command Modes

Privileged EXEC (#)
Diagnostic (#)

Command History

Release	Modification
11.0	This command was introduced.
12.2(11)T	This command was modified. The **/no-squeeze-reserve-space** keyword was added.
12.2(14)SX	This command was modified. Support for this command was added for the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was modified. The command was introduced in diagnostic mode on the Cisco ASR 1000 Series Routers, and the **/all** keyword was added.

Usage Guidelines

The **erase nvram:** command replaces the **write erase** command and the **erase startup-config** command.

Caution When you use the **erase** command to erase a file system, you cannot recover the files in the file system.

The *word help* feature is disabled for the **erase** command. You must enter the complete command name to enable the command. The parser does not complete the command name if you enter partial syntax of the command and press the Tab key. For more information on the *word help* feature, refer to the *Using the Cisco IOS Command-Line Interface* feature guide.

The **erase** command can be used on Class B and Class C flash file systems only.

Class A flash file systems cannot be erased. You can delete individual files using the **delete** command and then reclaim the space using the **squeeze** command. You can use the **format** command to format the flash file system. The **format** command when used on ATA disk clears the File Allocation Table (FAT) and root directory entries only. The data is not erased.

The **erase nvram:** command erases NVRAM. On Class A file system platforms, if the CONFIG_FILE variable specifies a file in flash memory, the specified file will be marked "deleted."

The **erase /all nvram:** command erases all files on NVRAM, including private NVRAM.

The **/no-squeeze-reserve-space** keyword is available on systems with small amounts of flash memory in order to conserve memory. When a squeeze operation is performed, the last two erase sectors are permanently reserved for the squeeze logs and squeeze buffer. The **/no-squeeze-reserve-space** keyword prevents the reservation of space that guarantees the ability to run the squeeze command. Disabling the squeeze operation keeps these memory sectors free. If any sectors using squeeze data are detected, they will be erased when the **/no-squeeze-reserve-space** keyword is used. The **/no-squeeze-reserve-space** keyword increases the available amount of usable flash space, but you may not be able to run the **squeeze** command. This is typically fine if the file system (such as flash) is used to store a single, large file. For example, an IOS image.

On Class C flash file systems, space is dynamically reclaimed when you use the **delete** command. You can also use either the **format** or **erase** command to reinitialize a Class C flash file system.

Note Use the context-sensitive help to determine which file systems can be used for the **erase** command. The output will vary based on the platform.

Examples

The following example shows how to erase the NVRAM, including the startup configuration located there:

```
Router# erase nvram:
```

The following example shows how to erase all of partition 2 in internal flash memory:

```
Router# erase flash:2

System flash directory, partition 2:
File  Length   Name/status
  1   1711088  dirt/images/c3600-i-mz
[1711152 bytes used, 15066064 available, 16777216 total]
Erase flash device, partition 2? [confirm]
Are you sure? [yes/no]: yes
Erasing device... eeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee ...erased
```

The following example shows how to erase flash memory when flash is partitioned, but no partition is specified in the command:

```
Router# erase flash:

System flash partition information:
Partition   Size     Used    Free    Bank-Size   State       Copy-Mode
    1       4096K    2048K   2048K   2048K       Read Only   RXBOOT-FLH
    2       4096K    2048K   2048K   2048K       Read/Write  Direct

[Type ?<no> for partition directory; ? for full directory; q to abort]
Which partition? [default = 2]
```

The system will prompt only if there are two or more read/write partitions. If the partition entered is not valid or is the read-only partition, the process terminates. You can enter a partition number, a question mark (**?**) for a directory display of all partitions, or a question mark and a number (**?***number*) for directory display of a particular partition. The default is the first read/write partition.

```
System flash directory, partition 2:
File  Length   Name/status
  1   3459720  master/igs-bfpx.100-4.3
[3459784 bytes used, 734520 available, 4194304 total]
Erase flash device, partition 2? [confirm] <Return>
```

Related Commands

Command	Description
boot config	Specifies the device and filename of the configuration file from which the router configures itself during initialization (startup).
delete	Deletes a file on a flash memory device.
more nvram:startup-config	Displays the startup configuration file contained in NVRAM or specified by the CONFIG_FILE environment variable.
squeeze	Removes all deleted files from the flash file system and recovers the memory space used by deleted files.
show bootvar	Displays the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, the contents of the BOOTLDR environment variable, and the configuration register setting.
undelete	Recovers a file marked “deleted” on a Class A or Class B flash file system.
write erase	The **write erase** command is replaced by the **erase nvram:** command. See the description of the **erase** command for more information

erase bootflash

The **erase bootflash:** and **erase bootflash** commands have identical functions. See the description of the **erase** command in this chapter for more information.

errdisable detect cause

To enable the error-disable detection, use the **errdisable detect cause** command in global configuration mode. To disable the error-disable detection, use the **no** form of this command.

errdisable detect cause {**all** | **dtp-flap** | **l2ptguard** | **link-flap** | **packet-buffer-error** | **pagp-flap** | **udld**}

no errdisable detect cause {**all** | **dtp-flap** | l**2ptguard** | **link-flap** | **pagp-flap** | **udld**}

Syntax Description

all	Specifies error-disable detection for all error-disable causes.
dtp-flap	Specifies detection for the DTP flap error-disable cause.
l2ptguard	Specifies detection for the Layer 2 protocol-tunnel error-disable cause.
link-flap	Specifies detection for the link flap error-disable cause.
packet-buffer-error	Causes the packet buffer error to error-disable the affected port.
pagp-flap	Specifies detection for the PAgP flap error-disable cause.
udld	Specifies detection for the UDLD error-disable cause.

Defaults

Enabled for all causes

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17b)SXA	This command was changed to include the **packet-buffer-error** keyword.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Note Entering the **no errdisable detect cause packet-buffer-error** command allows you to detect the fault that triggers a power cycle of the affected module.

A cause (bpduguard, dtp-flap, link-flap, pagp-flap, root-guard, udld) is defined as the reason why the error-disabled state occurred. When a cause is detected on an interface, the interface is placed in an error-disabled state (an operational state that is similiar to the link-down state).

You must enter the **shutdown** and then the **no shutdown** commands to recover an interface manually from the error-disable state.

Examples

This example shows how to enable the error-disable detection for the Layer 2 protocol-tunnel guard error-disable cause:

```
Router(config)# errdisable detect cause l2ptguard
Router(config)#
```

Related Commands

Command	Description
show errdisable detect	Displays the error-disable detection status.
show interfaces status	Displays the interface status or a list of interfaces in an error-disabled state on LAN ports only.

errdisable recovery

To configure the recovery mechanism variables, use the **errdisable recovery** command in global configuration mode. To return to the default state, use the **no** form of this command.

errdisable recovery {**cause** {**all** | **arp-inspection** | **bpduguard** | **channel-misconfig** | **dhcp-rate-limit** | **dtp-flap** | **gbic-invalid** | **l2ptguard** | **link-flap** | **pagp-flap** | **psecure-violation** | **security-violation** | **udld** | **unicast-flood**} | **interval** *interval*}

no errdisable recovery {**cause** {**all** | **arp-inspection** | **bpduguard** | **channel-misconfig** | **dhcp-rate-limit** | **dtp-flap** | **gbic-invalid** | **l2ptguard** | **link-flap** | **pagp-flap** | **psecure-violation** | **security-violation** | **udld** | **unicast-flood**} | **interval** *interval*}

Syntax Description

cause	Enables error-disable recovery from a specific cause.
all	Enables the recovery timers for all error-disable causes.
arp-inspection	Enables error-disable recovery from an ARP inspection cause.
bpduguard	Enables the recovery timer for the BPDU-guard error-disable cause.
channel-misconfig	Enables the recovery timer for the channel-misconfig error-disable cause.
dhcp-rate-limit	Enables the recovery timer for the DHCP-rate-limit error-disable cause.
dtp-flap	Enables the recovery timer for the DTP-flap error-disable cause.
gbic-invalid	Enables the recovery timer for the GBIC-invalid error-disable cause.
l2ptguard	Enables the recovery timer for the L2PT error-disable cause.
link-flap	Enables the recovery timer for the link-flap error-disable cause.
pagp-flap	Enables the recovery timer for the PAgP-flap error-disable cause.
psecure-violation	Enables the recovery timer for the psecure-violation error-disable cause.
security-violation	Enables the automatic recovery of ports that were disabled because of 802.1X security violations.
udld	Enables the recovery timer for the UDLD error-disable cause.
unicast-flood	Enables the recovery timer for the unicast-flood error-disable cause.
interval *interval*	Specifies the time, in seconds, to recover from a specified error-disable cause. Range: 30 to 86400. Default: 300.

Command Default

The recovery mechanisms are disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	This command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	This command was implemented on the Supervisor Engine 2.
12.2(18)SXD	The **arp-inspection** keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

A cause (**bpduguard**, **channel-misconfig**, **dhcp-rate-limit**, **dtp-flap**, **l2ptguard**, **link-flap**, **pagp-flap**, **psecure-violation**, **security-violation**, **udld**, or **unicast-flood**) is defined as the reason why the error-disabled state occurred. When a cause is detected on an interface, the interface is placed in an error-disabled state (an operational state that is similar to the link-down state). If you do not enable error-disable recovery for the cause, the interface stays in the error-disabled state until a shutdown and no shutdown occurs. If you enable recovery for a cause, the interface is brought out of the error-disabled state and allowed to retry operation once all the causes have timed out.

You must enter the **shutdown** command and then the **no shutdown** command to manually recover an interface from the error-disabled state.

Note Each time you want enter the **errdisable recovery cause** command to add a new reason for recovery, it takes up a separate line; each new reason does not get appended to the original single line. This means you must enter each new reason separately.

Examples

This example shows how to enable the recovery timer for the BPDU-guard error-disable cause:

```
Router(config)# errdisable recovery cause bpduguard
```

This example shows how to set the recovery timer to 300 seconds:

```
Router(config)# errdisable recovery interval 300
```

Related Commands

Command	Description
show errdisable recovery	Displays the information about the error-disable recovery timer.
show interfaces status	Displays the interface status or a list of interfaces in an error-disabled state on LAN ports only.

escape-character

To define a system escape character, use the **escape-character** command in line configuration mode. To set the escape character to Break, use the **no** or **default** form of this command.

escape-character {**break** | *char* | **default** | **none** | **soft**}

no escape-character [**soft**]

default escape-character [**soft**]

Syntax Description

break	Sets the escape character to Break. Note that the Break key should not be used as an escape character on a console terminal.
char	Character (for example, **!**) or its ASCII decimal representation (integer in the range of 0 to 255) to be used as the escape character.
default	Sets the escape key sequence to the default of Ctrl-^, X.
none	Disables escape entirely.
soft	Sets an escape character that will wait until pending input is processed before it executes.

Defaults

The default escape key sequence is Ctrl-Shift-6 (Ctrl-^) or Ctrl-Shift-6, X (^^X). The X is generally only required for modem connections.

The **default escape-character** command sets the escape character to Break (the default setting for Break is Ctrl-C).

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
11.3	The **soft** keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

See the "ASCII Character Set and Hexidecimal Values" appendix for a list of ASCII characters.

The escape character (or key sequence) suspends any actively running processes and returns you to privileged EXEC mode or, if a menu is being used, to the system menu interface. The escape character is used for interrupting or aborting a process started by previously executed command. Examples of processes from which you can escape include Domain-Name lookup, **ping**, **trace**, and Telnet sessions initiated from the device to which you are connected.

To view the current setting of the escape sequence for a line, use the **show line** command followed by the specific line identifier (for example, **show line 0**, or **show line console**). The default escape sequence for a line is often displayed as ^^X . The first caret symbol represents the Control (Ctrl) key, the second caret symbol is literal (Shift-6), and the X is literal (for most systems, the X is not required).

To set the escape key for the active terminal line session, use the **terminal escape-character** command.

The Break key cannot be used as an escape character on a console terminal because the Cisco IOS software interprets Break as an instruction to halt the system. Depending upon the configuration register setting, break commands issued from the console line either will be ignored or cause the server to shut down.

To send an escape sequence over a Telnet connection, press **Ctrl-Shift-6** twice.

The **escape-character soft** form of this command defines a character or character sequence that will cause the system to wait until pending input is processed before suspending the current session. This option allows you to program a key sequence to perform multiple actions, such as using the F1 key to execute a command, then execute the escape function after the first command is executed.

The following restrictions apply when using the **soft** keyword:

- The length of the logout sequence must be 14 characters or fewer.
- The soft escape character cannot be the same as the generic Cisco escape character, Break, or the characters b, d, n, or s.
- The soft escape character should be an ASCII value from 1 to 127. Do not use the number 30.

Examples

The following example sets the escape character for the console line to the keyboard entry Ctrl-P, which is represented by the ASCII decimal value of 16:

```
Router(config)# line console
Router(config-line)# escape-character 16
```

The following example sets the escape character for line 1 to **!**, which is represented in the configuration file as the ASCII number 33:

```
Router(config)# line 1
Router(config-line)# escape-character !
Router(config-line)# end
Router# show running-config
Building configuration...
.
.
.
line 1
 autoselect during-login
 autoselect ppp
 modem InOut
 transport preferred none
 transport output telnet
 escape-character 33
```

Related Commands

Command	Description
show line	Displays information about the specified line connection, or all the lines.
terminal escape-character	Sets the escape character for the current terminal line for the current session.

exec

To allow an EXEC process on a line, use the **exec** command in line configuration mode. To turn off the EXEC process for the specified line, use the **no** form of this command.

exec

no exec

Syntax Description

This command has no arguments or keywords.

Defaults

The EXEC processes is enabled on all lines.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

When you want to allow only an outgoing connection on a line, use the **no exec** command.

The **no exec** command allows you to disable the EXEC process for connections which may attempt to send unsolicited data to the router. (For example, the control port of a rack of modems attached to an auxiliary port of router.) When certain types of data are sent to a line connection, an EXEC process can start, which makes the line unavailable.

When a user tries to Telnet to a line with the EXEC process disabled, the user will get no response when attempting to log on.

Examples

The following example disables the EXEC process on line 7.

```
Router(config)# line 7
Router(config-line)# no exec
```

exec-banner

To reenable the display of EXEC and message-of-the-day (MOTD) banners on the specified line or lines, use the **exec-banner** command in line configuration mode. To suppress the banners on the specified line or lines, use the **no** form of this command.

exec-banner

no exec-banner

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled on all lines

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command determines whether the router will display the EXEC banner and the message-of-the-day (MOTD) banner when an EXEC session is created. These banners are defined with the **banner exec** and **banner motd** global configuration commands. By default, these banner are enabled on all lines. Disable the EXEC and MOTD banners using the **no exec-banner** command.

This command has no effect on the incoming banner, which is controlled by the **banner incoming** command.

The MOTD banners can also be disabled by the **no motd-banner** line configuration command, which disables MOTD banners on a line. If the **no exec-banner** command is configured on a line, the MOTD banner will be disabled regardless of whether the **motd-banner** command is enabled or disabled. Table 30 summarizes the effects of the **exec-banner** command and the **motd-banner** command.

Table 30 Banners Displayed Based On exec-banner and motd-banner Combinations

	exec-banner (default)	**no exec-banner**
motd-banner (default)	MOTD banner EXEC banner	None
no motd-banner	EXEC banner	None

For reverse Telnet connections, the EXEC banner is never displayed. Instead, the incoming banner is displayed. The MOTD banner is displayed by default, but it is disabled if either the **no exec-banner** command or **no motd-banner** command is configured. Table 31 summarizes the effects of the **exec-banner** command and the **motd-banner** command for reverse Telnet connections.

Table 31 Banners Displayed Based On exec-banner and motd-banner Combinations for Reverse Telnet Sessions to Async Lines

	exec-banner (default)	**no exec-banner**
motd-banner (default)	MOTD banner Incoming banner	Incoming banner
no motd-banner	Incoming banner	Incoming banner

Examples

The following example suppresses the EXEC and MOTD banners on virtual terminal lines 0 to 4:

```
Router(config)# line vty 0 4
Router(config-line)# no exec-banner
```

Related Commands

Command	Description
banner exec	Defines and enables a customized banner to be displayed whenever the EXEC process is initiated.
banner incoming	Defines and enables a customized message to be displayed when there is an incoming connection to a terminal line from a host on the network.
banner motd	Defines and enables a customized message-of-the-day banner.
motd-banner	Controls (enables or disables) the display of message-of-the-day banners on a specified line or lines.

exec-character-bits

To configure the character widths of EXEC and configuration command characters, use the **exec-character-bits** command in line configuration mode. To restore the default value, use the **no** form of this command.

exec-character-bits {**7** | **8**}

no exec-character-bits

Syntax Description

7	Selects the 7-bit character set. This is the default.
8	Selects the full 8-bit character set for use of international and graphical characters in banner messages, prompts, and so on.

Defaults

7-bit ASCII character set

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Setting the EXEC character width to 8 allows you to use special graphical and international characters in banners, prompts, and so on. However, setting the EXEC character width to 8 bits can cause failures. If a user on a terminal that is sending parity enters the **help** command, an "unrecognized command" message appears because the system is reading all 8 bits, and the eighth bit is not needed for the **help** command.

Note If you are using the **autoselect** function, set the activation character to the default (Return) and the value for **exec-character-bits** to 7. If you change these defaults, the application will not recognize the activation request.

Examples

The following example enables full 8-bit international character sets, except for the console, which is an ASCII terminal. It illustrates use of the **default-value exec-character-bits** global configuration command and the **exec-character-bits** line configuration command.

```
Router(config)# default-value exec-character-bits 8
Router(config)# line 0
Router(config-line)# exec-character-bits 7
```

Related Commands

Command	Description
default-value exec-character-bits	Defines the EXEC character width for either 7 bits or 8 bits.
default-value special-character-bits	Configures the flow control default value from a 7-bit width to an 8-bit width.
length	Sets the terminal screen length.
terminal exec-character-bits	Locally changes the ASCII character set used in EXEC and configuration command characters for the current session.
terminal special-character-bits	Changes the ASCII character widths to accept special characters for the current terminal line and session.

exec-timeout

To set the interval that the EXEC command interpreter waits until user input is detected, use the **exec-timeout** command in line configuration mode. To remove the timeout definition, use the **no** form of this command.

exec-timeout *minutes* [*seconds*]

no exec-timeout

Syntax Description

minutes	Integer that specifies the number of minutes. The default is 10 minutes.
seconds	(Optional) Additional time intervals in seconds.

Defaults

10 minutes

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If no input is detected during the interval, the EXEC facility resumes the current connection. If no connections exist, the EXEC facility returns the terminal to the idle state and disconnects the incoming session.

To specify no timeout, enter the **exec-timeout 0 0** command.

Examples

The following example sets a time interval of 2 minutes, 30 seconds:

```
Router(config)# line console
Router(config-line)# exec-timeout 2 30
```

The following example sets a time interval of 10 seconds:

```
Router(config)# line console
Router(config-line)# exec-timeout 0 10
```

execute-on

To execute commands on a line card, use the **execute-on** command in privileged EXEC mode.

execute-on {**slot** *slot-number* | **all | master**} *command*

Syntax Description

slot *slot-number*	Executes the command on the line card in the specified slot. Slot numbers can be chosen from the following ranges: • Cisco 12012 router: 0 to 11 • Cisco 12008 access server: 0 to 7 • Cisco AS5800 access server: 0 to 13
all	Executes the command on all line cards.
master	(AS5800 only) Executes the designated command on a Dial Shelf Controller (DSC). Do not use this option; it is used for technical support troubleshooting only.
command	Cisco IOS command to remotely execute on the line card.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was introduced to support Cisco 12000 series Gigabit Switch Routers.
11.3(2)AA	This command was implemented in images for the Cisco AS5800 series.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to execute a command on one or all line cards to monitor and maintain information on one or more line cards (for example, a line card in a specified slot on a dial shelf). This allows you to issue commands remotely; that is, to issue commands without needing to log in to the line card directly. The **all** form of the command allows you to issue commands to all the line cards without having to log in to each in turn.

Though this command does not have a **no** form, note that it is possible to use the **no** form of the remotely executed commands used in this command.

Tip This command is useful when used with **show** EXEC commands (such as **show version**), because you can verify and troubleshoot the features found only on a specific line card. Please note, however, that because not all statistics are maintained on the line cards, the output from some of the **show** commands might not be consistent.

Cisco 12000 GSR Guidelines and Restrictions

You can use the **execute-on** privileged EXEC command only from Cisco IOS software running on the GRP card.

Timesaver Though you can use the **attach** privileged EXEC command to execute commands on a specific line card, using the **execute-on slot** command saves you some steps. For example, first you must use the **attach** command to connect to the Cisco IOS software running on the line card. Next you must issue the command. Finally you must disconnect from the line card to return to the Cisco IOS software running on the GRP card. With the **execute-on slot** command, you can perform three steps with one command. In addition, the **execute-on all** command allows you to perform the same command on all line cards simultaneously.

Cisco AS5800 Guidelines and Restrictions

The purpose of the command is to conveniently enable certain commands to be remotely executed on the dial shelf cards from the router without connecting to each line card. This is the recommended procedure, because it avoids the possibility of adversely affecting a good configuration of a line card in the process. The **execute-on** command does not give access to every Cisco IOS command available on the Cisco AS5800 access server. In general, the purpose of the **execute-on** command is to provide access to statistical reports from line cards without directly connecting to the dial shelf line cards.

Caution Do not use this command to change configurations on dial shelf cards, because such changes will not be reflected in the router shelf.

Using this command makes it possible to accumulate inputs for inclusion in the **show tech-support** command.

The **master** form of the command can run a designated command remotely on the router from the DSC card. However, using the console on the DSC is *not* recommended. It is used for technical support troubleshooting only.

The **show tech-support** command for each dial shelf card is bundled into the router shelf's **show tech-support** command via the **execute-on** facility.

The **execute-on** command also support interactive commands such as the following:

```
router: execute-on slave slot slot ping
```

The **execute-on** command has the same limitations and restrictions as a **vty telnet** client has; that is, it cannot reload DSC using the following command:

```
router: execute-on slave slot slot reload
```

You can use the **execute-on** command to enable remote execution of the commands included in the following partial list:

- **debug dsc clock**
- **show context**
- **show diag**
- **show environment**
- **show dsc clock**
- **show dsi**
- **show dsip**
- **show tech-support**

Examples

In the following example, the user executes the **show controllers** command on the line card in slot 4 of a Cisco 12000 series GSR:

```
Router# execute-on slot 4 show controllers

========= Line Card (Slot 4) =======

Interface POS0
Hardware is BFLC POS
lcpos_instance struct   6033A6E0
RX POS ASIC addr space  12000000
TX POS ASIC addr space  12000100
SUNI framer addr space  12000400
SUNI rsop intr status   00
CRC16 enabled, HDLC enc, int clock
no loop

Interface POS1
Hardware is BFLC POS
lcpos_instance struct   6033CEC0
RX POS ASIC addr space  12000000
TX POS ASIC addr space  12000100
SUNI framer addr space  12000600
SUNI rsop intr status   00
CRC32 enabled, HDLC enc, int clock
no loop

Interface POS2
Hardware is BFLC POS
lcpos_instance struct   6033F6A0
RX POS ASIC addr space  12000000
TX POS ASIC addr space  12000100
SUNI framer addr space  12000800
SUNI rsop intr status   00
CRC32 enabled, HDLC enc, int clock
no loop

Interface POS3
Hardware is BFLC POS
lcpos_instance struct   60341E80
RX POS ASIC addr space  12000000
TX POS ASIC addr space  12000100
SUNI framer addr space  12000A00
SUNI rsop intr status   00
CRC32 enabled, HDLC enc, ext clock
no loop
Router#
```

Related Commands

Command	Description
attach	Connects you to a specific line card for the purpose of executing commands using the Cisco IOS software image on that line card.

exit (EXEC)

To close an active terminal session by logging off the router, use the **exit** command in EXEC mode.

exit

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use the **exit** command in EXEC mode to exit the active session (log off the device). This command can be used in any EXEC mode (such as User EXEC mode or Privileged EXEC mode) to exit from the EXEC process.

Examples

In the following example, the **exit** (global) command is used to move from global configuration mode to privileged EXEC mode, the **disable** command is used to move from privileged EXEC mode to user EXEC mode, and the **exit** (EXEC) command is used to log off (exit the active session):

```
Router(config)# exit
Router# disable
Router> exit
```

Related Commands

Command	Description
disconnect	Disconnects a line.
end	Ends your configuration session by exiting to EXEC mode.
exit (global)	Exits from the current configuration mode to the next highest configuration mode.
logout	Closes your connection to the device (equivilant to the **exit** command).

exit (global)

To exit any configuration mode to the next highest mode in the CLI mode hierarchy, use the **exit** command in any configuration mode.

exit

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values

Command Modes

All configuration modes

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **exit** command is used in the Cisco IOS CLI to exit from the current command mode to the next highest command mode in the CLI mode hierarchy.

For example, use the **exit** command in global configuration mode to return to privileged EXEC mode. Use the **exit** command in interface, line, or router configuration mode to return to global configuration mode. Use the **exit** command in subinterface configuration mode to return to interface configuration mode. At the highest level, EXEC mode, the **exit** command will exit the EXEC mode and disconnect from the router interface (see the description of the **exit** (EXEC) command for details).

Examples

The following example shows how to exit from the subinterface configuration mode and to return to the interface configuration mode:

```
Router(config-subif)# exit
Router(config-if)#

The following example displays an exit from the interface configuration mode to return to
the global configuration mode:

Router(config-if)# exit
Router(config)#
```

Related Commands

Command	Description
disconnect	Disconnects a line.
end	Ends your configuration session by exiting to privileged EXEC mode.
exit (EXEC)	Closes the active terminal session by logging off the router.

file prompt

To specify the level of prompting, use the **file prompt** command in global configuration mode.

file prompt [**alert** | **noisy** | **quiet**]

Syntax Description

alert	(Optional) Prompts only for destructive file operations. This is the default.
noisy	(Optional) Confirms all file operation parameters.
quiet	(Optional) Seldom prompts for file operations.

Defaults

alert

Command Modes

Global configuration

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to change the amount of confirmation needed for different file operations.

This command affects only prompts for confirmation of operations. The router will always prompt for missing information.

Examples

The following example configures confirmation prompting for all file operations:

```
Router(config)# file prompt noisy
```

file verify auto

To enable automatic image verification, use the **file verify auto** command in global configuration mode. To disable automatic image verification, use the **no** form of this command.

file verify auto

no file verify auto

Syntax Description

This command has no arguments or keywords.

Defaults

Image verification is not automatically applied to all images that are copied or reloaded onto a router.

Command Modes

Global configuration

Command History

Release	Modification
12.2(18)S	This command was introduced.
12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX and implemented on the Supervisor Engine 720.
12.2(17d)SXB	Support was added for the Supervisor Engine 2.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Image verification is accomplished by verifying the compressed Cisco IOS image checksum.

Image verification allows users to automatically verify the integrity of all Cisco IOS images. Thus, users can be sure that the image is protected from accidental corruption, which can occur at any time during transit, starting from the moment the files are generated by Cisco until they reach the user.

The **file verify auto** command enables image verification globally; that is, all images that are to be copied (via the **copy** command) or reloaded (via the **reload** command) are automatically verified. Although both the **copy** and **reload** commands have a **/verify** keyword that enables image verification, you must issue the keyword each time you want to copy or reload an image. The **file verify auto** command enables image verification by default so you no longer have to specify image verification multiple times.

If you have enabled image verification by default but prefer to disable verification for a specific image copy or reload, the **/noverify** keyword along with either the **copy** or the **reload** command will override the **file verify auto** command.

Examples

The following example shows how to enable automatic image verification:

```
Router(config)# file verify auto
```

Related Commands

Command	Description
copy	Copies any file from a source to a destination.
copy/noverify	Disables the automatic image verification for the current copy operation.
reload	Reloads the operating system.
verify	Verifies the checksum of a file on a Flash memory file system or computes an MD5 signature for a file.

format

To format a Class A, Class B, or Class C flash memory file system, use the **format** command in privileged EXEC or diagnostic mode.

Class B and Class C Flash File Systems

format *filesystem1***:**

Class A Flash File System

format [**spare** *spare-number*] *filesystem1***:** [[*filesystem2***:**][*monlib-filename*]]

Syntax Description

spare	(Optional) Reserves spare sectors as specified by the *spare-number* argument when you format flash memory.
spare-number	(Optional) Number of the spare sectors to reserve in formatted flash memory. Valid values are from 0 to 16. The default value is 0.
*filesystem1***:**	Flash memory to format, followed by a colon. Valid values for use with the Cisco 7600 series router are **disk0:**, **disk1:**, **bootflash:**, **slot0:**, **sup-slot0:**, and **sup-bootflash:**; see the "Usage Guidelines" section for additional information. Valid values for use with the ASR1000 Series Routers are **bootflash:**, **harddisk:**, **stby-harddisk:**, **obfl:**, and **usb**[**0**-**1**]**;**.
*filesystem2***:**	(Optional) File system containing the monlib file to use for formatting the argument *filesystem1* followed by a colon.
monlib-filename	(Optional) Name of the ROM monitor library file (monlib file) to use for formatting the *filesystem1* argument. The default monlib file is the one bundled with the system software. **Dual Route Switch Processors (RSP) High System Availability (HSA) Functionality** When this command is used with Dual RSPs and you do not specify the *monlib-filename* argument, the system takes the ROM monitor library file from the slave image bundle. If you specify the *monlib-filename* argument, the system assumes that the files reside on the slave devices.

Command Default

spare-number: 0
monlib-filename: The monlib file bundled with the system software

Command Modes

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
11.0	This command was introduced.
12.2(14)SX	Support for this command was added for the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.3(14)T	Support for Class B Flash (USB Flash and USB eToken) File Systems was added as part of the "USB Storage" feature.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR1000 Series Routers and the following enhancements were introduced: • This command was introduced in diagnostic mode for the first time. The command can be entered in both privileged EXEC and diagnostic mode on the Cisco ASR1000 Series Routers. • The **harddisk:**, **obfl:**, **stby-harddisk:**, **stby-usb**[**0-1**]**:** and **usb[0-1]:** *filesystem1***:** options were introduced.

Usage Guidelines

Reserve a certain number of memory sectors as spares, so that if some sectors fail, most of the flash memory card can still be used. Otherwise, you must reformat the flash card after some of the sectors fail.

Use this command to format Class A, B, or C flash memory file systems. The Cisco 7600 series router supports only Class A and Class C flash file systems.

In some cases, you might need to insert a new Personal Computer Memory Card Industry Association (PCMCIA) flash memory or flash PC card and load images or backup configuration files onto it. Before you can use a new flash memory or flash PC card, you must format it.

Sectors in flash memory or flash PC cards can fail. Reserve certain flash memory or flash PC sectors as "spares" by using the optional *spare-number* argument on the **format** command to specify 0 to 16 sectors as spares. If you reserve a small number of spare sectors for emergencies, you can still use most of the flash memory or flash PC card. If you specify 0 spare sectors and some sectors fail, you must reformat the flash memory or flash PC card, thereby erasing all existing data.

The monlib file is the ROM monitor library. The ROM monitor uses this file to access files in the flash file system. The Cisco IOS system software contains a monlib file. Use the **show disk0: all** command to display monlib file details.

When this command is used with HSA and you do not specify the *monlib-filename* argument, the system takes the ROM monitor library file from the slave image bundle. If you specify the *monlib-filename* argument, the system assumes that the files reside on the slave devices.

In the command syntax, the *filesystem1***:** argument specifies the device to format and the *filesystem2***:** argument specifies the optional device containing the monlib file used to format the *filesystem1***:** argument. The device determines which monlib file to use, as follows:

- If you omit the optional *filesystem2***:** and *monlib-filename* arguments, the system formats the *filesystem1***:** argument using the monlib file already bundled with the system software.
- If you omit only the optional *filesystem2***:** argument, the system formats the *filesystem1***:** argument using the monlib file from the device you specified with the **cd** command.
- If you omit only the optional *monlib-filename* argument, the system formats *filesystem1***:** using the *filesystem2***:** monlib file.

- When you specify both arguments—*filesystem2***:** and *monlib-filename*—the system formats the *filesystem1***:** argument using the monlib file from the specified device.
- You can specify the *filesystem1***:** arguments's own monlib file in this argument. If the system cannot find a monlib file, it terminates its formatting.

Note Most platforms do not support booting from images stored on flash memory cards. You should reboot your device only from integrated memory locations, such as NVRAM.

Cisco 7600 Series Router Notes

The **bootflash:**, **slot0:**, **sup-slot0:**, and **sup-bootflash:** keywords are supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

Use the **format** command to format Class A or C flash memory file systems.

- The **disk0:** and **disk1:** keywords are for Class C file systems.
- The **bootflash:**, **slot0:**, **sup-slot0:**, and **sup-bootflash:** keywords are for Class A file systems.

The **disk0:** keyword is supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2 only.

Cisco ASR 1000 Series Routers Notes

This command is available in both privileged EXEC and diagnostic mode on the Cisco ASR1000 Series Routers.

Examples

The following example shows how to format a flash memory card that is inserted in slot 0:

```
Router# format slot0:

Running config file on this device, proceed? [confirm] y
All sectors will be erased, proceed? [confirm] y
Enter volume id (up to 31 characters): <Return>
Formatting sector 1 (erasing)
Format device slot0 completed
```

When the console returns to the EXEC prompt, the new flash memory card is formatted and ready for use.

This example shows how to format a CompactFlash PC card that is inserted in slot 0:

```
Router# format disk0:

Running config file on this device, proceed? [confirm] y
All sectors will be erased, proceed? [confirm] y
Enter volume id (up to 31 characters): <Return>
Formatting sector 1 (erasing)
Format device disk0 completed
```

When the console returns to the EXEC prompt, the new CompactFlash PC card is formatted and ready for use.

Related Commands

Command	Description
cd	Changes the default directory or file system.
copy	Copies any file from a source to a destination.

Command	Description
delete	Deletes a file on a flash memory device.
show disk0: all	Displays ATA MONLIB file information for disk0.
show file systems	Lists available file systems.
squeeze	Permanently deletes flash files by squeezing a Class A flash file system.
undelete	Recovers a file marked “deleted” on a Class A or Class B flash file system.

fsck

To check a File Allocation Table (FAT)-based disk, a flash file system, or a Class C file system for damage and to repair any problems, use the **fsck** command in privileged EXEC or diagnostic mode.

Supported Platforms Other than the Cisco 7600 Series and Cisco ASR1000 Series Routers

fsck [**/nocrc**] [**/automatic**] [**/all**] [**/force**] [*filesystem***:**]

Cisco 7600 Series Routers

fsck [**/automatic**] [**/all**] [**/force**] [*filesystem***:**]

Cisco ASR 1000 Series Routers

fsck [**/all**] [**/force**] [*filesystem***:**]

Syntax Description

/nocrc	(Optional) This keyword is available for Class C flash file systems only. Omits cyclic redundancy checks (CRCs).
/automatic	(Optional) This keyword is available for Advanced Technology Attachment (ATA) FAT-based disks only. Specifies that the check and repair actions should proceed automatically. This option can be used to skip the prompts for each check and repair action. **Note** This command also specifies the automatic mode for the Cisco 7600 series router; see the "Usage Guidelines" section for additional information.
/all	(Optional) Specifies that all partitions on the disk be checked for problems.
/force	(Optional) Ensures forced termination of simultaneous file operations on the same device.
*filesystem***:**	The file system prefix indicating the disk to be checked. The colon (:) is required. Typically, the file system prefix will be **disk0:** or **disk1:**. In case of dual processors, the file system on the redundant supervisor engine can also be specified.

Command Default

A FAT-based disk, flash file system, or Class C file system is not checked for damage and repaired. If you do not enter the **/automatic** keyword, command-line interface (CLI) prompts for actions are issued. For the Cisco 7600 series router, if you do not specify the **disk0:** keyword, the current file system is checked.

This command is available in both privileged EXEC and diagnostic mode on the Cisco ASR1000 series routers.

Command Modes

Privileged EXEC (#)
Diagnostic (diag)

Command History

Release	Modification
11.3 AA	This command was introduced.
12.0(22)S	This command was implemented on the Cisco 7000 family of routers and on the Cisco 10000 series router and the Gigabit Switch Router (GSR) to support ATA disks.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.
12.2(14)SX	This command was modified. Support for this command was added for the Supervisor Engine 720.
12.2(17d)SXB	This command was modified. Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers and the following enhancements were introduced: • This command was introduced in diagnostic mode for the first time. The command can be entered in both privileged EXEC and diagnostic mode on the Cisco ASR 1000 series routers. • The **/all** option was introduced. • The **harddisk:**, **obfl:**, **stby-harddisk:**, **stby-usb**[**0**-**1**]**:**,and **usb**[**0**-**1**]**:** *filesystem***:** options were introduced.
15.0(1)M	This command was modified. The **/force** keyword was added.

Usage Guidelines

Supported Platforms Other than Cisco 7600 Series Router

This command performs all steps necessary to remove corrupted files and reclaim unused disk space. Changes include checking for incorrect file sizes, cluster loops, and so on. The default form of this command issues multiple prompts to confirm each of the changes. However, you can skip these prompts by using the **/automatic** keyword when issuing the command.

When you use the **/automatic** keyword you are prompted to confirm that you want the automatic option. Prompts for actions will be skipped, but all actions performed are displayed to the terminal (see the example below).

This command works with ATA Personal Computer Memory Card Industry Association (PCMCIA) cards formatted in Disk Operating System (DOS), or for Class C flash file systems.

Note Only one partition (the active partition) is checked in the ATA disk.

Cisco 7600 Series Router

The disk0: or slavedisk0: file systems are the only file systems in the Cisco 7600 series routers on which you can run the File-System-Check (fsck) utility. The slavedisk0**:** file system appears in redundant supervisor engine systems only.

This command is valid only on Class C flash file systems and only on PCMCIA ATA flash disks and CompactFlash disks.

The output for the **fsck slavedisk0:** command is similar to the **fsck disk0:** command output.

If you do not enter any arguments, the current file system is used. Use the **pwd** command to display the current file system.

If you enter the **disk0:** or **slavedisk0:** keyword, the fsck utility checks the selected file system for problems. If a problem is detected, a prompt is displayed asking if you want the problem fixed.

If you enter the **/automatic** keyword, you are prompted to confirm that you want the automatic mode. In automatic mode, problems are fixed automatically and you are not prompted to confirm.

If you do not specify the **/force** keyword, any simultaneous file operations on the same device are not terminated. Instead, an error message stating files are open for read or write access appears. If you specify the **/force** keyword, the fsck utility terminates files that are open for read or write access and continues to check for problems.

Table 32 lists the checks and actions that are performed by the fsck utility.

Table 32 fsck Utility Checks and Actions

Checks	Actions
Checks the boot sector and the partition table and reports the errors.	No action.
Validates the media with the signature in the last 2 bytes of the first sector (0x55 and 0xaa, respectively).	No action.
Checks the os_id to find whether this is a FAT-12 or FAT-16 file system (valid values include 0, 1, 4, and 6).	No action.
Checks the number of FAT's field (correct values are 1 and 2).	No action.
Checks these values: • n_fat_sectors cannot be less than 1. • n_root_entries cannot be less than 16. • n_root_sectors cannot be less than 2. • base_fat_sector, n_sectors_per_cluster, n_heads, n_sectors_per_track is not 0.	No action.
Checks the files and FAT for these errors:	
Checks the FAT for invalid cluster numbers.	If the cluster is a part of a file chain, the cluster is changed to end of file (EOF). If the cluster is not part of a file chain, it is added to the free list and unused cluster chain. Table 33 lists valid cluster numbers; numbers other than those listed in Table 33 are invalid numbers.
Checks the file's cluster chain for loops.	If the loop is broken, the file is truncated at the cluster where the looping occurred.
Checks the directories for nonzero size fields.	If directories are found with nonzero size fields, the size is reset to zero.
Checks for invalid start cluster file numbers.	If the start cluster number of a file is invalid, the file is deleted.
Checks files for bad or free clusters.	If the file contains bad or free clusters, the file is truncated at the last good cluster; an example is the cluster that points to this bad/free cluster.
Checks to see if the file's cluster chain is longer than indicated by the size fields.	If the file's cluster chain is longer than indicated by the size fields, the file size is recalculated and the directory entry is updated.

Table 32 fsck Utility Checks and Actions (continued)

Checks	Actions
Checks to see if two or more files share the same cluster (crosslinked).	If two or more files are crosslinked, you are prompted to accept the repair, and one of the files is truncated.
Checks to see if the file's cluster chain is shorter than is indicated by the size fields.	If the file's cluster chain is shorter than is indicated by the size fields, the file size is recalculated and the directory entry is updated.
Checks to see if there are any unused cluster chains.	If unused cluster chains are found, new files are created and linked to that file with the name fsck-*start cluster.*

Table 33 lists the valid cluster numbers. Numbers other than those listed in Table 33 are invalid numbers.

Table 33 Valid Cluster Numbers

Cluster	FAT-12	FAT-16
Next entry in the chain	2-FEF	2-FFEF
Last entry in chain	FF8-FFF	FFF8-FFFF
Available cluster	0	0
Bad Cluster	FF7	FFF7

Examples

Supported Platforms Other than the Cisco 7600 Series Router

The following example shows sample output from the **fsck** command in automatic mode:

```
Router# fsck /automatic disk1:

Proceed with the automatic mode? [yes] y
Checking the boot sector and partition table...
Checking FAT, Files and Directories...
Start cluster of file disk1:/file1 is invalid, removing file
File disk1:/file2 has a free/bad cluster, truncating...
File disk1:/file2 truncated.
File disk1:/file3 has a free/bad cluster, truncating...
File disk1:/file3 truncated.
File disk1:/file4 has a invalid cluster, truncating...
File disk1:/file4 truncated.
File disk1:/file5 has a invalid cluster, truncating...
File disk1:/file5 truncated.
File disk1:/file6 has a invalid cluster, truncating...
File disk1:/file6 truncated.
File size of disk1:/file7 is not correct, correcting it
File disk1:/file8 cluster chain has a loop, truncating it
File disk1:/file8 truncated.
File disk1:/file9 cluster chain has a loop, truncating it
File disk1:/file9 truncated.
File disk1:/file16 has a free/bad cluster, truncating...
File disk1:/file16 truncated.
File disk1:/file20 has a free/bad cluster, truncating...
File disk1:/file20 truncated.
Reclaiming unused space...
Created file disk1:/fsck-4 for an unused cluster chain
Created file disk1:/fsck-41 for an unused cluster chain
```

```
Created file disk1:/fsck-73 for an unused cluster chain
Created file disk1:/fsck-106 for an unused cluster chain
Created file disk1:/fsck-121 for an unused cluster chain
Created file disk1:/fsck-132 for an unused cluster chain
Created file disk1:/fsck-140 for an unused cluster chain
Created file disk1:/fsck-156 for an unused cluster chain
Created file disk1:/fsck-171 for an unused cluster chain
Created file disk1:/fsck-186 for an unused cluster chain
Created file disk1:/fsck-196 for an unused cluster chain
Created file disk1:/fsck-235 for an unused cluster chain
Created file disk1:/fsck-239 for an unused cluster chain
Updating FAT...
fsck of disk1: complete
```

Cisco 7600 Series Router

This example shows how to run a check of the current file system:

```
Router# fsck

 Checking the boot sector and partition table...
 Checking FAT, Files and Directories...
 Files
 1) disk0:/FILE3 and
 2) disk0:/FILE2
 have a common cluster.
 Press 1/2 to truncate or any other character to ignore[confirm] q
 Ignoring this error and continuing with the rest of the check...
 Files
 1) disk0:/FILE5 and
 2) disk0:/FILE4
 have a common cluster.
 Press 1/2 to truncate or any other character to ignore[confirm] 1
 File disk0:/FILE5 truncated.
 Files
 1) disk0:/FILE7 and
 2) disk0:/FILE6
 have a common cluster.
.
.
.
1) disk0:/FILE15 and
 2) disk0:/FILE13
 have a common cluster.
 Press 1/2 to truncate or any other character to ignore[confirm] i
 Ignoring this error and continuing with the rest of the check...
 Reclaiming unused space...
 Created file disk0:/fsck-11 for an unused cluster chain
 Created file disk0:/fsck-20 for an unused cluster chain
 Created file disk0:/fsck-30 for an unused cluster chain
 Created file disk0:/fsck-35 for an unused cluster chain
 Created file disk0:/fsck-40 for an unused cluster chain
 Created file disk0:/fsck-46 for an unused cluster chain
 Created file disk0:/fsck-55 for an unused cluster chain
 Created file disk0:/fsck-62 for an unused cluster chain
 Created file disk0:/fsck-90 for an unused cluster chain
 Updating FAT...
 fsck of disk0: complete
```

Related Commands

Command	Description
cd	Changes the default directory or file system.
pwd	Shows the current setting of the **cd** command.

full-help

To get help for the full set of user-level commands, use the **full-help** command in line configuration mode.

full-help

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **full-help** command enables (or disables) an unprivileged user to see all of the help messages available. It is used with the **show ?** command.

Examples

In the following example, the **show ?** command is used first with full-help disabled. Then **full-help** is enabled for the line, and the **show ?** command is used again to demonstrate the additional help output that is displayed.

```
Router> show ?

  bootflash  Boot Flash information
  calendar   Display the hardware calendar
  clock      Display the system clock
  context    Show context information
  dialer     Dialer parameters and statistics
  history    Display the session command history
  hosts      IP domain-name, lookup style, nameservers, and host table
  isdn       ISDN information
  kerberos   Show Kerberos Values
  modemcap   Show Modem Capabilities database
  ppp        PPP parameters and statistics
  rmon       rmon statistics
  sessions   Information about Telnet connections
  snmp       snmp statistics
  terminal   Display terminal configuration parameters
  users      Display information about terminal lines
  version    System hardware and software status

Router> enable
Password:<letmein>
```

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# line console 0
Router(config-line)# full-help
Router(config-line)# exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router# disable
Router> show ?

  access-expression  List access expression
  access-lists       List access lists
  aliases            Display alias commands
  apollo             Apollo network information
  appletalk          AppleTalk information
  arp                ARP table
  async              Information on terminal lines used as router interfaces
  bootflash          Boot Flash information
  bridge             Bridge Forwarding/Filtering Database [verbose]
  bsc                BSC interface information
  bstun              BSTUN interface information
  buffers            Buffer pool statistics
  calendar           Display the hardware calendar
 .
 .
 .
  translate          Protocol translation information
  ttycap             Terminal capability tables
  users              Display information about terminal lines
  version            System hardware and software status
  vines              VINES information
  vlans              Virtual LANs Information
  whoami             Info on current tty line
  x25                X.25 information
  xns                XNS information
  xremote            XRemote statistics
```

Related Commands

Command	Description
help	Displays a brief description of the help system.

help

To display a brief description of the help system, use the **help** command in any command mode.

help

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

User EXEC

Privileged EXEC

All configuration modes

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **help** command provides a brief description of the context-sensitive help system, which functions as follows:

- To list all commands available for a particular command mode, enter a question mark (?) at the system prompt.
- To obtain a list of commands that begin with a particular character string, enter the abbreviated command entry immediately followed by a question mark (?). This form of help is called *word help*, because it lists only the keywords or arguments that begin with the abbreviation you entered.
- To list the keywords and arguments associated with a command, enter a question mark (?) in place of a keyword or argument on the command line. This form of help is called *command syntax help*, because it lists the keywords or arguments that apply based on the command, keywords, and arguments you have already entered.

Examples

In the following example, the **help** command is used to display a brief description of the help system:

```
Router# help

Help may be requested at any point in a command by entering
a question mark '?'. If nothing matches, the help list will
be empty and you must backup until entering a '?' shows the
available options.
Two styles of help are provided:
1. Full help is available when you are ready to enter a
   command argument (e.g. 'show ?') and describes each possible
   argument.
2. Partial help is provided when an abbreviated argument is entered
```

```
   and you want to know what arguments match the input
   (e.g. 'show pr?'.)
```

The following example shows how to use word help to display all the privileged EXEC commands that begin with the letters “co.” The letters entered before the question mark are reprinted on the next command line to allow the user to continue entering the command.

```
Router# co?
configure  connect  copy
Router# co
```

The following example shows how to use command syntax help to display the next argument of a partially complete **access-list** command. One option is to add a wildcard mask. The <cr> symbol indicates that the other option is to press Enter to execute the command without adding any more keywords or arguments. The characters entered before the question mark are reprinted on the next command line to allow the user to continue entering the command or to execute that command as it is.

```
Router(config)# access-list 99 deny 131.108.134.234 ?
  A.B.C.D  Mask of bits to ignore
  <cr>
Router(config)# access-list 99 deny 131.108.134.234
```

Related Commands

Command	Description
full-help	Enables help for the full set of user-level commands for a line.

hidekeys

To suppress the display of password information in configuration log files, use the **hidekeys** command in configuration change logger configuration mode. To allow the display of password information in configuration log files, use the **no** form of this command.

hidekeys

no hidekeys

Syntax Description

This command has no arguments or keywords.

Command Default

Password information is displayed.

Command Modes

Configuration change logger configuration

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Usage Guidelines

Enabling the **hidekeys** command increases security by preventing password information from being displayed in configuration log files.

Examples

The following example shows how to prevent password information from being displayed in configuration log files:

```
Router# configure terminal
!
Router(config)# archive
Router(config-archive)# log config
Router(config-archive-log-config)# hidekeys
Router(config-archive-log-config)# end
```

Related Commands

Command	Description
archive	Enters archive configuration mode.
log config	Enters configuration change logger configuration mode.
logging enable	Enables the logging of configuration changes.

Command	Description
logging size	Specifies the maximum number of entries retained in the configuration log.
notify syslog	Enables the sending of notifications of configuration changes to a remote syslog.
show archive log config	Displays entries from the configuration log.

history

To enable the command history function, use the **history** command in line configuration mode. To disable the command history function, use the **no** form of this command.

history

no history

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled with ten command lines in the buffer.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The command history function provides a record of EXEC commands that you have entered. This function is particularly useful for recalling long or complex commands or entries, including access lists.

To change the number of command lines that the system will record in its history buffer, use the **history size** line configuration command.

The **history** command enables the history function with the last buffer size specified or, if there was not a prior setting, with the default of ten lines. The **no history** command disables the history function.

The **show history** EXEC command will list the commands you have entered, but you can also use your keyboard to display individual commands. Table 34 lists the keys you can use to recall commands from the command history buffer.

Table 34 History Keys

Key(s)	Functions
Ctrl-P or Up Arrow[1]	Recalls commands in the history buffer in a backward sequence, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Ctrl-N or Down Arrow[1]	Returns to more recent commands in the history buffer after recalling commands with Ctrl-P or the Up Arrow. Repeat the key sequence to recall successively more recent commands.

1. The arrow keys function only with ANSI-compatible terminals.

Examples

In the following example, the command history function is disabled on line 4:

```
Router(config)# line 4
Router(config-line)# no history
```

Related Commands

Command	Description
history size	Sets the command history buffer size for a particular line.
show history	Lists the commands you have entered in the current EXEC session.
terminal history	Enables the command history function for the current terminal session or changes the size of the command history buffer for the current terminal session.

history size

To change the command history buffer size for a particular line, use the **history size** command in line configuration mode. To reset the command history buffer size to ten lines, use the **no** form of this command.

history size *number-of-lines*

no history size

Syntax Description

number-of-lines	Specifies the number of command lines that the system will record in its history buffer. The range is from 0 to 256. The default is 10.

Defaults

10 command lines

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **history size** command should be used in conjunction with the **history** and **show history** commands. The **history** command enables or disables the command history function. The **show history** command lists the commands you have entered in the current EXEC session. The number of commands that the history buffer will show is set by the **history size** command.

Note The **history size** command only sets the size of the buffer; it does not reenable the history function. If the **no history** command is used, the **history** command must be used to reenable this function.

Examples

The following example displays line 4 configured with a history buffer size of 35 lines:

```
Router(config)# line 4
Router(config-line)# history size 35
```

Related Commands

Command	Description
history	Enables or disables the command history function.
show history	Lists the commands you have entered in the current EXEC session.
terminal history size	Enables the command history function for the current terminal session or changes the size of the command history buffer for the current terminal session.

hold-character

To define the local hold character used to pause output to the terminal screen, use the **hold-character** command in line configuration mode. To restore the default, use the **no** form of this command.

hold-character *ascii-number*

no hold-character

Syntax Description

ascii-number	ASCII decimal representation of a character or control sequence (for example, Ctrl-P).

Defaults

No hold character is defined.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The Break character is represented by zero; NULL cannot be represented. To continue the output, enter any character after the hold character. To use the hold character in normal communications, precede it with the escape character. See the "ASCII Character Set" appendix for a list of ASCII characters.

Examples

The following example sets the hold character to Ctrl-S, which is ASCII decimal character 19:

```
Router(config)# line 8
Router(config-line)# hold-character 19
```

Related Commands

Command	Description
terminal hold-character	Sets or changes the hold character for the current session.

hostname

To specify or modify the host name for the network server, use the **hostname** command in global configuration mode.

hostname *name*

Syntax Description

name	New host name for the network server.

Command Default

The default host name is Router.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

The host name is used in prompts and default configuration filenames.

Do not expect case to be preserved. Uppercase and lowercase characters look the same to many internet software applications. It may seem appropriate to capitalize a name the same way you might do in English, but conventions dictate that computer names appear all lowercase. For more information, refer to RFC 1178, *Choosing a Name for Your Computer.*

The name must also follow the rules for ARPANET host names. They must start with a letter, end with a letter or digit, and have as interior characters only letters, digits, and hyphens. Names must be 63 characters or fewer. A host name of less than 10 characters is recommended. For more information, refer to RFC 1035, *Domain Names—Implementation and Specification*.

On most systems, a field of 30 characters is used for the host name and the prompt in the CLI. Note that the length of your host name may cause longer configuration mode prompts to be truncated. For example, the full prompt for service profile configuration mode is:

```
(config-service-profile)#
```

However, if you are using the host-name of "Router", you will only see the following prompt (on most systems):

```
Router(config-service-profil)#
```

If the hostname is longer, you will see even less of the prompt:

```
Basement-rtr2(config-service)#
```

Keep this behavior in mind when assigning a name to your system (using the **hostname** global configuration command). If you expect that users will be relying on mode prompts as a CLI navigation aid, you should assign host names of no more than nine characters.

Examples

The following example changes the host name to “host1”:

```
Router(config)# hostname sandbox
host1(config)#
```

Related Commands

Command	Description
setup	Enables you to make major changes to your configurations, for example, adding a protocol suit, making major addressing scheme changes, or configuring newly installed interfaces.

hw-module reset

To reset a module by turning the power off and then on, use the **hw-module reset** command in privileged EXEC mode.

hw-module module *num* **reset**

Syntax Description

module *num*	Applies the command to a specific module; see the "Usage Guidelines" section for valid values.

Command Default

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	This command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	This command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS 12.2(31)SB2.

Usage Guidelines

The *num* argument designates the module number. Valid values depend on the chassis that is used. For example, if you have a 13-slot chassis, valid values for the module number are from 1 to 13.

Examples

This example shows how to reload a specific module:

```
Router# hw-module module 3 reset
```

hw-module shutdown

To shut down the module, use the **hw-module shutdown** command in privileged EXEC mode.

hw-module module *num* **shutdown**

Syntax Description

module *num*	Applies the command to a specific module; see the "Usage Guidelines" section for valid values.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is supported on the SSL Services Module and the NAM.

If you enter the **hw-module shutdown** command to shut down the module, you will have to enter the **no power enable module** command and the **power enable module** command to restart (power down and then power up) the module.

Examples

This example shows how to shut down and restart the module:

```
Router# hw-module module 3 shutdown
Router# no power enable module 3
Router# power enable module 3
```

insecure

To configure a line as insecure, use the **insecure** command in line configuration mode. To disable this function, use the **no** form of this command.

insecure

no insecure

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to identify a modem line as insecure for DEC local area transport (LAT) classification.

Examples

In the following example, line 10 is configured as an insecure dialup line:

```
Router(config)# line 10
Router(config-line)# insecure
```

international

If you are using Telnet to access a Cisco IOS platform and you want to display 8-bit and multibyte international characters (for example, Kanji) and print the Escape character as a single character instead of as the caret and bracket symbols (^[), use the **international** command in line configuration mode. To display characters in 7-bit format, use the **no** form of this command.

international

no international

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Line configuration

Command History

Release	Modification
11.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If you are configuring a Cisco IOS platform using the Cisco web browser user interface (UI), this function is enabled automatically when you enable the Cisco web browser UI using the **ip http server** global configuration command.

Examples

The following example enables a Cisco IOS platform to display 8-bit and multibyte characters and print the Escape character as a single character instead of as the caret and bracket symbols (^[) when you are using Telnet to access the platform:

```
line vty 4
 international
```

Related Commands

Command	Description
terminal international	Prints the Escape character as a single character instead of as the caret and bracket symbols (^[) for a current Telnet session in instances when you are using Telnet to access a Cisco IOS platform and you want to display 8-bit and multibyte international characters (for example, Kanji).

ip bootp server

To enable the Bootstrap Protocol (BOOTP) service on your routing device, use the **ip bootp server** command in global configuration mode. To disable BOOTP services, use the **no** form of the command.

ip bootp server

no ip bootp server

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
11.2	This command was introduced.
12.0(1)T	The DHCP relay agent and DHCP server features were introduced. BOOTP forwarding is now handled by the DHCP relay agent implementation.
12.2(8)T	The **ip dhcp bootp ignore** command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

By default, the BOOTP service is enabled. When disabled, the **no ip bootp server** command will appear in the configuration file.

The integrated Dynamic Host Configuration Protocol (DHCP) server was introduced in Cisco IOS Release 12.0(1)T. Because DHCP is based on BOOTP, both of these services share the "well-known" UDP server port of 67 (per RFC 951, RFC 1534, and RFC 2131; the client port is 68). To disable DHCP services (DHCP relay and DHCP server), use the **no service dhcp** command. To disable BOOTP services (in releases 12.2(8)T and later), but leave DHCP services enabled, use the **ip dhcp bootp ignore** command.

If both the BOOTP server and DHCP server are disabled, "ICMP port unreachable" messages will be sent in response to incoming requests on port 67, and the original incoming packet will be discarded. If DHCP is enabled, using the **no ip bootp server** command by itself will not stop the router from listening on UDP port 67.

Note As with all minor services, the async line BOOTP service should be disabled on your system if you do not have a need for it in your network.

Any network device that has User Data Protocol (UDP), TCP, BOOTP, DHCP, or Finger services should be protected by a firewall or have the services disabled to protect against Denial of Service attacks.

Examples

In the following example, BOOTP and DHCP services are disabled on the router:

```
Router(config)# no ip bootp server
Router(config)# no service dhcp
```

Related Commands

Command	Description
ip dhcp bootp ignore	Configures the Cisco IOS DHCP server to selectively ignore and not reply to received Bootstrap Protocol (BOOTP) request packets, allowing you continue using DHCP while disabling BOOTP.
service dhcp	Enables the Cisco IOS Dynamic Host Configuration Protocol (DHCP) server and relay agent features.

ip finger

To configure a system to accept Finger protocol requests (defined in RFC 742), use the **ip finger** command in global configuration mode. To disable this service, use the **no** form of this command.

ip finger [**rfc-compliant**]

no ip finger

Syntax Description

rfc-compliant	(Optional) Configures the system to wait for "Return" or "/W" input when processing Finger requests. This keyword should not be used for those systems.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.3	This command was introduced.
12.1(5), 12.1(5)T	This command was changed from being enabled by default to being disabled by default.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The Finger service allows remote users to view the output equivalent to the **show users** [**wide**] command.

When **ip finger** is configured, the router will respond to a **telnet** *a.b.c.d* **finger** command from a remote host by immediately displaying the output of the **show users** command and then closing the connection.

When the **ip finger rfc-compliant** command is configured, the router will wait for input before displaying anything (as required by RFC 1288). The remote user can then enter the Return key to display the output of the **show users** EXEC command, or enter **/W** to display the output of the **show users wide** EXEC command. After this information is displayed, the connection is closed.

Note As with all minor services, the Finger service should be disabled on your system if you do not have a need for it in your network.
Any network device that has UDP, TCP, BOOTP, or Finger services should be protected by a firewall or have the services disabled to protect against Denial of Service attacks.

Because of the potential for hung lines, the **rfc-compliant** form of this command should not be configured for devices with more than 20 simultaneous users.

Examples

The following example disables the Finger protocol:

```
Router(config)# no ip finger
```

ip ftp passive

To configure the router to use only passive FTP connections, use the **ip ftp passive** command in global configuration mode. To allow all types of FTP connections, use the **no** form of this command.

ip ftp passive

no ip ftp passive

Syntax Description

This command has no arguments or keywords.

Defaults

All types of FTP connections are allowed.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

In the following example, the router is configured to use only passive FTP connections:

```
Router(config)# ip ftp passive
```

Related Commands

Command	Description
ip ftp password	Specifies the password to be used for FTP connections.
ip ftp source-interface	Specifies the source IP address for FTP connections.
ip ftp username	Configures the username for FTP connections.

ip ftp password

To specify the password to be used for File Transfer Protocol (FTP) connections, use the **ip ftp password** command in global configuration mode. To return the password to its default, use the **no** form of this command.

ip ftp password [*type*] *password*

no ip ftp password

Syntax Description

type	(Optional) Type of encryption to use on the password. A value of 0 disables encryption. A value of 7 indicates proprietary encryption.
password	Password to use for FTP connections.

Defaults

The router forms a password *username@routername.domain*. The variable *username* is the username associated with the current session, *routername* is the configured host name, and *domain* is the domain of the router.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

The following example configures the router to use the username “red” and the password “blue” for FTP connections:

```
Router(config)# ip ftp username red
Router(config)# ip ftp password blue
```

Related Commands

Command	Description
ip ftp password	Specifies the password to be used for FTP connections.
ip ftp source-interface	Specifies the source IP address for FTP connections.
ip ftp username	Configures the username for FTP connections.

ip ftp source-interface

To specify the source IP address for File Transfer Protocol (FTP) connections, use the **ip ftp source-interface** command in global configuration mode. To use the address of the interface where the connection is made, use the **no** form of this command.

ip ftp source-interface *interface-type interface-number*

no ip ftp source-interface

Syntax Description

interface-type *interface-number*	The interface type and number to use to obtain the source address for FTP connections.

Command Default

The FTP source address is the IP address of the interface that the FTP packets use to leave the router.

Command Modes

Global configuration (config)

Command History

Release	Modification
10.3	This command was introduced.
12.3(6)	Destination address lookup in a Virtual Private Network (VPN) routing and forwarding (VRF) table was added for the transfer of FTP packets.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to set the same source address for all FTP connections.

In Cisco IOS 12.3(6) and later releases, FTP is VRF-aware, which means that FTP transfer is supported across an interface within a VRF instance. To specify a VRF as a source for FTP connections, the VRF must be associated with the same interface that you configure with the **ip ftp source-interface** command. In this configuration, FTP looks for the destination IP address for file transfer in the specified VRF table. If the specified source interface is not up, Cisco IOS software selects the address of the interface closest to the destination as the source address.

Examples

The following example shows how to configure the router to use the IP address associated with Ethernet interface 0 as the source address on all FTP packets, regardless of which interface is actually used to send the packet:

```
Router> enable
Router# configure terminal
Router(config)# ip ftp source-interface ethernet 0
```

The following example shows how to configure the router to use the VRF table named vpn1 to look for the destination IP address for the transfer of FTP packets:

```
Router# configure terminal
Router(config)# ip ftp source-interface ethernet 0
Router(config)# ip vrf vpn1
Router(config-vrf)# rd 200:1
Router(config-vrf)# route-target both 200:1
Router(config-vrf)# interface ethernet 0
Router(config-if)# ip vrf forwarding vpn1
Router(config-if)# end
```

Related Commands

Command	Description
ip ftp passive	Configures the router to use only passive FTP connections.
ip ftp password	Specifies the password to be used for FTP connections.
ip ftp username	Configures the username for FTP connections.

ip ftp username

To configure the username for File Transfer Protocol (FTP) connections, use the **ip ftp username** command in global configuration mode. To configure the router to attempt anonymous FTP, use the **no** form of this command.

ip ftp username *username*

no ip ftp username

Syntax Description

username	Username for FTP connections.

Defaults

The Cisco IOS software attempts an anonymous FTP.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The remote username must be associated with an account on the destination server.

Examples

In the following example, the router is configured to use the username “red” and the password “blue” for FTP connections:

```
Router(config)# ip ftp username red
Router(config)# ip ftp password blue
```

Related Commands

Command	Description
ip ftp passive	Configures the router to use only passive FTP connections.
ip ftp password	Specifies the password to be used for FTP connections.
ip ftp source-interface	Specifies the source IP address for FTP connections.

ip rarp-server

To enable the router to act as a Reverse Address Resolution Protocol (RARP) server, use the **ip rarp-server** command in interface configuration mode. To restore the interface to the default of no RARP server support, use the **no** form of this command.

ip rarp-server *ip-address*

no ip rarp-server *ip-address*

Syntax Description

ip-address	IP address that is to be provided in the source protocol address field of the RARP response packet. Normally, this is set to whatever address you configure as the primary address for the interface.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This feature makes diskless booting of clients possible between network subnets where the client and server are on separate subnets.

RARP server support is configurable on a per-interface basis, so that the router does not interfere with RARP traffic on subnets that need no RARP assistance.

The Cisco IOS software answers incoming RARP requests only if both of the following two conditions are met:

- The **ip rarp-server** command has been configured for the interface on which the request was received.
- A static entry is found in the IP ARP table that maps the MAC address contained in the RARP request to an IP address.

Use the **show ip arp** EXEC command to display the contents of the IP ARP cache.

Sun Microsystems, Inc. makes use of RARP and UDP-based network services to facilitate network-based booting of SunOS on it's workstations. By bridging RARP packets and using both the **ip helper-address** interface configuration command and the **ip forward-protocol** global configuration command, the Cisco IOS software should be able to perform the necessary packet switching to enable booting of Sun workstations across subnets. Unfortunately, some Sun workstations assume that the sender of the RARP response, in this case the router, is the host that the client can contact to TFTP load the bootstrap image. This causes the workstations to fail to boot.

By using the **ip rarp-server** command, the Cisco IOS software can be configured to answer these RARP requests, and the client machine should be able to reach its server by having its TFTP requests forwarded through the router that acts as the RARP server.

In the case of RARP responses to Sun workstations attempting to diskless boot, the IP address specified in the **ip rarp-server** interface configuration command should be the IP address of the TFTP server. In addition to configuring RARP service, the Cisco IOS software must be configured to forward UDP-based Sun portmapper requests to completely support diskless booting of Sun workstations. This can be accomplished using configuration commands of the following form:

```
ip forward-protocol udp 111
interface interface name
ip helper-address target-address
```

RFC 903 documents the RARP.

Examples

The following partial example configures a router to act as a RARP server. The router is configured to use the primary address of the specified interface in its RARP responses.

```
arp 172.30.2.5 0800.2002.ff5b arpa
interface ethernet 0
ip address 172.30.3.100 255.255.255.0
ip rarp-server 172.30.3.100
```

In the following example, a router is configured to act as a RARP server, with TFTP and portmapper requests forwarded to the Sun server:

```
! Allow the router to forward broadcast portmapper requests
ip forward-protocol udp 111
! Provide the router with the IP address of the diskless sun
arp 172.30.2.5 0800.2002.ff5b arpa
interface ethernet 0
! Configure the router to act as a RARP server, using the Sun Server's IP
! address in the RARP response packet.
ip rarp-server 172.30.3.100
! Portmapper broadcasts from this interface are sent to the Sun Server.
ip helper-address 172.30.3.100
```

Related Commands

Command	Description
ip forward-protocol	Speeds up flooding of UDP datagrams using the spanning-tree algorithm.
ip helper-address	Forwards UDP broadcasts, including BOOTP, received on an interface.

ip rcmd domain-lookup

To reenable the basic Domain Name Service (DNS) security check for rcp and rsh, use the **ip rcmd domain-lookup** command in global configuration mode. To disable the basic DNS security check for remote copy protocol (rcp) and remote shell protoco (rsh), use the **no** form of this command.

ip rcmd domain-lookup

no ip rcmd domain-lookup

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The abbreviation RCMD (remote command) is used to indicate both rsh and rcp.

DNS lookup for RCMD is enabled by default (provided general DNS services are enabled on the system using the **ip domain-lookup** command).

The **no ip rcmd domain-lookup** command is used to disable the DNS lookup for RCMD. The **ip rcmd domain-lookup** command is used to reenable the DNS lookup for RCMD.

DNS lookup for RCMD is performed as a basic security check. This check is performed using a host authentication process. When enabled, the system records the address of the requesting client. That address is mapped to a host name using DNS. Then a DNS request is made for the IP address for that host name. The IP address received is then checked against the original requesting address. If the address does not match with any of the addresses received from DNS, the RCMD request will not be serviced.

This reverse lookup is intended to help protect against spoofing. However, please note that the process only confirms that the IP address is a valid “routable” address; it is still possible for a hacker to spoof the valid IP address of a known host.

The DNS lookup is done after the TCP handshake but before the router (which is acting as a rsh/rcp server) sends any data to the remote client.

The **no ip rcmd domain-lookup** will turn off DNS lookups for rsh and rcp only. The **no ip domain-lookup** command takes precedence over the **ip rcmd domain-lookup** command. This means that if the **no ip domain-lookup** command is in the current configuration, DNS will be bypassed for rcp and rsh even if the **ip rcmd domain-lookup** command is enabled.

Examples

In the following example, the DNS security check is disabled for RCMD (rsh/rcp):

```
Router(config)# no ip rcmd domain-lookup
```

Related Commands

Command	Description
ip domain-lookup	Enables the IP DNS-based host name-to-address translation.

ip rcmd rcp-enable

To configure the Cisco IOS software to allow remote users to copy files to and from the router using remote copy protocol (rcp), use the **ip rcmd rcp-enable** command in global configuration mode. To disable rcp on the device, use the **no** form of this command.

ip rcmd rcp-enable

no ip rcmd rcp-enable

Syntax Description

This command has no arguments or keywords.

Defaults

To ensure security, the router is not enabled for rcp by default.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

To allow a remote user to execute rcp commands on the router, you must also create an entry for the remote user in the local authentication database using the **ip rcmd remote-host** command.

The **no ip rcmd rcp-enable** command does not prohibit a local user from using rcp to copy system images and configuration files to and from the router.

To protect against unauthorized users copying the system image or configuration files, the router is not enabled for rcp by default.

Examples

In the following example, the rcp service is enabled on the system, the IP address assigned to the Loopback0 interface is used as the source address for outbound rcp and rsh packets, and access is granted to the user “netadmin3”on the remote host 172.16.101.101:

```
Router(config)# ip rcmd rcp-enable
Router(config)# ip rcmd source-interface Loopback0
Router(config)# ip rcmd remote-host router1 172.16.101.101 netadmin3
```

Related Commands

Command	Description
ip rcmd remote-host	Creates an entry for the remote user in a local authentication database so that remote users can execute commands on the router using rsh or rcp.

ip rcmd remote-host

To create an entry for the remote user in a local authentication database so that remote users can execute commands on the router using remote shell protocol (rsh) or remote copy protocol (rcp), use the **ip rcmd remote-host** command in global configuration mode. To remove an entry for a remote user from the local authentication database, use the **no** form of this command.

ip rcmd remote-host *local-username* {*ip-address* | *host-name*} *remote-username* [**enable** [*level*]]

no ip rcmd remote-host *local-username* {*ip-address* | *host-name*} *remote-username* [**enable** [*level*]]

Syntax Description

local-username	Name of the user on the local router. You can specify the router name as the username. This name needs to be communicated to the network administrator or to the user on the remote system. To be allowed to remotely execute commands on the router, the remote user must specify this value correctly.
ip-address	IP address of the remote host from which the local router will accept remotely executed commands. Either the IP address or the host name is required.
host-name	Name of the remote host from which the local router will accept remotely executed commands. Either the host name or the IP address is required.
remote-username	Name of the user on the remote host from which the router will accept remotely executed commands.
enable [*level*]	(Optional) Enables the remote user to execute privileged EXEC commands using rsh or to copy files to the router using rcp. The range is from 1 to 15. The default is 15. For information on the enable level, refer to the **privilege level** global configuration command in the Release 12.2 *Cisco IOS Security Command Reference*.

Defaults

No entries are in the local authentication database.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

A TCP connection to a router is established using an IP address. Using the host name is valid only when you are initiating an rcp or rsh command from a local router. The host name is converted to an IP address using DNS or host-name aliasing.

To allow a remote user to execute rcp or rsh commands on a local router, you must create an entry for the remote user in the local authentication database. You must also enable the router to act as an rsh or rcp server.

To enable the router to act as an rsh server, issue the **ip rcmd rsh-enable** command. To enable the router to act as an rcp server, issue the **ip rcmd rcp-enable** command.The router cannot act as a server for either of these protocols unless you explicitly enable the capacity.

A local authentication database, which is similar to a UNIX *.rhosts* file, is used to enforce security on the router through access control. Each entry that you configure in the authentication database identifies the local user, the remote host, and the remote user. To permit a remote user of rsh to execute commands in privileged EXEC mode or to permit a remote user of rcp to copy files to the router, specify the **enable** keyword and level. For information on the enable level, refer to the **privilege level** global configuration command in the Release 12.2 *Cisco IOS Security Command Reference*.

An entry that you configure in the authentication database differs from an entry in a UNIX *.rhosts* file in the following aspect. Because the *.rhosts* file on a UNIX system resides in the home directory of a local user account, an entry in a UNIX *.rhosts* file need not include the local username; the local username is determined from the user account. To provide equivalent support on a router, specify the local username along with the remote host and remote username in each authentication database entry that you configure.

For a remote user to be able to execute commands on the router in its capacity as a server, the local username, host address or name, and remote username sent with the remote client request must match values configured in an entry in the local authentication file.

A remote client host should be registered with DNS. The Cisco IOS software uses DNS to authenticate the remote host's name and address. Because DNS can return several valid IP addresses for a host name, the Cisco IOS software checks the address of the requesting client against all of the IP addresses for the named host returned by DNS. If the address sent by the requester is considered invalid, that is, it does not match any address listed with DNS for the host name, then the software will reject the remote-command execution request.

Note that if no DNS servers are configured for the router, then that device cannot authenticate the host in this manner. In this case, the Cisco IOS software sends a broadcast request to attempt to gain access to DNS services on another server. If DNS services are not available, you must use the **no ip domain-lookup** command to disable the attempt to gain access to a DNS server by sending a broadcast request.

If DNS services are not available and, therefore, you bypass the DNS security check, the software will accept the request to remotely execute a command only if all three values sent with the request match exactly the values configured for an entry in the local authentication file.

Examples

The following example allows the remote user *named netadmin3* on a remote host with the IP address 172.16.101.101 to execute commands on *router1* using the rsh or rcp protocol. User netadmin3 is allowed to execute commands in privileged EXEC mode.

```
Router(config)# ip rcmd remote-host router1 172.16.101.101 netadmin3 enable
```

Related Commands

Command	Description
ip rcmd rcp-enable	Configures the Cisco IOS software to allow remote users to copy files to and from the router.

Command	Description
ip domain-lookup	Enables the IP DNS-based host name-to-address translation.
ip rcmd rsh-enable	Configures the router to allow remote users to execute commands on it using the rsh protocol.

ip rcmd remote-username

To configure the remote username to be used when requesting a remote copy using remote copy protocol (rcp), use the **ip rcmd remote-username** command in global configuration mode. To remove from the configuration the remote username, use the **no** form of this command.

ip rcmd remote-username *username*

no ip rcmd remote-username *username*

Syntax Description

username	Name of the remote user on the server. This name is used for rcp copy requests. All files and images to be copied are searched for or written relative to the directory of the remote user's account, if the server has a directory structure, for example, as do UNIX systems.

Defaults

If you do not issue this command, the Cisco IOS software sends the remote username associated with the current tty process, if that name is valid, for rcp copy commands. For example, if the user is connected to the router through Telnet and the user was authenticated through the **username** command, then the software sends that username as the remote username.

Note The remote username must be associated with an account on the destination server.

If the username for the current tty process is not valid, the Cisco IOS software sends the host name as the remote username. For rcp boot commands, the Cisco IOS software sends the access server host name by default.

Note For Cisco, tty lines are commonly used for access services. The concept of tty originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are called tty devices (tty stands for teletype, the original UNIX terminal).

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The rcp protocol requires that a client send the remote username on an rcp request to the server. Use this command to specify the remote username to be sent to the server for an rcp copy request. If the server has a directory structure, as do UNIX systems, all files and images to be copied are searched for or written relative to the directory of the remote user's account.

Note Cisco IOS Release 10.3 added the **ip** keyword to **rcmd** commands. If you are upgrading from Release 10.2 to Release 10.3 or a later release, this keyword is automatically added to any **rcmd** commands you have in your Release 10.2 configuration files.

Examples

The following example configures the remote username to netadmin1:

```
Router(config)# ip rcmd remote-username netadmin1
```

Related Commands

Command	Description
boot network rcp	Changes the default name of the network configuration file from which to load configuration commands.
boot system rcp	Specifies the system image that the router loads at startup.
bridge acquire	Forwards any frames for stations that the system has learned about dynamically.
copy	Copies any file from a source to a destination.

ip rcmd rsh-enable

To configure the router to allow remote users to execute commands on it using remote shell protocol (rsh), use the **ip rcmd rsh-enable** command in global configuration mode. To disable a router that is enabled for rsh, use the **no** form of this command.

ip rcmd rsh-enable

no ip rcmd rsh-enable

Syntax Description

This command has no arguments or keywords.

Defaults

To ensure security, the router is not enabled for rsh by default.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

rsh, used as a client process, gives users the ability to remotely get router information (such as status) without the need to connect into the router and then disconnect. This is valuable when looking at many statistics on many different routers.

Use this command to enable the router to receive rsh requests from remote users. In addition to issuing this command, you must create an entry for the remote user in the local authentication database to allow a remote user to execute rsh commands on the router.

The **no ip rcmd rsh-enable** command does not prohibit a local user of the router from executing a command on other routers and UNIX hosts on the network using rsh. The no form of this command only disables remote access to rsh on the router.

Examples

The following example enables a router as an rsh server:

```
Router(config)# ip rcmd rsh-enable
```

Related Commands

Command	Description
ip rcmd remote-host	Creates an entry for the remote user in a local authentication database so that remote users can execute commands on the router using rsh or rcp.

ip rcmd source-interface

To force remote copy protocol (rcp) or remote shell protocol (rsh) to use the IP address of a specified interface for all outgoing rcp/rsh communication packets, use the **ip rcmd source-interface** command in global configuration mode. To disable a previously configured **ip rcmd source-interface** command, use the **no** form of this command.

ip rcmd source-interface *interface-id*

no ip rcmd source-interface *interface-id*

Syntax Description

interface-id	The name and number used to identify the interface. For example, Loopback2.

Defaults

The address of the interface closest to the destination is used as the source interface for rcp/rsh communications.

Command Modes

Global configuration

Command History

Release	Modification
11.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If this command is not used, or if the interface specified in this command is not available (not up), the Cisco IOS software uses the address of the interface closest to the destination as the source address.

Use this command to force the system to tag all outgoing rcp/rsh packets with the IP address associated with the specified interface. This address is used as the source address as long as the interface is in the up state.

This command is especially useful in cases where the router has many interfaces, and you want to ensure that all rcp and/or rsh packets from this router have the same source IP address. A consistent address is preferred so that the other end of the connection (the rcp/rsh server or client) can maintain a single session. The other benefit of a consistent address is that an access list can be configured on the remote device.

The specified interface must have an IP address associated with it. If the specified interface does not have an IP address or is in a down state, then rcp/rsh reverts to the default. To avoid this, add an IP address to the subinterface or bring the interface to the up state.

Examples

In the following example, Loopback interface 0 is assigned an IP address of 220.144.159.200, and the **ip rcmd source-interface** command is used to specify that the source IP address for all rcp/rsh packets will be the IP address assigned to the Loopback0 interface:

```
interface Loopback0
```

```
  description Loopback interface
  ip address 220.144.159.200 255.255.255.255
  no ip directed-broadcast
!
.
.
.
clock timezone GMT 0
ip subnet-zero
no ip source-route
no ip finger
ip rcmd source-interface Loopback0
ip telnet source-interface Loopback0
ip tftp source-interface Loopback0
ip ftp source-interface Loopback0
ip ftp username cisco
ip ftp password shhhhsecret
no ip bootp server
ip domain-name net.galaxy
ip name-server 220.144.159.1
ip name-server 220.144.159.2
ip name-server 219.10.2.1
!
.
.
.
```

Related Commands

Command	Description
ip rcmd remote-host	Creates an entry for the remote user in a local authentication database so that remote users can execute commands on the router using rsh or rcp.

ip telnet source-interface

To specify the IP address of an interface as the source address for Telnet connections, use the **ip telnet source-interface** command in global configuration mode. To reset the source address to the default for each connection, use the **no** form of this command.

ip telnet source-interface *interface*

no ip telnet source-interface

Syntax Description

interface	The interface whose address is to be used as the source for Telnet connections.

Defaults

The address of the closest interface to the destination is the source address.

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to set the IP address of an interface as the source for all Telnet connections.

If the specified interface is not up, the Cisco IOS software selects the address of the interface closest to the destination as the source address.

Examples

The following example forces the IP address for Ethernet interface 1 as the source address for Telnet connections:

```
Router(config)# ip telnet source-interface Ethernet1
```

Related Commands

Command	Description
ip radius source-interface	Forces RADIUS to use the IP address of a specified interface for all outgoing RADIUS packets.

ip tftp source-interface

To specify the IP address of an interface as the source address for TFTP connections, use the **ip tftp source-interface** command in global configuration mode. To return to the default, use the **no** form of this command.

ip tftp source-interface *interface-type interface-number*

no ip tftp source-interface

Syntax Description

interface-type interface-number	The interface type and number whose address is to be used as the source for TFTP connections.

Command Default

The address of the closest interface to the destination is selected as the source address.

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.
12.3(6)	Destination address lookup in a Virtual Private Network (VPN) routing and forwarding (VRF) table was added for the transfer of TFTP packets.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to set the IP address of an interface as the source for all TFTP connections.

If the specified interface is not up, the Cisco IOS software selects the address of the interface closest to the destination as the source address.

In Cisco IOS 12.3(6) and later releases, TFTP is VRF-aware, which means that TFTP transfer is supported across an interface within a Virtual Private Network (VPN) routing and forwarding (VRF) instance. To specify a VRF as a source for TFTP connections, the VRF must be associated with the same interface that you configure with the **ip tftp source-interface** command. In this configuration, TFTP looks for the destination IP address for file transfer in the specified VRF table.

Examples

The following example shows how to configure the router to use the IP address associated with loopback interface 0 as the source address for TFTP connections:

```
configure terminal
!
ip tftp source-interface loopback0
```

The following example shows how to configure the router to use the VRF table named vpn1 to look for the destination IP address for TFTP connections:

```
configure terminal
!
ip tftp source-interface ethernet 1/0
!
ip vrf vpn1
rd 100:1
route-target both 100:1
!
interface ethernet 1/0
 ip vrf forwarding vpn1
 end
```

In this example, file transfer using TFTP is accomplished across an interface within a VRF (VRF vpn1) link.

Related Commands

Command	Description
ip ftp source-interface	Forces outgoing FTP packets to use the IP address of a specified interface as the source address.
ip radius source-interface	Forces outgoing RADIUS packets to use the IP address of a specified interface as the source address.

ip wccp web-cache accelerated

To enable the hardware acceleration for WCCP version 1, use the **ip wccp web-cache accelerated** command in global configuration mode. To disable hardware acceleration, use the **no** form of this command.

ip wccp web-cache accelerated [[**group-address** *groupaddress*] | [**redirect-list** *access-list*] | [**group-list** *access-list*] | [**password** *password*]]

no ip wccp web-cache accelerated

Syntax Description

group-address *group-address*	(Optional) Directs the router to use a specified multicast IP address for communication with the WCCP service group. See the "Usage Guidelines" section for additional information.
redirect-list *access-list*	(Optional) Directs the router to use an access list to control traffic that is redirected to this service group. See the "Usage Guidelines" section for additional information.
group-list *access-list*	(Optional) Directs the router to use an access list to determine which cache engines are allowed to participate in the service group. See the "Usage Guidelines" section for additional information.
password *password*	(Optional) Specifies a string that directs the router to apply MD5 authentication to messages received from the service group specified by the service name given. See the "Usage Guidelines" section for additional information.

Defaults

Disabled

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Cisco IOS Release 12.2(17d)SXB.
12.2(18)SXD1	This command was changed to support the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is supported on software releases later than cache engine software Release ACNS 4.2.1.

The **group-address** *group-address* option requires a multicast address that is used by the router to determine which cache engine should receive redirected messages. This option instructs the router to use the specified multicast IP address to coalesce the "I See You" responses for the "Here I Am" messages that it has received on this group address. In addition, the response is sent to the group address. The default is for no **group-address** to be configured, so that all "Here I Am" messages are responded to with a unicast reply.

The **redirect-list** *access-list* option instructs the router to use an access list to control the traffic that is redirected to the cache engines of the service group that is specified by the service-name given. The *access-list* argument specifies either a number from 1 to 99 to represent a standard or extended access-list number, or a name to represent a named standard or extended access list. The access list itself specifies the traffic that is permitted to be redirected. The default is for no **redirect-list** to be configured (all traffic is redirected).

The **group-list** *access-list* option instructs the router to use an access list to control the cache engines that are allowed to participate in the specified service group. The *access-list* argument specifies either a number from 1 to 99 to represent a standard access-list number, or a name to represent a named standard access list. The access list specifies which cache engines are permitted to participate in the service group. The default is for no **group-list** to be configured, so that all cache engines may participate in the service group.

The password can be up to seven characters. When you designate a password, the messages that are not accepted by the authentication are discarded. The password name is combined with the HMAC MD5 value to create security for the connection between the router and the cache engine.

Examples

This example shows how to enable the hardware acceleration for WCCP version 1:

```
Router(config)# ip wccp web-cache accelerated
```

Related Commands

Command	Description
ip wccp version	Specifies which version of WCCP to configure on your router.

length

To set the terminal screen length, use the **length** command in line configuration mode. To restore the default value, use the **no** form of this command.

length *screen-length*

no length

Syntax Description

screen-length	The number of lines on the screen. A value of zero disables pausing between screens of output.

Defaults

Screen length of 24 lines

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The Cisco IOS software uses the value of this command to determine when to pause during multiple-screen output. Not all commands recognize the configured screen length. For example, the **show terminal** command assumes a screen length of 24 lines or more.

Examples

In the following example, the terminal type is specified and the screen pause function is disabled for the terminal connection on line 6:

```
Router(config)# line 6
Router(config-line)# terminal-type VT220
Router(config-line)# length 0
```

Related Commands

Command	Description
terminal length	Sets the number of lines on the current terminal screen for the current session.

load-interval

To change the length of time for which data is used to compute load statistics, use the **load-interval** command in interface configuration mode or Frame Relay DLCI configuration mode. To revert to the default setting, use the **no** form of this command.

load-interval *seconds*

no load-interval *seconds*

Syntax Description

seconds	Length of time for which data is used to compute load statistics. Value is a multiple of 30, from 30 to 600 (30, 60, 90, 120, and so on). The default is 300 seconds.

Command Default

Enabled

Command Modes

Interface configuration
Frame Relay DLCI configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(4)T	This command was made available in Frame Relay DLCI configuration mode.
12.2(18)SXF	Support for this command was introduced on the Supervisor Engine 720.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

To make computations more reactive to short bursts of traffic, you can shorten the length of time over which load averages are computed.

If the load interval is set to 30 seconds, new data is used for load calculations over a 30-second period. This data is used to compute load statistics, including the input rate in bits and packets per second, the output rate in bits and packets per second, the load, and reliability.

Load data is gathered every five seconds. This data is used for a weighted-average calculation in which recent load data has more weight in the computation than older load data. If the load interval is set to 30 seconds, the average is computed for the last 30 seconds of load data.

If you change the calculation interval from the default of five minutes to a shorter period of time, the input and output statistics that are displayed by the **show interface** command or the **show frame-relay pvc** command will be more current and will be based on more nearly instantaneous data, rather than reflecting the average load over a longer period of time.

This command is often used for dial backup purposes to increase or decrease the likelihood of implementation of a backup interface, but it can be used on any interface.

Examples

Interface Example

In the following example, the default average of five minutes is changed to a 30-second average. A burst in traffic that would not trigger a dial backup for an interface configured with the default five-minute interval might trigger a dial backup for this interface, which is set for the shorter 30-second interval.

```
Router(config)# interface serial 0
Router(config-if)# load-interval 30
```

Frame Relay PVC Example

In the following example, the load interval is set to 60 seconds for a Frame Relay PVC with the DLCI 100:

```
Router(config)# interface serial 1/1
Router(config-if)# frame-relay interface-dlci 100
Router(config-fr-dlci)# load-interval 60
```

Related Commands

Command	Description
show interfaces	Displays statistics for all interfaces configured on the router or access server.

location

To provide a description of the location of a serial device, use the **location** command in line configuration mode. To remove the description, use the **no** form of this command.

location *text*

no location

Syntax Description

text	Location description.

Defaults

No location description is provided.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **location** command enters information about the device location and status. Use the **show users all** EXEC command to display the location information.

Examples

In the following example, the location description for the console line is given as "Building 3, Basement":

```
Router(config)# line console
Router(config-line)# location Building 3, Basement
```

lock

To configure a temporary password on a line, use the **lock** command in EXEC mode.

lock

Syntax Description

This command has no arguments or keywords.

Defaults

Not locked

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced in a release prior to Cisco IOS Release 10.0.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can prevent access to your session while keeping your connection open by setting up a temporary password. To lock access to the terminal, perform the following steps:

Step 1 Enter the **lock** command. The system prompts you for a password.

Step 2 Enter a password, which can be any arbitrary string. The system will prompt you to confirm the password. The screen then clears and displays the message “Locked.”

Step 3 To regain access to your sessions, reenter the password.

The Cisco IOS software honors session timeouts on a locked lines. You must clear the line to remove this feature. The system administrator must set the line up to allow use of the temporary locking feature by using the **lockable** line configuration command.

Examples

The following example shows configuring the router as lockable, saving the configuration, and then locking the current session for the user:

```
Router(config-line)# lockable
Router(config-line)# ^Z
Router# copy system:running-config nvram:startup-config
Building configuration...
OK
Router# lock
Password: <password>
Again: <password>
                      Locked
Password: <password>
Router#
```

Related Commands

Command	Description
lockable	Enables the **lock** EXEC command.
login (EXEC)	Enables or changes a login username.

lockable

To enable use of the **lock** EXEC command, use the **lockable** command in line configuration mode. To reinstate the default (the terminal session cannot be locked), use the **no** form of this command.

lockable

no lockable

Syntax Description

This command has no arguments or keywords.

Defaults

Sessions on the line are not lockable (the **lock** EXEC command has no effect).

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command enables use of temporary terminal locking, which is executed using the **lock** EXEC command. Terminal locking allows a user keep the current session open while preventing access by other users.

Examples

In the following example, the terminal connection is configured as lockable, then the current connection is locked:

```
Router# configure terminal
Router(config)# line console 0
Router(config-line)# lockable
Router(config)# ^Z
Router# lock
Password: <password>
Again: <password>
                      Locked

Password: <password>
Router#
```

Related Commands

Command	Description
lock	Prevents access to your session by other users by setting a temporary password on your terminal line.

log config

To enter configuration change logger configuration mode, use the **log config** command in archive configuration mode.

log config

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Archive configuration

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Examples

The following example shows how to place the router in configuration change logger configuration mode:

```
Router# configure terminal
!
Router(config)# archive
Router(config-archive)# log config
Router(config-archive-log-config)#
```

Related Commands

Command	Description
archive	Enters archive configuration mode.
hidekeys	Suppresses the display of password information in configuration log files.
logging enable	Enables the logging of configuration changes.
logging size	Specifies the maximum number of entries retained in the configuration log.
notify syslog	Enables the sending of notifications of configuration changes to a remote syslog.
show archive log config	Displays entries from the configuration log.

logging enable

To enable the logging of configuration changes, use the **logging enable** command in configuration change logger configuration mode. To disable the logging of configuration changes, use the **no** form of this command.

logging enable

no logging enable

Syntax Description

This command has no arguments or keywords.

Command Default

Configuration change logging is disabled.

Command Modes

Configuration change logger configuration

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Usage Guidelines

Use this command if you want to log configuration changes. If you disable configuration logging, all configuration log records that were collected are purged.

Examples

The following example shows how to enable configuration logging:

```
Router# configure terminal
!
Router(config)# archive
Router(config-archive)# log config
Router(config-archive-log-config)# logging enable
Router(config-archive-log-config)# end
```

The following example shows how to clear the configuration log by disabling and then reenabling the configuration log:

```
Router# configure terminal
!
Router(config)# archive
Router(config-archive)# log config
Router(config-archive-log-config)# no logging enable
Router(config-archive-log-config)# logging enable
Router(config-archive-log-config)# end
```

Related Commands

Command	Description
archive	Enters archive configuration mode.
hidekeys	Suppresses the display of password information in configuration log files.
log config	Enters configuration change logger configuration mode.
logging size	Specifies the maximum number of entries retained in the configuration log.
notify syslog	Enables the sending of notifications of configuration changes to a remote syslog.
show archive log config	Displays entries from the configuration log.

logging event bundle-status

To enable message bundling, use the **logging event bundle-status** command in interface configuration mode. To disable message bundling, use the **no** form of this command.

logging event bundle-status

no logging event bundle-status

Syntax Description

default	Enables system logging of interface state-change events on all interfaces in the system.
boot	Enables system logging of interface state-change events on all interfaces in the system during system initialization.

Defaults

Message bundling does not occur.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The logging event bundle-status command is not applicable on Port Channel or Ether-Channel interfaces.

Examples

This example shows how to enable the system logging of the interface state-change events on all interfaces in the system:

```
Router(config)# logging event bundle-status
Router(config)# end
Router # show logging event bundle-status
*Aug 4 17:36:48.240 UTC: %EC-SP-5-UNBUNDLE: Interface FastEthernet9/23 left the
port-channel Port-channel2
*Aug 4 17:36:48.256 UTC: %LINK-SP-5-CHANGED: Interface FastEthernet9/23, changed state to
administratively down
*Aug 4 17:36:47.865 UTC: %EC-SPSTBY-5-UNBUNDLE: Interface FastEthernet9/23 left the
port-channel Port-channel2
Router # show logging event bundle-status
*Aug 4 17:37:35.845 UTC: %EC-SP-5-BUNDLE: Interface FastEthernet9/23 joined port-channel
Port-channel2
*Aug 4 17:37:35.533 UTC: %EC-SPSTBY-5-BUNDLE: Interface FastEthernet9/23 joined
port-channel Port-channel2
```

Related Commands

Command	Description
show running-config	Displays the status and configuration of the module or Layer 2 VLAN.

logging event link-status (global configuration)

To change the default or set the link-status event messaging during system initialization, use the **logging event link-status** command in global configuration mode. To disable the link-status event messaging, use the **no** form of this command.

logging event link-status {**default** | **boot**}

no logging event link-status {**default** | **boot**}

Syntax Description

default	Enables system logging of interface state-change events on all interfaces in the system.
boot	Enables system logging of interface state-change events on all interfaces in the system during system initialization.

Defaults

Interface state-change messages are not sent.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You do not have to enter the **logging event link-status boot** command to enable link-status messaging during system initialization. The **logging event link-status default** command logs system messages even during system initialization.

If you enter both the **logging event link-status default** and the **no logging event link-status boot** commands, the interface state-change events are logged after all modules in the Cisco 7600 series router come online after system initialization. The **logging event link-status default** and the **no logging event link-status boot** commands are saved and retained in the running configuration of the system.

When both the **logging event link-status default** and the **no logging event link-status boot** commands are present in the running configuration and you want to display the interface state-change messages during system initialization, enter the **logging event link-status boot** command.

Examples

This example shows how to enable the system logging of the interface state-change events on all interfaces in the system:

```
Router(config)# logging event link-status default
Router(config)#
```

This example shows how to enable the system logging of interface state-change events on all interfaces during system initialization:

```
Router(config)# logging event link-status boot
Router(config)#
```

This example shows how to disable the system logging of interface state-change events on all interfaces:

```
Router(config)# no logging event link-status default
Router(config)#
```

This example shows how to disable the system logging of interface state-change events during system initialization:

```
Router(config)# no logging event link-status boot
Router(config)#
```

Related Commands

Command	Description
show running-config	Displays the status and configuration of the module or Layer 2 VLAN.

logging event link-status (interface configuration)

To enable the link-status event messaging on an interface, use the **logging event link-status** command in interface configuration mode. To disable the link-status event messaging, use the **no** form of this command.

logging event link-status

no logging event link-status

Syntax Description

This command has no arguments or keywords.

Defaults

Interface state-change messages are not sent.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

To enable system logging of interface state-change events on a specific interface, enter the **logging event link-status** command.

To enable system logging of interface state-change events on all interfaces in the system, enter the **logging event link-status** command.

Examples

This example shows how to enable the system logging of the interface state-change events on an interface:

```
Router(config-if)# logging event link-status
Router(config-if)#
```

This example shows how to disable the system logging of the interface state-change events on an interface:

```
Router(config-if)# no logging event link-status
Router(config-if)#
```

Related Commands

Command	Description
show running-config	Displays the status and configuration of the module or Layer 2 VLAN.

logging event subif-link-status

To enable the link-status event messaging on a subinterface, use the **logging event subif-link-status** command in interface configuration mode. To disable the link-status event messaging on a subinterface, use the **no** form of this command.

logging event subif-link-status

no logging event subif-link-status

Syntax Description

This command has no arguments or keywords.

Defaults

Subinterface state-change messages are not sent.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 720.

To enable system logging of interface state-change events on a specific subinterface, enter the **logging event subif-link-status** command.

To enable system logging of interface state-change events on a specific interface, enter the **logging event link-status** command.

To enable system logging of interface state-change events on all interfaces in the system, enter the **logging event link-status** command.

Examples

This example shows how to enable the system logging of the interface state-change events on a subinterface:

```
Router(config-if)# logging event subif-link-status
Router(config-if)#
```

This example shows how to disable the system logging of the interface state-change events on a subinterface:

```
Router(config-if)# no logging event subif-link-status
Router(config-if)#
```

Related Commands

Command	Description
show running-config	Displays the status and configuration of the module or Layer 2 VLAN.

logging event trunk-status

To enable trunk status messaging, use the **logging event trunk-status** command in interface configuration mode. To disable trunk status messaging, use the **no** form of this command.

logging event trunk-status

no logging event trunk-status

Syntax Description

This command has no keywords or variables.

Defaults

This command has no default settings.

Command Modes

Interface configuration mode

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced.

Usage Guidelines

The logging event bundle-status command is not applicable on Port Channel or Ether-Channel interfaces.

Examples

This example shows how to enable the trunk status messaging on physical ports:

```
Router(config)# logging event trunk-status
Router(config)# end
Router# show logging event trunk-status
*Aug 4 17:27:01.404 UTC: %DTP-SPSTBY-5-NONTRUNKPORTON: Port Gi3/3 has become non-trunk
*Aug 4 17:27:00.773 UTC: %DTP-SP-5-NONTRUNKPORTON: Port Gi3/3 has become non-trunk
Router#
```

logging ip access-list cache (global configuration)

To configure the Optimized ACL Logging (OAL) parameters, use the **logging ip access-list cache** command in global configuration mode. To return to the default settings, use the **no** form of this command.

logging ip access-list cache {**entries** *entries* | {**interval** *seconds* | **rate-limit** *pps* | **threshold** *packets*}

no logging ip access-list cache [**entries** | **interval** | **rate-limit** | **threshold**]

Syntax Description

entries *entries*	Specifies the maximum number of log entries that are cached in the software; valid values are from 0 to 1048576 entries.
interval *seconds*	Specifies the maximum time interval before an entry is sent to syslog; valid values are from 5 to 86400 seconds.
rate-limit *pps*	Specifies the number of packets that are logged per second in the software; valid values are from 10 to 1000000 pps.
threshold *packets*	Specifies the number of packet matches before an entry is sent to syslog; valid values are from 1 to 1000000 packets.

Defaults

The defaults are as follows:

- *entries*—**8000** entries.
- *seconds*—**300** seconds (5 minutes).
- **rate-limit** *pps*—**0** (rate limiting is off) and all packets are logged.
- **threshold** *packets*—**0** (rate limiting is off) and the system log is not triggered by the number of packet matches.

Command Modes

Global configuration

Command History

Release	Modification
12.2(17d)SXB	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is supported on Cisco 7600 series routers that are configured with a Supervisor Engine 720 only.

OAL is supported on IPv4 unicast traffic only.

You cannot configure OAL and VACL capture on the same chassis. OAL and VACL capture are incompatible. With OAL configured, use SPAN to capture traffic.

If the entry is inactive for the duration that is specified in the **update-interval** *seconds* command, the entry is removed from the cache.

If you enter the **no logging ip access-list cache** command without keywords, all the parameters are returned to the default values.

You must set ICMP unreachable rate limiting to 0 if the OAL is configured to log denied packets.

When enabling the IP "too short" check using the mls verify ip length minimum command, valid IP packets with with an IP protocol field of ICMP(1), IGMP(2), IP(4), TCP(6), UDP(17), IPv6(41), GRE(47), or SIPP-ESP(50) will be hardware switched. All other IP protocol fields are software switched.

Caution Using optimized access-list logging (OAL) and the mls verify ip length minimum command together can cause routing protocol neighbor flapping as they are incompatible

Examples

This example shows how to specify the maximum number of log entries that are cached in the software:

```
Router(config)# logging ip access-list cache entries 200
```

This example shows how to specify the maximum time interval before an entry is sent to the system log:

```
Router(config)# logging ip access-list cache interval 350
```

This example shows how to specify the number of packets that are logged per second in the software:

```
Router(config)# logging ip access-list cache rate-limit 100
```

This example shows how to specify the number of packet matches before an entry is sent to the system log:

```
Router(config)# logging ip access-list cache threshold 125
```

Related Commands

Command	Description
clear logging ip access-list cache	Clears all the entries from the OAL cache and sends them to the syslog.
logging ip access-list cache (interface configuration)	Enables an OAL-logging cache on an interface that is based on direction.
show logging ip access-list	Displays information about the logging IP access list.
update-interval *seconds*	Removes entries from the cache that are inactive for the duration that is specified in the command.

logging ip access-list cache (interface configuration)

To enable an Optimized ACL Logging (OAL)-logging cache on an interface that is based on direction, use the **logging ip access-list cache** command in interface configuration mode. To disable OAL, use the **no** form of this command.

logging ip access-list cache [**in** | **out**]

no logging ip access-list cache

Syntax Description

in	(Optional) Enables OAL on ingress packets.
out	(Optional) Enables OAL on egress packets.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
12.2(17d)SXB	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is supported on Cisco 7600 series routers that are configured with a Supervisor Engine 720 only.

This command is supported on traffic that matches the **log** keyword in the applied ACL. You must set ICMP unreachable rate limiting to 0 if the OAL is configured to log denied packets.

On systems that are configured with a PFC3A, support for the egress direction on tunnel interfaces is not supported.

OAL is supported on IPv4 unicast traffic only.

You cannot configure OAL and VACL capture on the same chassis. OAL and VACL capture are incompatible. With OAL configured, use SPAN to capture traffic.

If the entry is inactive for the duration that is specified in the **update-interval** *seconds* command, the entry is removed from the cache.

If you enter the **no logging ip access-list cache** command without keywords, all the parameters are returned to the default values.

When enabling the IP "too short" check using the mls verify ip length minimum command, valid IP packets with with an IP protocol field of ICMP(1), IGMP(2), IP(4), TCP(6), UDP(17), IPv6(41), GRE(47), or SIPP-ESP(50) will be hardware switched. All other IP protocol fields are software switched.

Caution Using optimized access-list logging (OAL) and the mls verify ip length minimum command together can cause routing protocol neighbor flapping as they are incompatible

Examples

This example shows how to enable OAL on ingress packets:

```
Router(config-if)# logging ip access-list cache in
```

This example shows how to enable OAL on egress packets:

```
Router(config-if)# logging ip access-list cache out
```

Related Commands

Command	Description
clear logging ip access-list cache	Clears all the entries from the OAL cache and sends them to the syslog.
logging ip access-list cache (global configuration)	Configures the OAL parameters.
show logging ip access-list	Displays information about the logging IP access list.
update-interval *seconds*	Removes entries from the cache that are inactive for the duration that is specified in the command.

logging persistent (config-archive-log-cfg)

To enable the configuration logging persistent feature and to select how the configuration commands are to be saved to the Cisco IOS secure file system, use the **logging persistent** command in the log config submode of archive configuration mode. To disable this capability, use the **no** form of this command.

logging persistent {**auto** | **manual**}

no logging persistent {**auto** | **manual**}

Syntax Description

auto	Specifies that each configuration command will be saved automatically to the Cisco IOS secure file system.
manual	Specifies that each configuration command must be saved manually to the Cisco IOS secure file system.

Command Default

The configuration commands are not saved to the Cisco IOS secure file system.

Command Modes

Archive configuration mode, log config (configuration-change logger) submode (config-archive-log-cfg)#

Command History

Release	Modification
12.0(26)S	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(11)T	This command was integrated into Cisco IOS Release 12.4(11)T.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.

Usage Guidelines

When you use the **manual** keyword, you must save each configuration command manually to the Cisco IOS secure file system. To do this, you must use the **archive log config persistent save** command.

Examples

The following example automatically saves the configuration commands to the Cisco IOS secure file system:

```
Router(config)# archive
Router(config-archive)# log config
Router(config-archive-log-cfg)# logging enable
Router(config-archive-log-cfg)# logging persistent auto
```

Related Commands

Command	Description
logging persistent reload	Sequentially applies configuration commands in the configuration logger database to the running-config file after a reload.
archive log config persistent save	Saves the persisted commands in the configuration log to the Cisco IOS secure file system.

logging persistent reload (config-archive-log-cfg)

To sequentially apply the configuration commands saved in the configuration logger database (since the last **write memory** command) to the running-config file after a reload, use the **logging persistent reload** command in configuration change logger configuration mode in archive configuration mode. To disable this capability, use the **no** form of this command.

logging persistent reload

no logging persistent reload

Syntax Description

This command has no arguments or keywords.

Command Default

The configuration commands saved in the configuration logger database are not applied to the running-config file.

Command Modes

Archive config mode; log config (configuration change logger) submode
(config-archive-log-cfg)#

Command History

Release	Modification
12.2(33)SRA	This command was introduced.
12.4(11)T	This command was integrated into Cisco IOS Release 12.4(11)T.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.

Usage Guidelines

Use the **logging persistent reload** command when you want changed configuration commands to take effect on the next reload of the router.

Examples

The following example applies the configuration commands in the configuration logger database to the running-config file after the next reload:

```
Router(config-archive-log-cfg)# logging persistent reload
```

Related Commands

Command	Description
logging persistent	Enables the configuration logging persistent feature.

logging size

To specify the maximum number of entries retained in the configuration log, use the **logging size** command in configuration change logger configuration mode. To reset the default value, use the **no** form of this command.

logging size *entries*

no logging size

Syntax Description

entries	The maximum number of entries retained in the configuration log. Valid values range from 1 to 1000. The default value is 100 entries.

Defaults

100 entries

Command Modes

Configuration change logger configuration

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Usage Guidelines

When the configuration log is full, the oldest log entry will be removed every time a new entry is added.

Note If a new log size is specified that is smaller than the current log size, the oldest entries will be immediately purged until the new log size is satisfied, regardless of the age of the log entries.

Examples

The following example shows how to specify that the configuration log may have a maximum of 200 entries:

```
Router(config-archive-log-config)# logging size 200
```

The following example shows how to clear the configuration log by reducing the log size to 1, then resetting the log size to the desired value. Only the most recent configuration log file will be saved.

```
Router(config)# archive
Router(config-archive)# log config
Router(config-archive-log-config)# logging size 1
Router(config-archive-log-config)# logging size 200
```

Related Commands

Command	Description
archive	Enters archive configuration mode.
hidekeys	Suppresses the display of password information in configuration log files.
log config	Enters configuration change logger configuration mode.
logging enable	Enables the logging of configuration changes.
notify syslog	Enables the sending of notifications of configuration changes to a remote syslog.
show archive log config	Displays entries from the configuration log.

logging synchronous

To synchronize unsolicited messages and debug output with solicited Cisco IOS software output and prompts for a specific console port line, auxiliary port line, or vty, use the **logging synchronous** command in line configuration mode. To disable synchronization of unsolicited messages and debug output, use the **no** form of this command.

logging synchronous [**level** *severity-level* | **all**] [**limit** *number-of-lines*]

no logging synchronous [**level** *severity-level* | **all**] [**limit** *number-of-lines*]

Syntax Description

level *severity-level*	(Optional) Specifies the message severity level. Messages with a severity level equal to or higher than this value are printed asynchronously. Low numbers indicate greater severity and high numbers indicate lesser severity. The default value is 2.
all	(Optional) Specifies that all messages are printed asynchronously, regardless of the severity level.
limit *number-of-lines*	(Optional) Specifies the number of buffer lines to be queued for the terminal, after which new messages are dropped. The default value is 20.

Defaults

This command is disabled.

If you do not specify a severity level, the default value of 2 is assumed.

If you do not specify the maximum number of buffers to be queued, the default value of 20 is assumed.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

When synchronous logging of unsolicited messages and debug output is turned on, unsolicited Cisco IOS software output is displayed on the console or printed after solicited Cisco IOS software output is displayed or printed. This keeps unsolicited messages and debug output from being interspersed with solicited software output and prompts.

Tip This command is useful for keeping system messages from interrupting your typing. By default, messages will appear immediately when they are processed by the system, and the CLI cursor will appear at the end of the displayed message. For example, the line “Configured by console from console”

may be printed to the screen, interrupting whatever command you are currently typing. The **logging synchronous** command allows you to avoid these potentially annoying interruptions without have to turn off logging to the console entirely.

When this command is enabled, unsolicited messages and debug output are displayed on a separate line than user input. After the unsolicited messages are displayed, the CLI returns to the user prompt.

Note This command is also useful for allowing you to continue typing when debugging is enabled.

When specifying a severity level number, consider that for the logging system, low numbers indicate greater severity and high numbers indicate lesser severity.

When a message queue limit of a terminal line is reached, new messages are dropped from the line, although these messages might be displayed on other lines. If messages are dropped, the notice "%SYS-3-MSGLOST *number-of-messages* due to overflow" follows any messages that are displayed. This notice is displayed only on the terminal that lost the messages. It is not sent to any other lines, any logging servers, or the logging buffer.

Caution By configuring abnormally large message queue limits and setting the terminal to "terminal monitor" on a terminal that is accessible to intruders, you expose yourself to "denial of service" attacks. An intruder could carry out the attack by putting the terminal in synchronous output mode, making a Telnet connection to a remote host, and leaving the connection idle. This could cause large numbers of messages to be generated and queued, and these messages could consume all available RAM. You should guard against this type of attack through proper configuration.

Examples

In the following example, a system message appears in the middle of typing the show running-config command:

```
Router(config-line)# end
Router# show ru
2w1d: %SYS-5-CONFIG_I: Configured from console by consolenning-config
 .
 .
 .
```

The user then enables synchronous logging for the current line (indicated by the * symbol in the **show line** command), after which the system displays the system message on a separate line, and returns the user to the prompt to allow the user to finish typing the command on a single line:

```
Router# show line
   Tty Typ     Tx/Rx    A Modem  Roty AccO AccI   Uses   Noise  Overruns   Int
*    0 CTY              -    -      -    -    -      0       3     0/0       -
 .
 .
 .
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# line 0
Router(config-line)# logging syn<tab>
Router(config-line)# logging synchronous
Router(config-line)# end
Router# show ru
2w1d: %SYS-5-CONFIG_I: Configured from console by console
Router# show running-config
```

In the following example, synchronous logging for line 4 is enabled with a severity level of 6. Then synchronous logging for line 2 is enabled with a severity level of 7 and is specified with a maximum number of buffer lines of 1,000.

```
Router(config)# line 4
Router(config-line)# logging synchronous level 6
Router(config-line)# exit
Router(config)# line 2
Router(config-line)# logging synchronous level 7 limit 1000
Router(config-line)# end
Router#
```

Related Commands

Command	Description
line	Identifies a specific line for configuration and starts the line configuration command collection mode.
logging on	Controls logging of error messages and sends debug or error messages to a logging process, which logs messages to designated locations asynchronously to the processes that generated the messages.

logging system

To enable System Event Archive (SEA) logging, use the **logging system** command in global configuration mode. To disable SEA logging, use the **no** form of this command.

logging system [**disk** *name*]

no logging system

Syntax Description

disk *name*	(Optional) Stores the system event archive (system event log file) in the specified disk. The specified disk must be already have been configured to allow for the storage of the system event archive.

Command Default

By default, SEA logging feature is enabled, and the events are logged to a file on a persistent storage device (bootflash: or disk:).

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.
12.2(33)SCC	The command was introduced for the Cisco uBR10012 router in the Cisco IOS Software Release 12.2(33)SCC.

Usage Guidelines

Cisco Universal Broadband Router 100112

The SEA feature is used to address the deficiencies of the debug trace and system console. Support for SEA feature was introduced on Cisco uBR10012 Router in the Cisco IOS Release 12.2(33)SCC. Use the **logging system disk** command to change the location of the disk used to store the sea_log.dat file.

Note To store the system event logs, the SEA requires either PCMCIA ATA disk or Compact Flash disk in compact flash adapter for PRE2.

Examples

The following example shows how to specify that the SEA log file should be written to the disk “disk1:”:

```
Router(config)# logging system disk disk1:
Router(config)# end
```

Related Commands

clear logging system	Clears the event records stored in the SEA.
copy logging system	Copies the archived system event log to another location.
show logging system	Displays the SEA logging system disk.

logout

To close an active terminal session by logging off the router, use the **logout** command in user EXEC mode.

logout

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

User EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

In the following example, the **exit** (global) command is used to move from global configuration mode to privileged EXEC mode, the **disable** command is used to move from privileged EXEC mode to user EXEC mode, and the **logout** command is used to log off (exit from the active session):

```
Router(config)# exit
Router# disable
Router> logout
```

logout-warning

To warn users of an impending forced timeout, use the **logout-warning** command in line configuration mode. To restore the default, use the **no** form of this command.

logout-warning [*seconds*]

logout-warning

Syntax Description

seconds	(Optional) Number of seconds that are counted down before session termination. If no number is specified, the default of 20 seconds is used.

Defaults

No warning is sent to the user.

Command Modes

Line configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command notifies the user of an impending forced timeout (set using the **absolute-timeout** command).

Examples

In the following example, a logout warning is configured on line 5 with a countdown value of 30 seconds:

```
Router(config)# line 5
Router(config-line)# logout-warning 30
```

Related Commands

Command	Description
absolute-timeout	Sets the interval for closing user connections on a specific line or port.
session-timeout	Sets the interval for closing the connection when there is no input or output traffic.

macro (global configuration)

To create a global command macro, use the **macro** command in global configuration mode. To remove the macro, use the **no** form of this command.

macro {**global** {**apply** *macro-name* | **description** *text* | **trace** *macro-name* [*keyword-to-value*] *value-first-keyword* [*keyword-to-value*] *value-second-keyword* [*keyword-to-value*] *value-third-keyword* [*keyword-to-value*]} | **name** *macro-name*}

no macro {**global** {**apply** *macro-name* | **description** *text* | **trace** *macro-name* [*keyword-to-value*] *value-first-keyword* [*keyword-to-value*] *value-second-keyword* [*keyword-to-value*] *value-third-keyword* [*keyword-to-value*]} | **name** *macro-name*}

Syntax Description

global	Applies the macro globally.
apply *macro-name*	Applies a specified macro.
description *text*	Specifies a description about the macros that are applied to the switch.
trace *macro-name*	Applies a specified macro with trace enabled.
keyword-to-value	(Optional) Keyword to replace with a value.
value-first-keyword	Value of the keyword to replace.
name *macro-name*	Specifies the name of a macro.

Defaults

This command has no default setting.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.

Usage Guidelines

You can enter up to three keyword pairs using the **macro global trace** command.

You can enter the **macro global description** command on the switch stack or on a standalone switch.

Use the **description** *text* keyword and argument to associate comment text, or the macro name, with a switch. When multiple macros are applied on a switch, the description text will be from the last applied macro. You can verify the **global description** settings by entering the **show parser macro description** command.

To find any syntax or configuration errors, enter the **macro global trace** *macro-name* command to apply and debug the macro.

To display a list of any keyword-value pairs defined in the macro, enter the **macro global apply** *macro-name* **?** command.

You can delete a global macro-applied configuration on a switch only by entering the **no** version of each command that is in the macro.

Keyword matching is case sensitive.

In the commands that the macro applies, all matching occurrences of keywords are replaced with the corresponding values.

The **no** form of the **macro name** global configuration command only deletes the macro definition. It does not affect the configuration of those interfaces on which the macro is already applied.

Examples

This example shows how to apply the user-created macro called snmp, to set the host name address to test-server and to set the IP precedence value to 7:

```
Router(config)# macro global apply snmp ADDRESS test-server VALUE 7
```

This example shows how to debug the user-created macro called snmp by using the **macro global trace** global configuration command to find any syntax or configuration errors in the macro when it is applied to the switch.

```
Router(config)# macro global trace snmp VALUE 7

Applying command...`snmp-server enable traps port-security'
Applying command...`snmp-server enable traps linkup'
Applying command...`snmp-server enable traps linkdown'
Applying command...`snmp-server host'
%Error Unknown error.
Applying command...`snmp-server ip precedence 7'
Router(config)#
```

Related Commands

Command	Description
macro (interface configuration)	Creates an interface-specific command macro.
show parser macro	Displays the smart port macros.

macro (interface configuration)

To create an interface-specific command macro, use the **macro** command in interface configuration mode. To remove the macro, use the **no** form of this command.

macro {**apply** *macro-name* | **description** *text* | **trace** *macro-name* [*keyword-to-value*] *value-first-keyword* [*keyword-to-value*] *value-second-keyword* [*keyword-to-value*] *value-third-keyword* [*keyword-to-value*]}

no macro {**apply** *macro-name* | **description** *text* | **trace** *macro-name* [*keyword-to-value*] *value-first-keyword* [*keyword-to-value*] *value-second-keyword* [*keyword-to-value*] *value-third-keyword* [*keyword-to-value*]}

Syntax Description

apply *macro-name*	Applies a specified macro.
description *text*	Specifies a description about the macros that are applied to the interface.
trace *macro-name*	Applies a specified macro with trace enabled.
keyword-to-value	(Optional) Keyword to replace with a value.
value-first-keyword	Value of the keyword to replace.

Defaults

This command has no default setting.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.

Usage Guidelines

You can enter up to three keyword changes using the **macro trace** command.

You can enter the **macro description** command on the switch stack or on a standalone switch.

Use the **description** *text* keyword and argument to associate comment text, or the macro name, with a switch. When multiple macros are applied on a switch, the description text will be from the last applied macro. You can verify the **description** settings by entering the **show parser macro description** command.

To find any syntax or configuration errors, enter the **macro trace** *macro-name* command to apply and debug the macro.

To display a list of any keyword-value pairs defined in the macro, enter the **macro apply** *macro-name* **?** command.

To successfully apply the macro, you must enter any required keyword-value pairs.

Keyword matching is case sensitive.

In the commands that the macro applies, all matching occurrences of keywords are replaced with the corresponding values.

You can delete all configuration on an interface by entering the **default interface** *interface* interface configuration command.

Examples

The following example shows how to apply the user-created macro called desktop-config and to verify the configuration:

```
Router(config)# interface fastethernet1/2
Router(config-if)# macro apply desktop-config
```

The following example shows how to apply the user-created macro called desktop-config and to replace all occurrences of vlan with VLAN ID 25:

```
Router(config-if)# macro apply desktop-config vlan 25
```

Related Commands

Command	Description
macro (global configuration)	Creates a command macro.
show parser macro	Displays the smart port macros.

maximum

To set the maximum number of archive files of the running configuration to be saved in the Cisco IOS configuration archive, use the **maximum** command in archive configuration mode. To reset this command to its default, use the **no** form of this command.

maximum *number*

no maximum *number*

Syntax Description

number	Maximum number of archive files of the running configuration to be saved in the Cisco IOS configuration archive. You can archive from 1 to 14 configuration files. The default is 10.

Command Default

By default, a maximum of 10 archive files of the running configuration are saved in the Cisco IOS configuration archive.

Command Modes

Archive configuration

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was implemented on the Cisco 10000 series.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Usage Guidelines

Note Before using this command, you must configure the **path** command to specify the location and filename prefix for the files in the Cisco IOS configuration archive.

After the maximum number of files are saved in the Cisco IOS configuration archive, the oldest file is automatically deleted when the next, most recent file is saved.

Note This command should only be used when a local writable file system is specified in the *url* argument of the **path** command. Network file systems may not support deletion of previously saved files.

Examples

In the following example, a value of 5 is set as the maximum number of archive files of the running configuration to be saved in the Cisco IOS configuration archive:

```
configure terminal
!
archive
 path disk0:myconfig
 maximum 5
 end
```

Related Commands

Command	Description
archive config	Saves a copy of the current running configuration to the Cisco IOS configuration archive.
configure confirm	Confirms replacement of the current running configuration with a saved Cisco IOS configuration file.
configure replace	Replaces the current running configuration with a saved Cisco IOS configuration file.
path	Specifies the location and filename prefix for the files in the Cisco IOS configuration archive.
show archive	Displays information about the files saved in the Cisco IOS configuration archive.
time-period	Sets the time increment for automatically saving an archive file of the current running configuration in the Cisco IOS configuration archive.

memory free low-watermark

To configure a router to issue system logging message notifications when available memory falls below a specified threshold, use the **memory free low-watermark** command in global configuration mode. To disable memory threshold notifications, use the **no** form of this command.

memory free low-watermark {**processor** *threshold* | **io** *threshold*}

no memory free low-watermark

Syntax Description

processor *threshold*	Sets the processor memory threshold in kilobytes. When available processor memory falls below this threshold, a notification message is triggered. Valid values are 1 to 4294967295.
io *threshold*	Sets the input/output (I/O) memory threshold in kilobytes. When available I/O memory falls below this threshold, a notification message is triggered. Valid values are 1 to 4294967295.

Defaults

Memory threshold notifications are disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.2(18)S	This command was introduced.
12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Using this command, you can configure a router to issue a system logging message each time available free memory falls below a specified threshold ("low-watermark"). Once available free memory rises to 5 percent above the threshold, another notification message is generated.

Examples

The following example specifies a free processor memory notification threshold of 20000 KB:

```
Router(config)# memory free low-watermark processor 200000
```

If available free processor memory falls below this threshold, the router sends a notification message like this one:

```
000029: *Aug 12 22:31:19.559: %SYS-4-FREEMEMLOW: Free Memory has dropped below 20000k
Pool: Processor  Free: 66814056  freemem_lwm: 204800000
```

Once available free processor memory rises to a point 5 percent above the threshold, another notification message like this is sent:

```
000032: *Aug 12 22:33:29.411: %SYS-5-FREEMEMRECOVER: Free Memory has recovered 20000k
Pool: Processor  Free: 66813960  freemem_lwm: 0
```

Related Commands

Command	Description
memory reserve critical	Reserves memory for use by critical processes.

memory lite

To enable the memory allocation lite (malloc_lite) feature, use the **memory lite** command in global configuration mode. To disable this feature, use the **no** form of this command.

memory lite

no memory lite

Syntax Description

This command has no arguments or keywords.

Defaults

This command is enabled by default.

Command Modes

Global configuration

Command History

Release	Modification
12.3(11)T	This command was introduced.

Usage Guidelines

The malloc_lite feature was implemented to avoid excessive memory allocation overhead for situations where less than 128 bytes were required. This feature is supported for processor memory pools only.

The malloc_lite feature is enabled by default. If the malloc_lite feature is disabled using the **no memory lite** command, you can re-enable the feature by entering the **memory lite** command.

Examples

The following example shows how to disable the malloc_lite feature:

```
no memory lite
```

Related Commands

Command	Description
scheduler heapcheck process	Performs a “sanity check” for corruption in memory blocks when a process switch occurs.

memory reserve critical

Note Effective with Cisco IOS Release 12.4(15)T1, the **memory reserve critical** command is replaced by the **memory reserve** command. See the **memory reserve** command for more information.

To configure the size of the memory region to be used for critical notifications (system logging messages), use the **memory reserve critical** command in global configuration mode. To disable the reservation of memory for critical notifications, use the **no** form of this command.

memory reserve critical *kilobytes*

no memory reserve critical

Syntax Description

kilobytes	Specifies the amount of memory to be reserved in kilobytes. Valid values are 1 to 4294967295, but the value you specify cannot exceed 25 percent of total memory. The default is 100 kilobytes.

Defaults

100 kilobytes of memory is reserved for the logging process.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(18)S	This command was introduced.
12.0(26)S	This command was integrated into Cisco IOS Release 12.0(26)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(15)T1	This command was replaced by the **memory reserve** command.

Usage Guidelines

This command reserves a region of memory on the router so that, when system resources are overloaded, the router retains enough memory to issue critical system logging messages.

Note Once the size of the reserved memory region is specified, any change to the specified value takes effect only after the current configuration is saved and the system has been reloaded.

Examples

The following example shows how to reserve 1,000 KB of system memory for logging messages at the next system restart:

```
Router(config)# memory reserve critical 1000
```

Related Commands

Command	Description
memory free low-watermark	Configures a router to issue syslog notifications when available memory falls below a specified threshold.

memory sanity

To perform a "sanity check" for corruption in buffers and queues, use the **memory sanity** command in global configuration mode. To disable this feature, use the **no** form of this command.

memory sanity [**buffer** | **queue** | **all**]

no memory sanity

Syntax Description

buffer	(Optional) Specifies checking all buffers.
queue	(Optional) Specifies checking all queues.
all	(Optional) Specifies checking all buffers and queues.

Defaults

This command is not enabled by default.
If the **buffer** or **queue** keyword is not specified, a sanity check will be performed on all buffers and queues.

Command Modes

Global configuration

Command History

Release	Modification
12.2(15)T	This command was introduced.

Usage Guidelines

When the **memory sanity buffer** command is enabled, a sanity check is performed on buffers when a packet buffer is allocated or when a packet buffer is returned to the buffer pool. This command also time-stamps the buffer, which may be useful when tracking the age of a buffer.

The **memory sanity** command can be saved in the startup configuration file and, therefore, it is not necessary to reconfigure this command each time the router is reloaded. Like the **scheduler heapcheck process memory** command, the **memory sanity** command can check for corruption in the I/O memory block.

Enabling the **memory sanity** command may result in slight router performance degradation.

Examples

The following example shows how to perform a sanity check for corruption in all buffers and queues:

```
memory sanity all
```

Related Commands

Command	Description
scheduler heapcheck process memory	Performs a "sanity check" for corruption in memory blocks when a process switch occurs.

memory scan

To enable the Memory Scan feature, use the **memory scan** command in global configuration mode. To restore the router configuration to the default, use the **no** form of this command.

memory scan

no memory scan

Syntax Description

This command has no arguments or keywords.

Defaults

This command is disabled by default.

Command Modes

Global configuration

Command History

Release	Modification
12.0(4)XE	This command was introduced.
12.0(7)T	This command was integrated in Cisco IOS Release 12.0 T for the Cisco 7500 series only.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The Memory Scan feature adds a low-priority background process that searches all installed dynamic random-access memory (DRAM) for possible parity errors. If errors are found in memory areas that are not in use, this feature attempts to scrub (remove) the errors. The time to complete one memory scan and scrub cycle can range from 10 minutes to several hours, depending on the amount of installed memory. The impact of the Memory Scan feature on the central processing unit (CPU) is minimal. To view the status of the memory scan feature on your router, use the **show memory scan** command in EXEC mode.

Examples

The following example enables the Memory Scan feature on a Cisco 7500 series router:

```
Router(config)# memory scan
```

Related Commands

Command	Description
show memory scan	Displays the number and type of parity errors on your system.

memory-size iomem

To reallocate the percentage of DRAM to use for I/O memory and processor memory on Cisco 3600 series routers, use the **memory-size iomem** command in global configuration mode. To revert to the default memory allocation, use the **no** form of this command.

memory-size iomem *i/o-memory-percentage*

no memory-size iomem *i/o-memory-percentage*

Syntax Description

i/o-memory-percentage	The percentage of DRAM allocated to I/O memory. The values permitted are **10**, **15**, **20**, **25**, **30**, **40**, and **50**. A minimum of 4 MB of memory is required for I/O memory.

Defaults

The default memory allocation is 25 percent I/O memory and 75 percent processor memory.

Note If the **smartinit** process has been enabled, the default memory allocation of 25 percent to I/O does not apply. Instead, **smartinit** examines the network modules and then calculates the I/O memory required.

Command Modes

Global configuration

Command History

Release	Modification
11.2 P	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

When you specify the percentage of I/O memory in the command line, processor memory automatically acquires the remaining percentage of DRAM memory.

Examples

The following example allocates 40 percent of the DRAM memory to I/O memory and the remaining 60 percent to processor memory:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# memory-size iomem 40
Router(config)# exit
Router# copy system:running-config nvram:startup-config
Building configuration...
[OK]

Router# reload

rommon 1 > boot
program load complete, entry point: 0x80008000, size: 0x32ea24
```

```
Self decompressing the image :
########################################################################################################
########################################################################################################
################################################################## [OK]
```

menu (EXEC)

To display a preconfigured user menu, use the **menu** command in user EXEC or privileged EXEC mode.

menu *menu-name*

Syntax Description

menu-name	The name of the menu.

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

A user menu is a type of user interface where text descriptions of actions to be performed are displayed to the user. The user can use the menu to select services and functions without having to know the details of command-line interface (CLI) commands.

Menus can be created for users in global configuration mode, using the commands listed in the "Related Commands" section.

A menu can be invoked at either the user or privileged EXEC level, but if an item in the menu contains a privileged EXEC command, the user must be logged in at the privileged level for the command to succeed.

Examples

The following example invokes a menu named OnRamp:

```
Router> menu OnRamp

      Welcome to OnRamp Internet Services

       Type a number to select an option;
            Type 9 to exit the menu.

1     Read email

2     UNIX Internet access

3     Resume UNIX connection


6     Resume next connection

9     Exit menu system
```

Related Commands

Command	Description
menu clear-screen	Clears the terminal screen before displaying a menu.
menu command	Specifies underlying commands for user interface menus.
menu default	Specifies the menu item to use as the default.
menu line-mode	Requires the user to press Enter after specifying an option number.
menu options	Sets options for items in user interface menus.
menu prompt	Specifies the prompt for a user interface menu.
menu single-space	Displays menu items single-spaced rather than double-spaced.
menu status-line	Displays a line of status information about the current user at the top of a menu.
menu text	Specifies the text of a menu item in a user interface menu.
menu title	Creates a title, or banner, for a user menu.
no menu	Deletes a specified menu from a menu configuration.

menu <menu-name> single-space

To display menu items single-spaced rather than double-spaced, use the **menu <menu-name> single-space** command in global configuration mode.

menu *menu-name* **single-space**

Syntax Description

menu-name	Name of the menu this command should be applied to.

Defaults

Enabled for menus with more than nine items; disabled for menus with nine or fewer items.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

When more than nine menu items are defined, the menu is displayed single-spaced. To configure the menus with nine or fewer items to display single-spaced, use this command.

Examples

In the following example, single-spaced menu items are displayed for the menu named Access1:

```
menu Access1 single-space
```

Related Commands

Command	Description
menu (EXEC)	Invokes a user menu.
menu clear-screen	Clears the terminal screen before displaying a menu.
menu command	Specifies underlying commands for user menus.
menu default	Specifies the menu item to use as the default.
menu line-mode	Requires the user to press Enter after specifying an item.
menu options	Sets options for items in user menus.
menu prompt	Specifies the prompt for a user menu.
menu status-line	Displays a line of status information about the current user at the top of a menu.
menu text	Specifies the text of a menu item in a user menu.
menu title	Creates a title, or banner, for a user menu.

menu clear-screen

To clear the terminal screen before displaying a menu, use the **menu clear-screen** command in global configuration mode.

menu *menu-name* **clear-screen**

Syntax Description

menu-name	Name of the menu this command should be applied to.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command uses a terminal-independent mechanism based on termcap entries defined in the router and the configured terminal type for the user. This command allows the same menu to be used on multiple types of terminals instead of having terminal-specific strings embedded within menu titles. If the termcap entry does not contain a clear string, the menu system enters 24 new lines, causing all existing text to scroll off the top of the terminal screen.

Examples

In the following example, the terminal screen is cleared before displaying the menu named Access1:

```
Router(config)# menu Access1 clear-screen
```

Related Commands

Command	Description
menu (EXEC)	Invokes a user menu.
menu command	Specifies underlying commands for user menus.
menu default	Specifies the menu item to use as the default.
menu line-mode	Requires the user to press Enter after specifying an item.
menu options	Sets options for items in user menus.
menu prompt	Specifies the prompt for a user menu.
menu single-space	Displays menu items single-spaced rather than double-spaced.
menu status-line	Displays a line of status information about the current user at the top of a menu
menu text	Specifies the text of a menu item in a user menu.

Command	Description
menu title	Creates a title, or banner, for a user menu.
no menu	Deletes a specified menu from a menu configuration.

menu command

To specify underlying commands for user menus, use the **menu command** command in global configuration mode.

menu *menu-name* **command** *menu-item* {*command* | **menu-exit**}

Syntax Description

menu-name	Name of the menu. You can specify a maximum of 20 characters.
menu-item	Number, character, or string used as the key for the item. The key is displayed to the left of the menu item text. You can specify a maximum of 18 menu entries. When the tenth item is added to the menu, the line-mode and single-space options are activated automatically.
command	Command to issue when the user selects an item.
menu-exit	Provides a way for menu users to return to a higher-level menu or exit the menu system.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to assign actions to items in a menu. Use the **menu text** global configuration command to assign text to items. These commands must use the same menu name and menu selection key.

The **menu command** command has a special keyword for the *command* argument, **menu-exit**, that is available only within menus. It is used to exit a submenu and return to the previous menu level, or to exit the menu altogether and return to the EXEC command prompt.

You can create submenus that are opened by selecting entries in another menu. Use the **menu** EXEC command as the *command* for the submenu item.

Note If you nest too many levels of menus, the system prints an error message on the terminal and returns to the previous menu level.

When a menu allows connections (their normal use), the command for an entry activating the connection should contain a **resume** command, or the line should be configured to prevent users from escaping their sessions with the **escape-char none** command. Otherwise, when they escape from a connection and return to the menu, there will be no way to resume the session and it will sit idle until the user logs out.

Specifying the **resume** command as the action that is performed for a selected menu entry permits a user to resume a named connection or connect using the specified name, if there is no active connection by that name. As an option, you can also supply the connect string needed to connect initially. When you do not supply this connect string, the command uses the specified connection name.

You can also use the **resume/next** command, which resumes the next connection in the user's list of connections. This function allows you to create a single menu entry that steps through all of the user's connections.

Note A menu should not contain any exit paths that leave users in an unfamiliar interface environment.

When a particular line should always display a menu, that line can be configured with an **autocommand** line configuration command. Menus can be run on a per-user basis by defining a similar **autocommand** command for that local username. For more information about the **autocommand** command, refer to the *Cisco IOS Dial Technologies Configuration Guide*.

Examples

In the following example, the commands to be issued when the menu user selects option 1, 2, or 3 are specified for the menu named Access1:

```
menu Access1 command 1 tn3270 vms.cisco.com
menu Access1 command 2 rlogin unix.cisco.com
menu Access1 command 3 menu-exit
```

The following example allows a menu user to exit a menu by entering **Exit** at the menu prompt:

```
menu Access1 text Exit Exit
```
menu Access1 command Exit menu-exit

Related Commands

Command	Description
autocommand	Configures the Cisco IOS software to automatically execute a command when a user connects to a particular line.
menu (EXEC)	Invokes a user menu.
menu clear-screen	Clears the terminal screen before displaying a menu.
menu default	Specifies the menu item to use as the default.
menu line-mode	Requires the user to press Enter after specifying an item.
menu options	Sets options for items in user menus.
menu prompt	Specifies the prompt for a user menu.
menu single-space	Displays menu items single-spaced rather than double-spaced.
menu status-line	Displays a line of status information about the current user at the top of a menu
menu text	Specifies the text of a menu item in a user menu.
menu title	Creates a title, or banner, for a user menu.

menu default

To specify the menu item to use as the default, use the **menu default** command in global configuration mode.

menu *menu-name* **default** *menu-item*

Syntax Description

menu-name	Name of the menu. You can specify a maximum of 20 characters.
menu-item	Number, character, or string key of the item to use as the default.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to specify which menu entry is used when the user presses Enter without specifying an item. The menu entries are defined by the **menu command** and **menu text** global configuration commands.

Examples

In the following example, the menu user exits the menu when pressing Enter without selecting an item:

```
menu Access1 9 text Exit the menu
menu Access1 9 command menu-exit
menu Access1 default 9
```

Related Commands

Command	Description
menu (EXEC)	Invokes a preconfigured user menu.
menu command	Specifies underlying commands for user menus.
menu prompt	Specifies the prompt for a user menu.
menu text	Specifies the text of a menu item in a user menu.
menu title	Creates a title, or banner, for a user menu.

menu line-mode

To require the user to press Enter after specifying an item, use the **menu line-mode** command in global configuration mode.

menu *menu-name* **line-mode**

Syntax Description

menu-name	Name of the menu this command should be applied to.

Defaults

Enabled for menus with more than nine items. Disabled for menus with nine or fewer items.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

In a menu of nine or fewer items, you ordinarily select a menu item by entering the item number. In line mode, you select a menu entry by entering the item number and pressing Enter. Line mode allows you to backspace over the selected number and enter another number before pressing Enter to issue the command.

This option is activated automatically when more than nine menu items are defined but also can be configured explicitly for menus of nine or fewer items.

In order to use strings as keys for items, the **menu line-mode** command must be configured.

Examples

In the following example, the line-mode option is enabled for the menu named Access1:

```
menu Access1 line-mode
```

Related Commands

Command	Description
menu (EXEC)	Invokes a preconfigured user menu.
menu clear-screen	Clears the terminal screen before displaying a menu.
menu command	Specifies underlying commands for a user menu.
menu default	Specifies the menu item to use as the default.
menu options	Sets options for items in user menus.
menu prompt	Specifies the prompt for a user menu.
menu single-space	Displays menu items single-spaced rather than double-spaced.

Command	Description
menu status-line	Displays a line of status information about the current user at the top of a menu.
menu text	Specifies the text of a menu item in a user menu.

menu options

To set options for items in user menus, use the **menu options** command in global configuration mode.

menu *menu-name* **options** *menu-item* {**login** | **pause**}

Syntax Description

menu-name	The name of the menu. You can specify a maximum of 20 characters.
menu-item	Number, character, or string key of the item affected by the option.
login	Requires a login before issuing the command.
pause	Pauses after the command is entered before redrawing the menu.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use the **menu command** and **menu text** global configuration commands to define a menu entry.

Examples

In the following example, a login is required before issuing the command specified by menu entry 3 of the menu named Access1:

```
menu Access1 options 3 login
```

Related Commands

Command	Description
menu (EXEC)	Invokes a user menu.
menu clear-screen	Clears the terminal screen before displaying a menu.
menu command	Specifies underlying commands for user menus.
menu default	Specifies the menu item to use as the default.
menu line-mode	Requires the user to press Enter after specifying an item.
menu prompt	Specifies the prompt for a user menu.
menu single-space	Displays menu items single-spaced rather than double-spaced.
menu status-line	Displays a line of status information about the current user at the top of a menu.
menu text	Specifies the text of a menu item in a user menu.
menu title	Creates a title, or banner, for a user menu.

menu prompt

To specify the prompt for a user menu, use the **menu prompt** command in global configuration mode.

menu *menu-name* **prompt** *d prompt d*

Syntax Description

menu-name	Name of the menu. You can specify a maximum of 20 characters.
d	A delimiting character that marks the beginning and end of a title. Text delimiters are characters that do not ordinarily appear within the text of a title, such as slash (/), double quote ("), and tilde (~). ^C is reserved for special use and should not be used in the text of the title.
prompt	Prompt string for the menu.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Press Enter after entering the first delimiter. The router will prompt you for the text of the prompt. Enter the text followed by the delimiter, and press Enter.

Use the **menu command** and **menu text** commands to define the menu selections.

Examples

In the following example, the prompt for the menu named Access1 is configured as “Select an item.”:

```
Router(config)# menu Access1 prompt /
Enter TEXT message.  End with the character '/'.
Select an item. /
Router(config)#
```

Related Commands

Command	Description
menu (EXEC)	Invokes a user menu.
menu command	Specifies underlying commands for user menus.
menu default	Specifies the menu item to use as the default.
menu text	Specifies the text of a menu item in a user menu.
menu title	Creates a title, or banner, for a user menu.

menu status-line

To display a line of status information about the current user at the top of a menu, use the **menu status-line** command in global configuration mode.

menu *menu-name* **status-line**

Syntax Description

menu-name	Name of the menu this command should be applied to.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command displays the status information at the top of the screen before the menu title is displayed. This status line includes the router's host name, the user's line number, and the current terminal type and keymap type (if any).

Examples

In the following example, status information is enabled for the menu named Access1:

```
menu Access1 status-line
```

Related Commands

Command	Description
menu (EXEC)	Invokes a user menu.
menu clear-screen	Clears the terminal screen before displaying a menu.
menu command	Specifies underlying commands for user menus.
menu default	Specifies the menu item to use as the default.
menu line-mode	Requires the user to press Enter after specifying an item in a menu.
menu options	Sets options for items in user menus.
menu prompt	Specifies the prompt for a user menu.
menu single-space	Displays menu items single-spaced rather than double-spaced.
menu text	Specifies the text of a menu item in a user menu.
menu title	Creates a title, or banner, for a user menu.

menu text

To specify the text of a menu item in a user menu, use the **menu text** command in global configuration mode.

menu *menu-name* **text** *menu-item menu-text*

Syntax Description

menu-name	Name of the menu. You can specify a maximum of 20 characters.
menu-item	Number, character, or string used as the key for the item. The key is displayed to the left of the menu item text. You can specify a maximum of 18 menu items. When the tenth item is added to the menu, the **menu line-mode** and **menu single-space** commands are activated automatically.
menu-text	Text of the menu item.

Defaults

No text appears for the menu item.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to assign text to items in a menu. Use the **menu command** command to assign actions to items. These commands must use the same menu name and menu selection key.

You can specify a maximum of 18 items in a menu.

Examples

In the following example, the descriptive text for the three entries is specified for options 1, 2, and 3 in the menu named Access1:

```
menu Access1 text 1 IBM Information Systems
menu Access1 text 2 UNIX Internet Access
menu Access1 text 3 Exit menu system
```

Related Commands

Command	Description
menu (EXEC)	Invokes a user menu.
menu clear-screen	Clears the terminal screen before displaying a menu.
menu command	Specifies underlying commands for user menus.
menu default	Specifies the menu item to use as the default.
menu line-mode	Requires the user to press Enter after specifying an item.

Command	Description
menu options	Sets options for items in user menus.
menu prompt	Specifies the prompt for a user menu.
menu single-space	Displays menu items single-spaced rather than double-spaced.
menu status-line	Displays a line of status information about the current user at the top of a menu.
menu title	Creates a title, or banner, for a user menu.

menu title

To create a title (banner) for a user menu, use the **menu title** command in global configuration mode.

menu *menu-name* **title** *d menu-title d*

Syntax Description

menu-name	Name of the menu. You can specify a maximum of 20 characters.
d	A delimiting character that marks the beginning and end of a title. Text delimiters are characters that do not ordinarily appear within the text of a title, such as slash (/), double quote ("), and tilde (~). ^C is reserved for special use and should not be used in the text of the title.
menu-title	Lines of text to appear at the top of the menu.

Defaults

The menu does not have a title.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **menu title** command must use the same menu name used with the **menu text** and **menu command** commands used to create a menu.

You can position the title of the menu horizontally by preceding the title text with blank characters. You can also add lines of space above and below the title by pressing Enter.

Follow the **title** keyword with one or more blank characters and a delimiting character of your choice. Then enter one or more lines of text, ending the title with the same delimiting character. You cannot use the delimiting character within the text of the message.

When you are configuring from a terminal and are attempting to include special control characters, such as a screen-clearing string, you must use Ctrl-V before the special control characters so that they are accepted as part of the title string. The string ^[[H^[[J is an escape string used by many VT100-compatible terminals to clear the screen. To use a special string, you must enter Ctrl-V before each escape character.

You also can use the **menu clear-screen** global configuration command to clear the screen before displaying menus and submenus, instead of embedding a terminal-specific string in the menu title. The **menu clear-screen** command allows the same menu to be used on different types of terminals.

Examples

In the following example, the title that will be displayed is specified when the menu named Access1 is invoked. Press Enter after the second slash (/) to display the prompt.

```
Router(config)# menu Access1 title /^[[H^[[J
Enter TEXT message.  End with the character '/'.
               Welcome to Access1 Internet Services

                  Type a number to select an option;
                           Type 9 to exit the menu.
/
Router(config)#
```

Related Commands

Command	Description
menu (EXEC)	Invokes a user menu.
menu clear-screen	Clears the terminal screen before displaying a menu.
menu command	Specifies underlying commands for user menus.
menu default	Specifies the menu item to use as the default.
menu line-mode	Requires the user to press Enter after specifying an item.
menu options	Sets options for items in user menus.
menu prompt	Specifies the prompt for a user menu.
menu single-space	Displays menu items single-spaced rather than double-spaced.
menu status-line	Displays a line of status information about the current user at the top of a menu.
menu text	Specifies the text of a menu item in a user menu.

microcode (12000)

To load a Cisco IOS software image on a line card from Flash memory or the GRP card on a Cisco 12000 series Gigabit Switch Router (GSR), use the **microcode** command in global configuration mode. To load the microcode bundled with the GRP system image, use the **no** form of this command.

microcode {**oc12-atm** | **oc12-pos | oc3-pos4**} {**flash** *file-id* [*slot*] | **system** [*slot*]}

no microcode {**oc12-atm** | **oc12-pos** | **oc3-pos4**} [**flash** *file-id* [*slot*] | **system** [*slot*]]

Syntax Description

oc12-atm | **oc12-pos** | **oc3-pos4**	Interface name.
flash	Loads the image from the Flash file system.
file-id	Specifies the device and filename of the image file to download from Flash memory. A colon (:) must separate the device and filename (for example, slot0:gsr-p-mz). Valid devices include: • **bootflash:**—Internal Flash memory. • **slot0:**—First PCMCIA slot. • **slot1:**—Second PCMCIA slot.
slot	(Optional) Slot number of the line card that you want to copy the software image to. Slot numbers range from 0 to 11 for the Cisco 12012 router and 0 to 7 for the Cisco 12008 router. If you do not specify a slot number, the Cisco IOS software image is downloaded on all line cards.
system	Loads the image from the software image on the GRP card.

Defaults

The default is to load the image from the GRP card (**system**).

Command Modes

Global configuration

Command History

Release	Modification
11.2 GS	This command was introduced for Cisco 12000 series GSRs.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

In addition to the Cisco IOS image that resides on the GRP card, each line card on a Cisco 12000 series has a Cisco IOS image. When the router is reloaded, the specified image is loaded onto the GRP card and then automatically downloaded to all the line cards.

Normally, you want the same Cisco IOS image on the GRP card and all line cards. However, if you want to upgrade a line card with a new version of microcode for testing or to fix a defect, you might need to load a Cisco IOS image that is different from the one on the line card. Additionally, you might need to load a new image on the line card to work around a problem that is affecting only one of the line cards.

To load a Cisco IOS image on a line card, first use the **copy tftp** command to download the Cisco IOS image to a slot on one of the PCMCIA Flash memory cards. Then use the **microcode** command to download the image to the line card, followed by the **microcode reload** command to start the image. Immediately after you enter the **microcode reload** command and press Return, the system reloads all microcode. Global configuration mode remains enabled. After the reloading is complete, enter the **exit** command to return to the EXEC system prompt.

To verify that the correct image is running on the line card, use the **execute-on slot** *slot* **show version** command.

For additional information on GSR configuration, refer to the documentation specific to your Cisco IOS software release.

Examples

In the following example, the Cisco IOS software image in slot 0 is downloaded to the line card in slot 10. This software image is used when the system is booted, a line card is inserted or removed, or the **microcode reload** global configuration command is issued.

```
Router(config)# microcode oc3-POS-4 flash slot0:fip.v141-7 10
Router(config)# microcode reload 10
```

In this example, the user would issue the **execute-on slot 10 show version** command to verify that the correct version is loaded.

Related Commands

Command	Description
microcode reload (12000)	Reloads microcode on Cisco 12000 series GSRs.

microcode (7000/7500)

To specify the location of the microcode that you want to download from Flash memory into the writable control store (WCS) on Cisco 7000 series (including RSP based routers) or Cisco 7500 series routers, use the **microcode** command in global configuration mode. To load the microcode bundled with the system image, use the **no** form of this command.

microcode *interface-type* {*flash-filesystem*:*filename* [*slot*] | **rom** | **system** [*slot*]]}

no microcode *interface-type* {*flash-filesystem*:*filename* [*slot*] | **rom** | **system** [*slot*]}

Syntax Description

interface-type	One of the following interface processor names: **aip**, **cip**, **eip**, **feip**, **fip**, **fsip**, **hip**, **mip**, **sip**, **sp**, **ssp**, **trip**, **vip**, or **vip2**.
flash-filesystem:	Flash file system, followed by a colon. Valid file systems are **bootflash**, **slot0**, and **slot1**. Slave devices such as slaveslot0 are invalid. The slave's file system is not available during microcode reloads.
filename	Name of the microcode file.
slot	(Optional) Number of the slot. Range is from 0 to 15.
rom	If ROM is specified, the router loads from the onboard ROM microcode.
system	If the **system** keyword is specified, the router loads the microcode from the microcode bundled into the system image you are running for that interface type.

Defaults

The default is to load from the microcode bundled in the system image.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If you do not use the **microcode reload** command after using the **microcode** command, the **microcode reload** command will be written to the configuration file automatically.

When using Dual RSPs for simple hardware backup, ensure that the master and slave RSP card contain the same microcode image in the same location when the router is to load the interface processor microcode from a Flash file system. Thus, if the slave RSP becomes the master, it will be able to find the microcode image and download it to the interface processor.

Examples

In the following example, all FIP cards will be loaded with the microcode found in Flash memory file fip.v141-7 when the system is booted, when a card is inserted or removed, or when the **microcode reload** global configuration command is issued. The configuration is then written to the startup configuration file.

```
Router(config)# microcode fip slot0:fip.v141-7
Router(config)# end
Router# copy system:running-config nvram:startup-config
```

Related Commands

Command	Description
more flh:logfile	Displays the system console output generated during the Flash load helper operation.

microcode (7200)

To configure a default override for the microcode that is downloaded to the hardware on a Cisco 7200 series router, use the **microcode** command in global configuration mode. To revert to the default microcode for the current running version of the Cisco IOS software, use the **no** form of this command.

microcode {**ecpa** | **pcpa**} *location*

no microcode {**ecpa** | **pcpa**}

Syntax Description

ecpa	ESCON Channel Port Adapter (CPA) interface.
pcpa	Parallel CPA interface.
location	Location of microcode, including the device and filename.

Defaults

If the default or **no** form of the command is specified, the driver uses the default microcode for the current running version of the Cisco IOS software.

Command Modes

Global configuration

Command History

Release	Modification
11.3(3)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If there are any default overrides when the configuration is written, then the **microcode reload** command will be written to the configuration automatically. This action enables the configured microcode to be downloaded at system startup.

The CPA microcode image is preloaded on Flash memory cards for Cisco 7200-series routers for Cisco IOS Release 11.3(3)T and later releases. You may be required to copy a new image to Flash memory when a new microcode image becomes available.

For more information on the CPA configuration and maintenance, refer to the "Configuring Cisco Mainframe Channel Connection Adapters" chapter in the Release 12.2 *Cisco IOS Bridging and IBM Networking Configuration Guide*.

Examples

The following example instructs the Cisco IOS software to load the microcode from an individual microcode image that is stored as a file on the Flash card inserted in Flash card slot 0:

```
microcode ecpa slot0:xcpa26-1
```

Related Commands

Command	Description
microcode reload (7200)	Resets and reloads the specified hardware in a Cisco 7200 series router.
show microcode	Displays microcode information.

microcode reload (12000)

To reload the Cisco IOS image from a line card on Cisco 12000 series routers, use the **microcode reload** command in global configuration mode.

microcode reload [*slot-number*]

Syntax Description

slot-number	(Optional) Slot number of the line card that you want to reload the Cisco IOS software image on. Slot numbers range from 0 to 11 for the Cisco 12012 and from 0 to 7 for the Cisco 12008 router. If you do not specify a slot number, the Cisco IOS software image is reloaded on all line cards.

Command Modes

Global configuration

Command History

Release	Modification
11.2 GS	This command was introduced for Cisco 12000 series GSRs.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

In addition to the Cisco IOS image that resides on the GRP card, each line card on Cisco 12000 series routers has a Cisco IOS image. When the router is reloaded, the specified Cisco IOS image is loaded onto the GRP card and automatically downloaded to all the line cards.

Normally, you want the same Cisco IOS image on the GRP card and all line cards. However, if you want to upgrade a line card with a new version of microcode for testing or to fix a defect, you might need to load a different Cisco IOS image. Additionally, you might need to load a new image on the line card to work around a problem affecting only one of the line cards.

To load a Cisco IOS image on a line card, first use the **copy tftp** command to download the Cisco IOS image to a slot on one of the PCMCIA Flash memory cards. Then use the **microcode** command to download the image to the line card, followed by the **microcode reload** command to start the image. To verify that the correct image is running on the line card, use the **execute-on slot** *slot* **show version** command.

For additional information on GSR configuration, refer to the "Observing System Startup and Performing a Basic Configuration" chapter in the Cisco 12000 series installation and configuration guides.

The **microcode reload** (12000) command allows you to issue another command immediately.

Note Issuing a **microcode reload** command on any of the line cards in a Cisco 12000 GSR immediately returns the console command prompt. This allows you to issue a subsequent command immediately to the reloading line card. However, any commands entered at this time will not execute, and often no indication will be given that such a command failed to run. Verify that the microcode has reloaded before issuing new commands.

Examples

In the following example, the mirocode firmware is reloaded on the line card in slot 10:

```
Router(config)# microcode reload 10
```

Related Commands

Command	Description
microcode (12000)	Loads a Cisco IOS software image on a line card from Flash memory or the GRP card on a Cisco 12000 series GSR.

microcode reload (7000/7500)

To reload the processor card on the Cisco 7000 series with RSP7000 or Cisco 7500 series routers, use the **microcode reload** command in global configuration mode.

microcode reload [*slot-number*]

Syntax Description

slot-number	(Optional) Reloads the specified processor card slot on a Cisco 7500 series router.

Defaults

No default behaviors or values.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced for Cisco 7500 series routers.
12.3(8)T	The *slot-number* argument was added for Cisco 7500 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command reloads the microcode without rebooting the router. Immediately after you enter the **microcode reload** command, the system reloads all microcode. Global configuration mode remains enabled.

Note If you modify the system configuration to load a microcode image, the **microcode reload** command will be written to the configuration file automatically following the use of a **microcode** command. This action enables the configured microcode to be downloaded at system startup.

Examples

In the following example, all controllers are reset, and the microcode specified in the current configuration is loaded:

```
Router(config)# microcode reload
```

Related Commands

Command	Description
microcode (7000/7500)	Specifies the location from where microcode should be loaded when the **microcode reload** command is processed on RSP-based routers.

microcode reload (7200)

To reload the Cisco IOS microcode image on an ESCON CPA card in the Cisco 7200 series router, use the **microcode reload** command in privileged EXEC mode.

microcode reload {**all** | **ecpa** [**slot** *slot-number*] | **pcpa** [**slot** *slot-number*]}

Syntax Description

all	Resets and reloads all hardware types that support downloadable microcode.
ecpa	Resets and reloads only those slots that contain hardware type **ecpa**.
pcpa	Resets and reloads only those slots that contain hardware type **pcpa**.
slot *slot-number*	(Optional) Resets and reloads only the slot specified, and only if it contains the hardware specified.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3(3)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Hardware types that do not support downloadable microcode are unaffected by the **microcode reload all** command.

You will be prompted for confirmation before the **microcode reload** command is executed.

Examples

The following example reloads the ESCON CPA microcode in slot 5 with the currently configured microcode:

```
Router# microcode reload ecpa slot 5
```

Related Commands

Command	Description
microcode (7200)	Configures a default override for the microcode that is downloaded to the hardware on a Cisco 7200 series router.
show microcode	Displays the microcode bundled into a Cisco 7000 series with RSP7000, Cisco 7200 series, or Cisco 7500 series router.

mkdir

To create a new directory in a Class C Flash file system, use the **mkdir** command in EXEC, privileged EXEC, or diagnostic mode.

mkdir *directory*

Syntax Description

directory	The name of the directory to create.

Command Modes

EXEC (>)

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
11.3 AA	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers and the following enhancements were introduced: • This command was introduced in diagnostic mode for the first time. The command can be entered in both privileged EXEC and diagnostic mode on the Cisco ASR 1000 Series Routers. • The **harddisk:**, **obfl:**, **stby-harddisk:**, **stby-nvram:**, **stby-obfl:**, **stby-usb**[**0**-**1**]**:**,and **usb**[**0**-**1**]**:** *directory* options were introduced.

Usage Guidelines

This command is only valid on Class C Flash file systems.

If you do not specify the directory name in the command line, the router prompts you for it.

Examples

The following example creates a directory named newdir:

```
Router# mkdir newdir

Mkdir file name [newdir]?
Created dir flash:newdir
Router# dir
Directory of flash:

  2  drwx           0   Mar 13 1993 13:16:21  newdir

8128000 bytes total (8126976 bytes free)
```

Related Commands

Command	Description
dir	Displays a list of files on a file system.
rmdir	Removes an existing directory in a Class C Flash file system.

mkdir disk0:

To create a new directory in a Flash file system, use the **mkdir disk0:** command.

mkdir disk0:

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to the 12.2 SX release.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is valid only on Flash file systems.

After you enter the **mkdir disk0:** command, you are prompted to enter the new directory filename.

To check your entry, enter the **dir** command.

To remove a directory, enter the **rmdir** command.

Examples

This example shows how to create a directory named newdir:

```
Router# mkdir disk0:
Create directory filename [ ]? newdir
Created dir disk0: newdir
Router#
```

Related Commands

Command	Description
cd	Changes the default directory or file system.
dir	Displays a list of files on a file system.
rmdir	Removes an existing directory in a Class C Flash file system.

mode

To set the redundancy mode, use the **mode** command in redundancy configuration mode.

Syntax for 12.2S Release

mode {**rpr** | **rpr-plus** | **sso**}

Syntax for Cisco IOS XE Release 2.5 and Later Releases

mode {**rpr** | **sso**}

Syntax for 12.2XNE Release

mode sso

Syntax Description

rpr	Specifies Route Processor Redundancy (RPR) mode.
rpr-plus	Specifies Route Processor Redundancy Plus (RPR+) mode.
sso	Specifies stateful switchover (SSO) mode.

Command Default

Cisco 7600 series routers That Are Configured with a Supervisor Engine 720

- The default is SSO mode if the system is not configured for redundancy and the active and standby supervisor engines have the same image.
- The default is RPR mode if different versions are installed.
- If redundancy is enabled, the default is the mode that you have configured.

Cisco 7600 series routers That Are Configured with a Supervisor Engine 2

- The default is RPR+ mode if the system is not configured for redundancy and the active and standby supervisor engines have the same image.
- The default is RPR mode if different versions are installed.
- If redundancy is enabled, the default is the mode that you have configured.

Cisco ASR 1000 Series Aggregation Services Routers That Are Configured with a Supervisor Engine

- The default is SSO mode if the system is not configured for redundancy and the active and standby supervisor engines have the same image.
- The default is RPR mode if different versions are installed.

Cisco 10000 Router That Is Configured with a Supervisor Engine

- The default is SSO mode if the system is not configured for redundancy and the active and standby supervisor engines have the same image.
- The default is RPR mode if different versions are installed.

Command Modes

Redundancy configuration (config-red)

Command History

Release	Modification
12.2(14)SX	This command was introduced on the Supervisor Engine 720.
12.2(17b)SXA	This command was modified. Support was added for SSO mode and the default mode change.
12.2(17d)SXB	This command was modified. Support was added for multicast and unicast traffic.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)XNE	This command was modified. This command was implemented on the Cisco 10000 router.
Cisco IOS XE Release 2.5	This command was modified. This command was implemented on the Cisco ASR 1000 Series Routers.

Usage Guidelines

Cisco IOS Release 12.2S and 7600 Series Routers

SSO is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

On releases prior to Release 12.2(17d)SXB, single router mode (SRM) with SSO redundancy does not support stateful switchover for multicast traffic. When a switchover occurs, all multicast hardware switching entries are removed and are then re-created and reinstalled in the hardware by the newly active multilayer switch feature card (MSFC).

SRM/SSO is supported in the following releases only:

- Release 12.2(17b)SXA and subsequent rebuilds.
- Release 12.2(17d)SXB and subsequent rebuilds.

Nonstop forwarding (NSF) with SSO redundancy mode supports IPv4. NSF with SSO redundancy mode does not support IPv6, Internetwork Packet Exchange (IPX), and Multiprotocol Label Switching (MPLS).

If you have configured MPLS on the Cisco 7600 series routers with redundant supervisor engines, you must configure the Cisco 7600 series router in RPR mode. The switch should not be running in the default mode of SSO.

Enter the **redundancy** command in global configuration mode to enter redundancy configuration mode. You can enter the **mode** command within redundancy configuration mode.

Follow these guidelines when configuring your system for RPR+ mode:

- You must install compatible images on the active and standby supervisor engines to support RPR+ mode and SSO mode.
- Both supervisor engines must run the same Cisco IOS software version.
- Any modules that are not online at the time of a switchover are reset and reloaded on a switchover.
- The Forwarding Information Base (FIB) tables are cleared on a switchover. As a result, routed traffic is interrupted until route tables reconverge.

The standby supervisor engine reloads on any change of mode and begins to work in the current mode. When you use this command to force the standby supervisor engine to run as a Distributed Forwarding Card (DFC) card, the uplink ports in the standby engine continue to be in use and are not disabled.

Cisco IOS Release XE Release 2.5 and ASR 1000 Series Routers

For Cisco ASR 1002 and 1004 routers, RRP and stateful switchover can be used to switch between Cisco IOS processes. RPR and SSO need to be configured by the user, however, because a second Cisco IOS process is not available by default on Cisco ASR 1002 and 1004 routers. Enter the **redundancy** command in global configuration mode to enter redundancy configuration mode. You can enter the **mode** command within redundancy configuration mode.

The Cisco ASR 1006 Router supports a second Route Processor. The second Cisco IOS process can run only on the standby Route Processor. This means that hardware redundancy is available and RPR and SSO do not need to be configured by the user because a second Cisco IOS process is available by default on the Cisco ASR 1006 router.

RPR+ mode is not supported on the Cisco ASR 1000 Series Routers.

Cisco IOS Release 12.2XNE and 1000 Series Routers

Enter the **redundancy** command in global configuration mode to enter redundancy configuration mode. You can enter the **mode** command within redundancy configuration mode.

RPR mode is not supported on the Cisco 10000 router.

Examples

This example shows how to set the redundancy mode to RPR+:

```
Router(config)# redundancy
Router(config-red)# mode rpr-plus
```

This example shows how to set the redundancy mode to SSO:

```
Router(config)# redundancy
Router(config-red)# mode sso
```

Related Commands

Command	Description
redundancy	Enters redundancy configuration mode.
redundancy force-switchover	Forces a switchover from the active to the standby supervisor engine.
route-converge-interval	Configures the time interval after which the old FIB entries are purged.
show redundancy	Displays RF information.
show running-config	Displays the status and configuration of the module or Layer 2 VLAN.

monitor event-trace (EXEC)

To monitor and control the event trace function for a specified Cisco IOS software subsystem component, use the **monitor event-trace** command in privileged EXEC mode.

monitor event-trace *component* {**clear** | **continuous** | **disable** | **dump** [**pretty**] | **enable** | **one-shot**}

Cisco 10000 Series Routers

monitor event-trace *component* {**disable** | **dump** | **enable** | **size** | **stacktrace**}

Catalyst 6500 Series Switches and Cisco 7600 Series Routers

monitor event-trace all-traces {**continuous** [**cancel**] | **dump** [**merged**] [**pretty**]}

monitor event-trace l3 {**clear** | **continuous** [**cancel**] | **disable** | **dump** [**pretty**] | **enable** | **interface** *type mod/port* | **one-shot**}

monitor event-trace spa {**clear** | **continuous** [**cancel**] | **disable** | **dump** [**pretty**] | **enable** | **one-shot**}

monitor event-trace subsys {**clear** | **continuous** [**cancel**] | **disable** | **dump** [**pretty**] | **enable** | **one-shot**}

Syntax Description

component	Name of the Cisco IOS software subsystem component that is the subject of the event trace. To get a list of components that support event tracing, use the **monitor event-trace ?** command.
clear	Clears existing trace messages for the specified component from memory on the networking device.
continuous	Continuously displays the latest event trace entries.
disable	Turns off event tracing for the specified component.
dump	Writes the event trace results to the file configured using the **monitor event-trace** command in global configuration mode. The trace messages are saved in binary format.
pretty	(Optional) Saves the event trace message in ASCII format.
enable	Turns on event tracing for the specified component.
one-shot	Clears any existing trace information from memory, starts event tracing again, and disables the trace when the trace reaches the size specified using the **monitor event-trace** command in global configuration mode.
size	Sets the number of messages that can be written to memory for a single instance of a trace. **Note** Some Cisco IOS software subsystem components set the size by default. To display the size parameter, use the **show monitor event-trace** *component* **parameters** command. When the number of event trace messages in memory exceeds the size, new messages will begin to overwrite the older messages in the file.
stacktrace	Enables the stack trace at tracepoints.
all-traces	Displays the configured merged-event traces.

merged	(Optional) Dumps the entries in all event traces sorted by time.
l3	Displays information about the Layer 3 trace.
spa	Displays information about the Shared Port Adapter (SPA) trace.
interface *type mod/port*	Specifies the interface to be logged.
cancel	(Optional) Cancels the continuous display of latest trace entries.
subsys	Displays information about the subsystem's initial trace.

Command Default

The event trace function is disabled by default.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(18)S	This command was introduced.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S. The **monitor event-trace cef ipv4 clear** command replaces the **clear ip cef event-log** command.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Usage Guidelines

Use the **monitor event-trace** command to control what, when, and how event trace data is collected. Use this command after you have configured the event trace functionality on the networking device using the **monitor event-trace** command in global configuration mode.

Note The amount of data collected from the trace depends on the trace message size configured using the **monitor event-trace** command in global configuration mode for each instance of a trace.

The Cisco IOS software allows for the subsystem components to define whether support for event tracing is enabled or disabled at boot time. You can enable or disable event tracing in two ways: using the **monitor event-trace** command in privileged EXEC mode or using the **monitor event-trace** command in global configuration mode. To disable event tracing, you would enter either of these commands with the **disable** keyword. To enable event tracing again, you would enter either of these commands with the **enable** keyword.

To determine whether you can enable event tracing on a subsystem, use the **monitor event-trace ?** command to get a list of software components that support event tracing. To determine whether event tracing is enabled by default for the subsystem, use the **show monitor event-trace** command to display trace messages.

Use the **show monitor event-trace** command to display trace messages. Use the **monitor event-trace** *component* **dump** command to save trace message information for a single event. By default, trace information is saved in binary format. If you want to save trace messages in ASCII format, possibly for additional application processing, use the **monitor event-trace** *component* **dump pretty** command.

To write the trace messages for all events currently enabled on a networking device to a file, enter the **monitor event-trace dump** command.

To configure the file where you want to save trace information, use the **monitor event-trace** command in global configuration mode. The trace messages are saved in a binary format.

Examples

The following example shows the privileged EXEC commands to stop event tracing, clear the current contents of memory, and reenable the trace function for the interprocess communication (IPC) component. This example assumes that the tracing function is configured and enabled on the networking device.

```
Router# monitor event-trace ipc disable
Router# monitor event-trace ipc clear
Router# monitor event-trace ipc enable
```

The following example shows how the **monitor event-trace one-shot** command accomplishes the same function as the previous example except in one command. In this example, once the size of the trace message file has been exceeded, the trace is terminated.

```
Router# monitor event-trace ipc one-shot
```

The following example shows the command for writing trace messages for an event in binary format. In this example, the trace messages for the IPC component are written to a file.

```
Router# monitor event-trace ipc dump
```

The following example shows the command for writing trace messages for an event in ASCII format. In this example, the trace messages for the MBUS component are written to a file.

```
Router# monitor event-trace mbus dump pretty
```

Catalyst 6500 Series Switches and Cisco 7600 Series Routers Examples Only

This example shows how to stop event tracing, clear the current contents of memory, and reenable the trace function for the SPA component. This example assumes that the tracing function is configured and enabled on the networking device.

```
Router# monitor event-trace spa disable
Router# monitor event-trace spa clear
Router# monitor event-trace spa enable
```

Related Commands

Command	Description
monitor event-trace (global)	Configures event tracing for a specified Cisco IOS software subsystem component.
monitor event-trace dump-traces	Saves trace messages for all event traces currently enabled on the networking device.
show monitor event-trace	Displays event trace messages for Cisco IOS software subsystem components.

monitor event-trace (global)

To configure event tracing for a specified Cisco IOS software subsystem component, use the **monitor event-trace** command in global configuration mode.

monitor event-trace *component* {**disable** | **dump-file** *filename* | **enable** | **size** *number* | **stacktrace** *number*}

monitor event-trace timestamps [**datetime** [**localtime**] [**msec**] [**show-timezone**] | **uptime**]

Cisco 10000 Series Routers

monitor event-trace *component* {**disable** | **dump-file** *filename* | **enable** | **clear** | **continuous** | **one-shot**}

Syntax Description

component	Name of the Cisco IOS software subsystem component that is the object of the event trace. To get a list of components that support event tracing, use the **monitor event-trace ?** command.
disable	Turns off event tracing for the specified component.
dump-file *filename*	Specifies the file where event trace messages are written from memory on the networking device. The maximum length of the filename (path and filename) is 100 characters, and the path can point to flash memory on the networking device or to a TFTP or FTP server.
enable	Turns on event tracing for the specified component provided that the component has been configured using the **monitor event-trace** command.
size *number*	Sets the number of messages that can be written to memory for a single instance of a trace. Valid values are from1 to 65536. **Note** Some Cisco IOS software subsystem components set the size by default. To display the size parameter, use the **show monitor event-trace** *component* **parameters** command. When the number of event trace messages in memory exceeds the configured size, new messages will begin to overwrite the older messages in the file.
stacktrace *number*	Enables the stack trace at tracepoints and specifies the depth of the stack trace stored. Valid values are from 1 to 16.
timestamps	Includes time stamp information with the event trace messages for the specified component.
datetime	(Optional) Specifies that the time stamp information included with event trace messages will consist of the date and time of the event trace.
localtime	(Optional) Specifies that the time given in the time stamp will be local time.
msec	(Optional) Includes milliseconds in the time stamp.
show-timezone	(Optional) Includes time zone information in the time stamp.
uptime	(Optional) Displays time stamped information about the system uptime.
clear	Clears existing trace messages for the specified component from memory on the networking device.

continuous	Continuously displays the latest event trace entries.
one-shot	Clears any existing trace information from memory, starts event tracing again, and disables the trace when the trace reaches the size specified using the **monitor event-trace** command.

Command Default

Event tracing is enabled or disabled depending on the software component.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.0(18)S	This command was introduced.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX and implemented on the Supervisor Engine 720.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Usage Guidelines

Use the **monitor event-trace** command to enable or disable event tracing and to configure event trace parameters for Cisco IOS software subsystem components.

Note Event tracing is intended for use as a software diagnostic tool and should be configured only under the direction of a Technical Assistance Center (TAC) representative. In Cisco IOS software images that do not provide subsystem support for the event trace function, the **monitor event-trace** command is not available.

The Cisco IOS software allows the subsystem components to define whether support for event tracing is enabled or disabled by default. The command interface for event tracing allows you to change the default two ways: using the **monitor event-trace** command in privileged EXEC mode or using the **monitor event-trace** command in global configuration mode.

Additionally, default settings do not show up in the configuration file. If the subsystem software enables event tracing by default, the **monitor event-trace** *component* **enable** command will not show up in the configuration file of the networking device; however, disabling event tracing that has been enabled by default by the subsystem will create a command entry in the configuration file.

Note The amount of data collected from the trace depends on the trace message size configured using the **monitor event-trace** command for each instance of a trace.

To determine whether you can enable event tracing on a subsystem, use the **monitor event-trace ?** command to get a list of software components that support event tracing.

To determine whether event tracing is enabled by default for the subsystem, use the **show monitor event-trace** command to display trace messages.

To specify the trace call stack at tracepoints, you must first clear the trace buffer.

Examples

The following example shows how to enable event tracing for the interprocess communication (IPC) subsystem component in Cisco IOS software and configure the size to 4096 messages. The trace messages file is set to ipc-dump in slot0 (flash memory).

```
configure terminal
!
monitor event-trace ipc enable
monitor event-trace ipc dump-file slot0:ipc-dump
monitor event-trace ipc size 4096
```

When you select Cisco Express Forwarding as the component for which to enable event tracing, you can use the following additional arguments and keywords: **monitor event-trace cef** [**events** | **interface** | **ipv6** | **ipv4**][**all**]. The following example shows how to enable event tracing for IPv4 or IPv6 events of the Cisco Express Forwarding component in Cisco IOS software:

```
configure terminal
!
monitor event-trace cef ipv4 enable

configure terminal
!
monitor event-trace cef ipv6 enable
exit
```

The following example shows what happens when you try to enable event tracing for a component (in this case, adjacency events) when it is already enabled:

```
configure terminal
!
monitor event-trace adjacency enable

%EVENT_TRACE-6-ENABLE: Trace already enabled.
```

Related Commands

Command	Description
monitor event-trace (EXEC)	Controls the event trace function for a specified Cisco IOS software subsystem component.
monitor event-trace dump-traces	Saves trace messages for all event traces currently enabled on the networking device.
show monitor event-trace	Displays event trace messages for Cisco IOS software subsystem components.

monitor event-trace dump-traces

To save trace messages for all event traces currently enabled on the networking device, use the **monitor event-trace dump-traces** command in privileged EXEC mode.

monitor event-trace dump-traces [**pretty**]

Syntax Description

pretty	(Optional) Saves the event trace message in ASCII format.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(18)S	This command was introduced.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

Usage Guidelines

Use the **monitor event-trace dump-traces** command to save trace message information for all event traces currently enabled on a networking device. By default, trace information is saved in binary format. If you want to save trace messages in ASCII format, possibly for additional application processing, use the **monitor event-trace dump-traces pretty** command.

To write the trace messages for an individual trace event to a file, enter the **monitor event-trace** (EXEC) command.

To configure the file where you want to save messages, use the **monitor event-trace** (global) command.

Examples

The following example shows how to save the trace messages in binary format for all event traces enabled on the networking device.

```
monitor event-trace dump-traces
```

The following example shows how to save the trace messages in ASCII format for all event traces enabled on the networking device.

```
monitor event-trace dump-traces pretty
```

Related Commands

Command	Description
monitor event-trace (EXEC)	Controls event trace function for a specified Cisco IOS software subsystem component.
monitor event-trace (global)	Configures event tracing for a specified Cisco IOS software subsystem component.
show monitor event-trace	Displays event trace messages for Cisco IOS software subsystem components.

monitor permit-list

To configure a destination port permit list or add to an existing destination port permit list, use the **monitor permit-list** command in global configuration mode. To delete from or clear an existing destination port permit list, use the **no** form of this command.

Activate monitoring

monitor permit-list

no monitor permit-list

Activate monitoring on one port

monitor permit-list destination interface *interface-type slot*/*port*

no monitor permit-list destination interface *interface-type slot*/*port*

Activate monitoring on one range of ports

monitor permit-list destination interface *interface-type slot*/*port-last-port*

no monitor permit-list destination interface *interface-type slot*/*port-last-port*

Activate monitoring on two or more ranges of ports

monitor permit-list destination interface *interface-type slot*/*port-last-port* , [*port-last-port*]

no monitor permit-list destination interface *interface-type slot*/*port-last-port* , [*port-last-port*]

Syntax Description

destination	Specifies a destination port.
interface *interface-type*	Specifies the interface type; valid values are **ethernet**, **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
slot	The slot that the interface module is installed in.
port	Specifies a single port on an interface module, or the first port on an interface module used in a range of ports.
last-port	(Optional) Specifies the port on an interface module used as the last port in a range of ports.
,	(Optional) Separates each instance of a port, or range of ports, that are monitored. See the Usage Guidelines and the Examples for more information.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
12.2(18)SXE	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

To prevent accidental configuration of ports as destinations, you can create a permit list of the ports that are valid for use as destinations. With a destination port permit list configured, you can only configure the ports in the permit list as destinations.

When you enter multiple instances of **interface** *interface-type slot*/*port-last-port*, you must enter a space before and after the comma. For example, **interface** *interface-type slot*/*port-last-port* , *interface-type slot*/*port-last-port* , *interface-type slot*/*port-last-port*.

Examples

This example shows how to configure a destination port permit list that includes Gigabit Ethernet ports 5/1 through 5/4, and activate monitoring:

```
Router# configure terminal
Router(config)# monitor permit-list destination interface gigabitethernet 5/1-4
Router(config)# monitor permit-list
```

This example shows how to configure a destination port permit list that includes Fast Ethernet ports 1/1-48, 2/1-48, and Gigabit Ethernet ports 3/1 through 3/4, and activate monitoring:

```
Router# configure terminal
Router(config)# monitor permit-list destination interface fastEthernet 1/1-48 ,
fastEthernet 2/1-48 , gigabitEthernet 3/1-4
Router(config)# monitor permit-list
```

Related Commands

Command	Description
show monitor permit-list	Displays the permit-list state and interfaces configured.

monitor session egress replication-mode

To switch the egress-span mode from the default mode (either centralized or distributed depending on your Cisco IOS software release), use the **monitor session egress replication-mode** command in global configuration mode. To return to the default mode, use the **no** form of the command.

Cisco IOS Release 12.2(33)SXH2a and Later Releases

monitor session egress replication-mode centralized

no monitor session egress replication-mode centralized

Cisco IOS Release 12.2(33)SXH, SXH1, and SXH2

monitor session egress replication-mode distributed

no monitor session egress replication-mode distributed

Syntax Description

centralized	**In Cisco IOS Release 12.2(33)SXH2a and later releases:** Specifies centralized egress span monitoring as the default mode.
distributed	**In Cisco IOS Release 12.2(33)SXH, SXH1, and SXH2:** Specifies distributed egress span monitoring as the default mode.

Command Default

Cisco IOS Releases 12.2(33)SXH2a and later releases: Centralized mode

Cisco IOS Releases 12.2(33)SXH, SXH1, and SXH2: Distributed mode

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.
12.2(33)SXH2a	The command was changed as follows: • The default mode was changed from distributed mode to centralized mode. • The **centralized** keyword was removed and the **distributed** keyword was added.

Usage Guidelines

Note Prior to Cisco IOS Release 12.2(33)SXH and the introduction of this feature, the operating mode was centralized and could not be changed.

Centralized egress span monitoring redirects traffic to the supervisor engine for egress monitoring.

Distributed egress span monitoring is performed in the ingress module. Distributed replication for Switched Port Analyzer (SPAN), Remote SPAN (RSPAN), and Encapsulated RSPAN (ERSPAN) increases the total throughput at the span destination.

Note Distributed egress span (DES) mode is applied to ASIC-based sessions only.

Examples

Cisco IOS Release 12.2(33)SXH, SXH1, and SXH2

The following example shows how to switch the egress-span mode from the distributed default to centralized mode:

```
Router(config)# monitor session egress replication-mode centralized
```

The following example shows how to switch the egress-span mode from centralized back to distributed mode:

```
Router(config)# no monitor session egress replication-mode centralized
```

Cisco IOS Release 12.2(33)SXH2a and Later Releases

The following example shows how to switch the egress-span mode from the centralized default to distributed mode:

```
Router(config)# monitor session egress replication-mode distributed
```

The following example shows how to switch the egress-span mode from distributed back to centralized mode:

```
Router(config)# no monitor session egress replication-mode distributed
```

Related Commands

Command	Description
show monitor session	Displays the operational mode and configured mode of the session and module session capabilities.

monitor session type

To configure a local Switched Port Analyzer (SPAN), RSPAN, or ERSPAN, use the **monitor session type** command in global configuration mode. To remove one or more source or destination interfaces from the SPAN session, use the **no** form of this command.

monitor session *span-session-number* **type** {**erspan-destination** | **erspan-source | local | local-tx | rspan-destination | rspan-source**}

no monitor session *span-session-number* **type** {**erspan-destination** | **erspan-source | local | local-tx | rspan-destination | rspan-source**}

Syntax Description

span-session-number	Number of the local SPAN or ERSPAN session; valid values are from 1 to 66.
erspan-destination	Specifies the ERSPAN destination-session configuration mode.
erspan-source	Specifies the ERSPAN source-session configuration mode.
local	Specifies the local SPAN session configuration mode.
local-tx	Specifies the local egress-only SPAN session configuration mode.
rspan-destination	Specifies the RSPAN destination-session configuration mode.
rspan-source	Specifies the RSPAN source-session configuration mode.

Defaults

This command has no default settings.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(18)SXE	Support for this command was introduced on the Supervisor Engine 720.
12.2(18)SXF	This command was changed as follows: • Support for this command was introduced on the Supervisor Engine 32. • ERSPAN is supported in any switch fabric module functionality switching mode.
12.2(33)SXH	This command was changed to include the following keywords: • **local** • **local-tx** • **rspan-destination** • **rspan-source**

Usage Guidelines

Release 12.2(18)SXE and later releases support ERSPAN with the Supervisor Engine 720, hardware revision 3.2 or higher. Enter the **show module version | include WS-SUP720-BASE** command to display the hardware revision.

ERSPAN traffic is GRE-encapsulated SPAN traffic that can only be processed by an ERSPAN destination session.

This command is not supported on Catalyst 6500 series switches that are configured with a Supervisor Engine 2.

All ERSPAN source sessions on a switch must use the same source IP address. You enter the **origin ip address** command to configure the IP address for the ERSPAN source sessions.

All ERSPAN destination sessions on a switch must use the same IP address. You enter the **ip address** command to configure the IP address for the ERSPAN destination sessions. If the ERSPAN destination IP address is not a Supervisor Engine 720 (for example, it is a network sniffer), the traffic arrives with the GRE and RSPAN headers/encapsulation intact.

The ERSPAN source session destination IP address, which must be configured on an interface on the destination switch, is the source of traffic that an ERSPAN destination session sends to the destination ports. You configure the same address in both the source and destination sessions with the **ip address** command.

The ERSPAN ID differentiates the ERSPAN traffic arriving at the same destination IP address from different ERSPAN source sessions.

The local ERSPAN session limits are as follows:

- Total sessions—66
- Source sessions—2 (ingress or egress or both)
- Destination sessions—23

The **monitor session type** command creates a new ERSPAN session or allows you to enter the ERSPAN session configuration mode. ERSPAN uses separate source and destination sessions. You configure the source and destination sessions on different switches. The ERSPAN session configuration mode prompts are as follows:

- Router(config-mon-erspan-src)—Indicates the ERSPAN source session configuration mode.
- Router(config-mon-erspan-src-dst)—Indicates the ERSPAN source session destination configuration mode.
- Router(config-mon-erspan-dst)—Indicates the ERSPAN destination session configuration mode.
- Router(config-mon-erspan-dst-src)—Indicates the ERSPAN destination session source configuration mode

Table 35 lists the ERSPAN destination session configuration mode syntaxes.

Table 35 ERSPAN Destination Session Configuration Mode Syntaxes

Syntax	Description
Global Configuration Mode	

monitor session *erspan-destination-session-number* | *rspan-destination-session-number* **type erspan-destination** | **erspan-destination**	Enters ERSPAN or RSPAN destination session configuration mode and changes the prompt to the following:
	`Router(config-mon-erspan-dst)#`
	`Router(config-mon-rspan-dst)#`

Destination Session Configuration Mode	
description *session-description*	(Optional) Describes the ERSPAN or RSPAN destination session.

Table 35 ERSPAN Destination Session Configuration Mode Syntaxes

Syntax	Description
shutdown	(Optional) (Default) Inactivates the ERSPAN destination session.
no shutdown	Activates the ERSPAN destination session.
destination {*single-interface* | *interface-list* | *interface-range* | *mixed-interface-list*}	Associates the ERSPAN destination session number with the destination ports.
source	Enters ERSPAN destination session source configuration mode and changes the prompt to the following: `Router(config-mon-erspan-dst-src)#`
Destination Session Source Configuration Mode	
ip address *ip-address* [**force**]	Configures the ERSPAN flow destination IP address, which must also be configured on an interface on the destination switch and be entered in the ERSPAN destination session configuration.
erspan-id *erspan-flow-id*	Configures the ID number used by the destination and destination sessions to identify the ERSPAN traffic.
vrf *vrf-name*	(Optional) Configures the VRF name of the packets in the ERSPAN traffic.

Table 36 lists the ERSPAN source session configuration mode syntaxes.

Table 36 ERSPAN or RSPAN Source Session Configuration Mode Syntaxes

Syntax	Description
Global Configuration Mode	

monitor session *erspan-source-session-number* **type erspan-source | rspan-source**	Enters ERSPAN or RSPAN source session configuration mode and changes the prompt as appropriate to the following:
	`Router(config-mon-erspan-src)#`
	`Router(config-mon-rspan-src)#`

Source Session Configuration Mode	
description *session-description*	(Optional) Describes the ERSPAN or RSPAN source session.
shutdown	(Optional) (Default) Inactivates the ERSPAN or RSPAN source session.
no shutdown	Activates the ERSPAN or RSPAN source session.
source {{*single-interface* | *interface-list* | *interface-range* | *mixed-interface-list* | *single-vlan* | *vlan-list* | *vlan-range* | *mixed-vlan-list*} [**rx** | **tx** | **both**]}	Associates the ERSPAN or RSPAN source session number with the source ports or VLANs, and selects the traffic direction to be monitored.
filter {*single-vlan* | *vlan-list* | *vlan-range* | *mixed-vlan-list*}	(Optional) Configures source VLAN filtering when the ERSPAN or RSPAN source is a trunk port.
description *session-description*	(Optional) Describes the ERSPAN or RSPAN source session.

Table 36 ERSPAN or RSPAN Source Session Configuration Mode Syntaxes

Syntax	Description
Source Session Destination Configuration Mode	
ip address *ip-address*	Configures the ERSPAN or RSPAN flow destination IP address, which must also be configured on an interface on the destination switch and be entered in the ERSPAN or RSPAN destination session configuration.
erspan-id *erspan-flow-id*	Configures the ID number used by the source and destination sessions to identify the ERSPAN or RSPAN traffic.
origin ip address *ip-address*	Configures the IP address used as the source of the ERSPAN or RSPAN traffic.
ip {{**ttl** *ttl-value*} | {**prec** *ipp-value*} | {**dscp** *dscp-value*}}	(Optional) Configures the following packet values in the ERSPAN or RSPAN traffic: • **ttl** *ttl-value*—IP time-to-live (TTL) value • **prec** *ipp-value*—IP-precedence value • **dscp** *dscp-value*—IP-precedence value
vrf *vrf-name*	(Optional) Configures the VRF name of the packets in the ERSPAN or RSPAN traffic.

When you configure the monitor sessions, follow these syntax guidelines:

- *erspan-destination-span-session-number* can range from 1 to 66.
- *single-interface* is **interface** *type slot*/*port*; *type* is **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
- *interface-list* is *single-interface* , *single-interface* , *single-interface* ...

Note In lists, you must enter a space before and after the comma. In ranges, you must enter a space before and after the dash.

- *interface-range* is **interface** *type slot*/*first-port* - *last-port* .
- *mixed-interface-list* is, in any order, *single-interface* , *interface-range* , ...
- *erspan-flow-id* can range from 1 to 1023.

When you clear the monitor sessions, follow these syntax guidelines:

- The **no monitor session** *session-number* command entered with no other parameters clears the session *session-number.*
- *session-range* is *first-session-number-last-session-number.*

Note When you enter the **no monitor session range** command, do not enter spaces before or after the dash. If you enter multiple ranges, do not enter spaces before or after the commas.

Use the **monitor session type local** command to configure ingress, egress, or both ingress and egress SPAN sessions.

Use the **monitor session type local-tx** command to configure egress-only SPAN sessions.

When you enter the local or the local egress-only SPAN session configuration mode, the prompt changes accordingly to Router(config-mon-local)# or Router(config-mon-local-tx)#, and the following commands are available:

- **description**—Describes the properties for this session using this syntax:

  description *description*

  The *description* can be up to 240 characters and cannot contain special characters or spaces.

- **destination**—Specifies the destination and the destination properties using this syntax:

  destination {**analysis-module** *num* | **anomaly-detector-module** *num* | **interface** *type number* | **intrusion-detection-module** *num*}

analysis-module *num*	Specifies the SPAN destination analysis-module.
anomaly-detector-module *num*	Specifies the SPAN destination anomaly-detector-module.
interface *type number*	Specifies the **interface** *type* and *number* as follows: • **GigabitEthernet** *mod*/*port* • **port-channel** *num*—Ethernet Channel of interfaces; valid values are from 1 to 496.
ingress	(Optional) Configures destinations to receive traffic from attached devices.
learning	(Optional) Enables MAC address learning from the destinations, which allows the switch to transmit traffic that is addressed to devices attached to the destinations.
intrusion-detection-module *num*	Specifies the SPAN destination intrusion-detection-module.

- **exit**—Exits from configuration session mode.
- **filter vlan** *vlan-id*—Limits the SPAN source traffic to specific VLANs; valid values are from 1 to 4096.
- **no**—Negates a command or sets its defaults.
- **shutdown**—Shuts down this session
- **source**—Specifies the SPAN source interface or VLAN using the following syntax:

  source {**cpu** {**rp** | **sp**} | {**interface** *type number*} | {**intrusion-detection-module** *num*} | {**vlan** *vlan-id*}} [**,** | **-** | **rx** | **tx** | **both**]

cpu rp	Associates the local SPAN session number with the CPU on the route processor.
cpu sp	Associates the local SPAN session number with the CPU on the switch processor.

interface *type number*	Specifies the interface type and number as follows: • **FastEthernet** *mod*/*port* • **GigabitEthernet** *mod*/*port* • **Port-channel** *num*—Ethernet Channel of interfaces; valid values are from 1 to 496.
vlan *vlan-id*	Specifies the VLAN; valid values are from 1 to 4094.
,	(Optional) Specifies another range of interfaces.
-	(Optional) Specifies a range of interfaces.
both	(Optional) Monitors the received and the transmitted traffic.
rx	(Optional) Monitors the received traffic only.
tx[1]	(Optional) Monitors the transmitted traffic only.

1. When you enter the **local-tx** keyword, the **rx** and **both** keywords are not available and the **tx** keyword is required.

The local SPAN session limits are as follows:

- Total sessions—80
- Source sessions—2 (ingress or egress or both)
- Egress only—14

If you enter the **filter** keyword on a monitored trunk interface, only traffic on the set of specified VLANs is monitored.

Only one destination per SPAN session is supported. If you attempt to add another destination interface to a session that already has a destination interface configured, you get an error. You must first remove a SPAN destination interface before changing the SPAN destination to a different interface.

You can configure up to 64 SPAN destination interfaces, but you can have one egress SPAN source interface and up to 128 ingress source interfaces only.

A SPAN session can either monitor VLANs or monitor individual interfaces, but it cannot monitor both specific interfaces and specific VLANs. Configuring a SPAN session with a source interface and then trying to add a source VLAN to the same SPAN session causes an error. Configuring a SPAN session with a source VLAN and then trying to add a source interface to that session also causes an error. You must first clear any sources for a SPAN session before switching to another type of source.

Port channel interfaces display in the list of interface options if you have them configured. VLAN interfaces are not supported. However, you can span a particular VLAN by entering the **monitor session session source vlan** *vlan-id* command.

When you configure the **destination**, use these guidelines:

- A *single-interface* is as follows:
  - **interface** *type slot*/*port*; *type* is **fastethernet**, **gigabitethernet**, or **tengigabitethernet**.
  - **interface port-channel** *number*

Note Destination port channel interfaces must be configured with the **channel-group** *group-num* **mode on** command and the **no channel-protocol** command.

- An *interface-list* is *single-interface* , single-*interface* , *single-interface* ...

Note In lists, you must enter a space before and after the comma. In ranges, you must enter a space before and after the dash.

- An *interface-range* is **interface** *type slot/first-port* **-** *last-port*.
- A *mixed-interface-list* is, in any order, *single-interface* **,** *interface-range* **,** ...
- A *single-vlan* is the ID number of a single VLAN.
- A *single-list* is *single-vlan* **,** *single-vlan* **,** *single-vlan* ...
- A *vlan-range* is *first-vlan-ID* **-** *last-vlan-ID*.
- A *mixed-vlan-list* is, in any order, *single-vlan* , *vlan-range* , ...

When you clear the monitor sessions, follow these syntax guidelines:

- The **no monitor session** *session-number* command entered with no other parameters clears the session *session-number.*
- *session-range* is *first-session-number-last-session-number.*

Note When you enter the **no monitor session range** command, do not enter spaces before or after the dash. If you enter multiple ranges, do not enter spaces before or after the commas.

Examples

This example shows how to configure an ERSPAN source session number and enter the ERSPAN source session configuration mode for the session:

```
Router(config)# monitor session 55 type erspan-source
Router(config-mon-erspan-src)#
```

This example shows how to configure an ERSPAN destination session number and enter the ERSPAN destination session configuration mode for the session:

```
Router(config)# monitor session 55 type erspan-destination
Router(config-mon-erspan-dst)#
```

This example shows how to associate the ERSPAN destination session number with the destination ports:

```
Router(config-mon-erspan-dst) destination interface fastethernet 1/2 , 2/3
```

This example shows how to enter the ERSPAN destination session source configuration:

```
Router(config-mon-erspan-dst)# source
Router(config-mon-erspan-dst-src)#
```

This example shows how to enter the ERSPAN destination session source configuration mode:

```
Router(config-mon-erspan-dst)# source
Router(config-mon-erspan-dst-src)#
```

This example shows how to configure multiple sources for a session:

```
Router(config-mon-erspan-src)# source interface fastethernet 5/15 , 7/3 rx
Router(config-mon-erspan-src)# source interface gigabitethernet 1/2 tx
Router(config-mon-erspan-src)# source interface port-channel 102
Router(config-mon-erspan-src)# source filter vlan 2 - 3
Router(config-mon-erspan-src)#
```

This example shows how to enter the ERSPAN source session destination configuration mode:

```
Router(config-mon-erspan-src)# destination
Router(config-mon-erspan-src-dst)#
```

This example shows how to configure the ID number that is used by the source and destination sessions to identify the ERSPAN traffic:

```
Router(config-mon-erspan-src-dst)# erspan-id 1005
Router(config-mon-erspan-src-dst)#
```

This example shows how to configure session 1 to monitor ingress traffic from Gigabit Ethernet port 1/1 and configure Gigabit Ethernet port 1/2 as the destination:

```
Router(config)# monitor session 1 type local
Router(config-mon-local)# source interface gigabitethernet 1/1 rx
Router(config-mon-local)# destination interface gigabitethernet 1/2
```

This example shows how to configure session 1 to monitor egress-only traffic from Gigabit Ethernet port 5/1 and configure Gigabit Ethernet port 5/2 as the destination:

```
Router(config)# monitor session 1 type local-tx
Router(config-mon-local)# source interface gigabitethernet 5/1 rx
Router(config-mon-local)# destination interface gigabitethernet 5/2
```

This example shows how to remove an interface from a session:

```
Router(config)# no monitor session 1 type local-tx
```

Related Commands

Command	Description
monitor session type	Creates an ERSPAN source session number or enters the ERSPAN session configuration mode for the session.
show monitor session	Displays information about the ERSPAN, SPAN, and RSPAN sessions.

mop device-code

To identify the type of device sending Maintenance Operation Protocol (MOP) System Identification (sysid) messages and request program messages, use the **mop device-code** command in global configuration mode. To set the identity to the default value, use the **no** form of this command.

mop device-code {**cisco** | **ds200**}

no mop device-code {**cisco** | **ds200**}

Syntax Description

cisco	Denotes a Cisco device code. This is the default.
ds200	Denotes a DECserver 200 device code.

Defaults

Cisco device code

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The sysid messages and request program messages use the identity information indicated by this command.

Examples

The following example identifies a DECserver 200 device as sending MOP sysid and request program messages:

```
mop device-code ds200
```

Related Commands

Command	Description
mop sysid	Enables an interface to send out periodic MOP system identification messages.

mop retransmit-timer

To configure the length of time that the Cisco IOS software waits before resending boot requests to a Maintenance Operation Protocol (MOP) server, use the **mop retransmit-timer** command in global configuration mode. To reinstate the default value, use the **no** form of this command.

mop retransmit-timer *seconds*

no mop retransmit-timer

Syntax Description

seconds	Sets the length of time (in seconds) that the software waits before resending a message. The value is a number from 1 to 20.

Defaults

4 seconds

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

By default, when the software sends a request that requires a response from a MOP boot server and the server does not respond, the message is re-sent after 4 seconds. If the MOP boot server and router are separated by a slow serial link, it might take longer than 4 seconds for the software to receive a response to its message. Therefore, you might want to configure the software to wait longer than 4 seconds before resending the message if you are using such a link.

Examples

In the following example, if the MOP boot server does not respond within 10 seconds after the router sends a message, the server will resend the message:

```
mop retransmit-timer 10
```

Related Commands

Command	Description
mop device-code	Identifies the type of device sending MOP sysid messages and requests program messages.
mop enabled	Enables an interface to support the MOP.

mop retries

To configure the number of times the Cisco IOS software will resend boot requests to a Maintenance Operation Protocol (MOP) server, use the **mop retries** command in global configuration mode. To reinstate the default value, use the **no** form of this command.

mop retries *count*

no mop retries

Syntax Description

count	Indicates the number of times the software will resend a MOP boot request. The value is a number from 3 to 24. The default is 8.

Defaults

8 times

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

In the following example, the software will attempt to resend a message to an unresponsive host 11 times before declaring a failure:

```
Router(config)# mop retries 11
```

Related Commands

Command	Description
mop device-code	Identifies the type of device sending MOP sysid messages and requests program messages.
mop enabled	Enables an interface to support the MOP server.
mop retransmit-timer	Configures the length of time that the Cisco IOS software waits before resending boot requests to a MOP server.

more

To display the contents of a file, use the **more** command in EXEC mode.

more [**/ascii** | **/binary** | **/ebcdic**] *url*

Syntax Description

/ascii	(Optional) Displays a binary file in ASCII format.
/binary	(Optional) Displays a file in hex/text format.
/ebcdic	(Optional) Displays a binary file in EBCDIC format.
url	The URL of the file to display. A URL in the CLI consists of a file-system prefix (such as **system:** or **nvram:**), an optional path (such as a folder name), and the name of a file.

Defaults

The command displays the conent of a file in its native format. Optional formats include ascii, binary, and ebcdic.

Command Modes

EXEC

Command History

Release	Modification
11.3 AA	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **more system:running-config** command displays the same output as the **show running-config** command. The **more nvram:startup-config** command is recommended as a replacement for the **show startup-config** command and the **show configuration** command.

You can use this command to display configuration files, as follows:

- The **more nvram:startup-config** command displays the startup configuration file contained in NVRAM or specified by the CONFIG_FILE environment variable. The Cisco IOS software informs you whether the displayed configuration is a complete configuration or a distilled version. A distilled configuration is one that does not contain access lists.
- The **more system:running-config** command displays the running configuration.

These commands show the version number of the software used when you last changed the configuration file.

You can also display the contents of files on remote systems using the **more** command. For example, you could display a saved running configuration file on an FTP server using **more ftp://username:password@ftp-host1/mydirectory/7200-basic-running-config**. See the description of the **copy** command for more information on file-system prefixes available in the Cisco IOS CLI.

Options for filtering and redirecting the output of this command are available by appending a pipe character (|). See the Related Commands table for a list of **more <url>** command extensions.

Examples

The following partial sample output displays the configuration file named startup-config in NVRAM:

```
Router# more nvram:startup-config

!
! No configuration change since last restart
! NVRAM config last updated at 02:03:26 PDT Thu Oct 2 1997
!
version 12.1
service timestamps debug uptime
service timestamps log uptime
service password-encryption
service udp-small-servers
service tcp-small-servers
.
.
.
end
```

The following is partial sample output from the **more nvram:startup-config** command when the configuration file has been compressed:

```
Router# more nvram:startup-config

Using 21542 out of 65536 bytes, uncompressed size = 142085 bytes
!
version 12.1
service compress-config
!
hostname rose
!
.
.
.
```

The following partial sample output displays the running configuration:

```
Router2# more system:running-config

Building configuration...

Current configuration:
!
version 12.1
no service udp-small-servers
no service tcp-small-servers
!
hostname Router2
!
.
.
.
!
end
```

Related Commands

Command	Description
boot config	Specifies the device and filename of the configuration file from which the router configures itself during initialization (startup).
more <url> begin	Begins the output of any **more** command from a matched string.

Command	Description
more <url> exclude	Filters the output of any **more** command to exclude a matched string.
more <url> include	Filters the output of any **more** command to display only the lines that match the specified string.
service compress-config	Compresses startup configuration files.
show bootvar	Displays the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, the contents of the BOOTLDR environment variable, and the configuration register setting.

more <url> begin

To search the output of any **more** command, use the **more** *url* **|** **begin** command in EXEC mode. This command begins unfiltered output of the **more** command with the first line that contains the regular expression you specify.

more *url* **|** **begin** *regular-expression*

Syntax Description

url	The Universal Resource Locator (RLl) of the file to display. **More** commands are advanced **show** commands; for details, see the command reference page in this book for the **more** command.
|	A vertical bar (the "pipe" symbol) indicates that an output processing specification follows.
regular-expression	Any regular expression found in **more** command output.
/	Specifies a search at a --More-- prompt that begins unfiltered output with the first line that contains the regular expression.
-	Specifies a filter at a --More-- prompt that only displays output lines that do not contain the regular expression.
+	Specifies a filter at a --More-- prompt that only displays output lines that contain the regular expression.

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
11.3 AA	The **more** command was introduced.
12.0(1)T	This extension of the **more** command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The *regular-expression* argument is case sensitive and allows for complex matching requirements.

You can specify a new search at every --More-- prompt.

To search the remaining output of the **more** command, use the following command at the --More-- prompt:

/regular-expression

To filter the remaining output of the **more** command, use one of the following commands at the --More-- prompt:

-regular-expression

+regular-expression

When output volume is large, the search can produce long lists of output. To interrupt the output, press **Ctrl**-^ (Ctrl-Shift-6) or **Ctrl**-**Z**.

Note Once you specify a filter for a **more** command, you cannot specify another filter at a --More-- prompt. The first specified filter remains until the **more** command output finishes or until you interrupt the output. The use of the keyword **begin** does not constitute a filter.

Because prior output is not saved, you cannot search or filter backward through prior output.

Examples

The following is partial sample output of the **more nvram:startup-config | begin** command that begins unfiltered output with the first line that contain the regular expression "ip." At the --More-- prompt, the user specifies a filter to exclude output lines that contain the regular expression "ip."

```
router# more nvram:startup-config | begin ip

ip subnet-zero
ip domain-name cisco.com
ip name-server 198.92.30.32
ip name-server 171.69.2.132
!
isdn switch-type primary-5ess
.
.
.
interface Ethernet1
 ip address 5.5.5.99 255.255.255.0
 --More--
-ip
filtering...
 media-type 10BaseT
!
interface Serial0:23
 encapsulation frame-relay
 no keepalive
 dialer string 4001
 dialer-group 1
 isdn switch-type primary-5ess
 no fair-queue
```

Related Commands

Command	Description
more <url> exclude	Filters **more** command output so that it excludes lines that contain a particular regular expression.
more <url> include	Filters **more** command output so that it displays only lines that contain a particular regular expression.
show <command> begin	Searches the output of any **show** command and displays the output from the first instance of a specified string.
show <command> exclude	Filters **show** command output so that it excludes lines that contain a particular regular expression.
show <command> include	Filters **show** command output so that it displays only lines that contain a particular regular expression.

more <url> exclude

To filter **more** command output so that it excludes lines that contain a particular regular expression, use the **more exclude** command in EXEC mode.

more *url* **| exclude** *regular-expression*

Syntax Description

url	The Universal Resource Locator (URL) of the file to display. **More** commands are advanced **show** commands; for details, see the command reference page in this book for the **more** command. The Cisco IOS File System (IFS) uses URLs to specify the location of a file system, directory, and file. Typical URL elements include: *prefix***:**[*directory*/]*filename* Prefixes can be local file systems or file locations, such as **nvram:** or **system:**. Alternatively, you can specify network locations using the following syntax: **ftp:**[[//[*username*[**:***password*]**@**]*location*]/*directory*]/*filename* **tftp:**[[//*location*]/*directory*]/*filename* **rcp:**[[//[*username@*]*location*]/*directory*]/*filename*
|	A vertical bar (the "pipe" symbol) indicates that an output processing specification follows.
regular-expression	Any regular expression found in **more** command output.
/	Specifies a search at a --More-- prompt that begins unfiltered output with the first line that contains the regular expression.

Command Modes

EXEC

Command History

Release	Modification
11.3 AA	The **more** command was introduced.
12.0(1)T	This extension of the **more** command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The *regular-expression* argument is case sensitive and allows for complex matching requirements.

You can specify a new search at any --More-- prompt. To search the remaining output of the **more** command, use the following command at the --More-- prompt:

/regular-expression

When output volume is large, the search can produce long lists of output. To interrupt the output, press **Ctrl**-^ (Ctrl-Shift-6) or **Ctrl**-**Z**.

Because prior output is not saved, you cannot search or filter backward through prior output.

Examples

The following is partial sample output of the **more nvram:startup-config | exclude** command. The use of **| exclude service** in the command specifies a filter that excludes lines that contain the regular expression "service." At the --More-- prompt, the user searches for the regular expression "Dialer1," which continues filtered output with the first line that contains "Dialer1."

```
router# more nvram:startup-config | exclude service
!
version 12.0
!
hostname router
!
boot system flash
no logging buffered
!
ip subnet-zero
ip domain-name cisco.com
.
.
.
--More--
/Dialer1
filtering...
interface Dialer1
 no ip address
 no ip directed-broadcast
 dialer in-band
 no cdp enable
```

Related Commands

Command	Description
more <url> begin	Begins unfiltered output of the **more** command with the first line that contains the regular expression you specify.
more <url> include	Filters **more** command output so that it displays only lines that contain a particular regular expression.
show <command> begin	Searches the output of any **show** command and displays the output from the first instance of a specified string.
show <command> exclude	Filters **show** command output so that it excludes lines that contain a particular regular expression.
show <command> include	Filters **show** command output so that it displays only lines that contain a particular regular expression.

more <url> include

To filter **more** command output so that it displays only lines that contain a particular regular expression, use the **more include** command in EXEC mode.

more *url* **| include** *regular-expression*

Syntax Description

url	The Universal Resource Locator (URL) of the file to display. **More** commands are advanced **show** commands; for details, see the command reference page in this book for the **more** command.
|	A vertical bar (the "pipe" symbol) indicates that an output processing specification follows.
regular-expression	Any regular expression found in **more** command output.
/	Specifies a search at a --More-- prompt that begins unfiltered output with the first line that contains the regular expression.

Command Modes

EXEC

Command History

Release	Modification
11.3 AA	The **more** command was introduced.
12.0(1)T	This extension of the **more** command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The *regular-expression* argument is case sensitive and allows for complex matching requirements.

You can specify a new search at any --More-- prompt. To search the remaining output of the **more** command, use the following syntax at the --More-- prompt:

/regular-expression

When output volume is large, the search can produce long lists of output. To interrupt the output, press **Ctrl**-^ (Ctrl-Shift-6) or **Ctrl**-**Z**.

Because prior output is not saved, you cannot search or filter backward through prior output.

Examples

The following is partial sample output of the **more nvram:startup-config | include** command. It only displays lines that contain the regular expression "ip."

```
router# more nvram:startup-config | include ip

ip subnet-zero
ip domain-name cisco.com
ip name-server 198.92.30.32
ip name-server 171.69.2.132
 description ip address 172.21.53.199 255.255.255.0
 ip address 172.21.53.199 255.255.255.0
```

Related Commands

Command	Description
more <url> begin	Begins unfiltered output of the **more** command with the first line that contains the regular expression you specify.
more <url> exclude	Filters **more** command output so that it excludes lines that contain a particular regular expression.
show <command> begin	Searches the output of any **show** command and displays the output from the first instance of a specified string.
show <command> exclude	Filters **show** command output so that it excludes lines that contain a particular regular expression.
show <command> include	Filters **show** command output so that it displays only lines that contain a particular regular expression.

more flh:logfile

To view the system console output generated during the Flash load helper operation, use the **more flh:logfile** privileged EXEC command.

more flh:logfile

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3 AA	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If you are a remote Telnet user performing the Flash upgrade without a console connection, this command allows you to retrieve console output when your Telnet connection has terminated due to the switch to the ROM image. The output indicates what happened during the download, and is particularly useful if the download fails.

This command is a form of the **more** command. See the **more** command for more information.

Examples

The following is sample output from the **more flh:logfile** command:

```
Router# more flh:logfile

%FLH: abc/igs-kf.914 from 172.16.1.111 to flash...

System flash directory:
File  Length   Name/status
  1   2251320  abc/igs-kf.914

[2251384 bytes used, 1942920 available, 4194304 total]
Accessing file 'abc/igs-kf.914' on 172.16.1.111...
Loading from 172.16.13.111:

Erasing device...... erased
Loading from 172.16.13.111:
- [OK -
2251320/4194304 bytes]

Verifying checksum... OK (0x97FA)
Flash copy took 79292 msecs
%FLH: Re-booting system after download
Loading abc/igs-kf.914 at 0x3000040, size = 2251320 bytes [OK]

F3: 2183364+67924+259584 at 0x3000060


                Restricted Rights Legend
```

```
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Cisco IOS (tm) GS Software (GS7), Version 11.0
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Compiled Tue 06-Dec-94 14:01 by smith
Image text-base: 0x00001000, data-base: 0x005A9C94

cisco 2500 (68030) processor (revision 0x00) with 4092K/2048K bytes of
memory.
Processor board serial number 00000000
DDN X.25 software, Version 2.0, NET2 and BFE compliant.
ISDN software, Version 1.0.
Bridging software.
Enterprise software set supported. (0x0)
1 Ethernet/IEEE 802.3 interface.
2 Serial network interfaces.
 --More--

1 ISDN Basic Rate interface.
32K bytes of non-volatile configuration memory.

4096K bytes of processor board System flash (Read ONLY)
```

Related Commands

Command	Description
more	Displays a file.

motd-banner

To enable the display of message-of-the-day (MOTD) banners on the specified line or lines, use the **motd-banner** command in line configuration mode. To suppress the MOTD banners on the specified line or lines, use the **no** form of this command.

motd-banner

no motd-banner

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled on all lines.

Command Modes

Line configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command determines whether the router will display the MOTD banner when an EXEC session is created on the specified line or lines. The MOTD banner is defined with the **banner motd** global configuration command. By default, the MOTD banner is enabled on all lines. Disable the MOTD banner on specific lines using the **no motd-banner** line configuration command.

The MOTD banners can also be disabled by the **no exec-banner** line configuration command, which disables both MOTD banners and EXEC banners on a line. If the **no exec-banner** command is configured on a line, the MOTD banner will be disabled regardless of whether the **motd-banner** command is enabled or disabled. Table 37 summarizes the effects of the **exec-banner** command and the **motd-banner** command.

Table 37 Banners Displayed Based On exec-banner and motd-banner Combinations

	exec-banner (default)	**no exec-banner**
motd-banner (default)	MOTD banner EXEC banner	None
no motd-banner	EXEC banner	None

For reverse Telnet connections, the EXEC banner is never displayed. Instead, the incoming banner is displayed. The MOTD banner is displayed by default, but it is disabled if either the **no exec-banner** command or **no motd-banner** command is configured. Table 38 summarizes the effects of the **exec-banner** command and the **motd-banner** command for reverse Telnet connections.

Table 38 Banners Displayed Based On exec-banner and motd-banner Combinations for Reverse Telnet Sessions to Async Lines

	exec-banner (default)	**no exec-banner**
motd-banner (default)	MOTD banner Incoming banner	Incoming banner
no motd-banner	Incoming banner	Incoming banner

Examples

The following example suppresses the MOTD banner on vty lines 0 through 4:

```
line vty 0 4
 no motd-banner
```

Related Commands

Command	Description
banner exec	Defines and enables a customized banner to be displayed whenever the EXEC process is initiated.
banner incoming	Defines and enables a customized message to be displayed when there is an incoming connection to a terminal line from a host on the network.
banner motd	Defines and enables a customized message-of-the-day banner.
motd-banner	Controls (enables or disables) the display of message-of-the-day banners on a specified line or lines.

name-connection

To assign a logical name to a connection, use the **name-connection** command in user EXEC mode.

name-connection

Syntax Description

This command has no arguments or keywords.

Defaults

No logical name is defined.

Command Modes

User EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command can be useful for keeping track of multiple connections.

You are prompted for the connection number and name to assign. The **where** command displays a list of the assigned logical connection names.

Examples

The following example assigns the logical name blue to the connection:

```
Router> where
Conn Host                Address             Byte  Idle Conn Name
*  1 doc-2509            172.30.162.131         0     0 doc-2509

Router> name-connection
Connection number: 1
Enter logical name: blue
Connection 1 to doc-2509 will be named "BLUE" [confirm]
```

Related Commands

Command	Description
where	Lists open sessions associated with the current terminal line.

no menu

To delete a user menu from the configuration file, use the **no menu** command in global configuration mode.

no menu *menu-name*

Syntax Description

menu-name	Name of the menu to delete from the configuration file.

Defaults

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to remove any **menu** commands for a particular menu from the configuration file.

As with all global configuration commands, this command will only effect the startup configuration file when you save the running configuration using the **copy running-config startup-config** EXEC command.

Examples

The following example deletes the menu named Access1:

```
no menu Access1
```

Related Commands

Command	Description
menu (EXEC)	Invokes a user menu.
menu command	Specifies underlying commands for user menus.
menu prompt	Specifies the prompt for a user menu.
menu text	Specifies the text of a menu item in a user menu.
menu title	Creates a title, or banner, for a user menu.

notify

To enable terminal notification about pending output from other Telnet connections, use the **notify** command in line configuration mode. To disable notifications, use the **no** form of this command.

notify

no notify

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command sets a line to inform a user that has multiple, concurrent Telnet connections when output is pending on a connection other than the current one.

Examples

In the following example, notification of pending output from connections is enabled on virtual terminal lines 0 to 4:

```
Router(config)# line vty 0 4
Router(config-line)# notify
```

Related Commands

Command	Description
terminal notify	Configures a line to inform a user that has multiple, concurrent Telnet connections when output is pending on a connection other than the current one.

notify syslog

To enable the sending of notifications of configuration changes to a remote system message logging (syslog), use the **notify syslog** command in configuration change logger configuration mode. To disable the sending of notifications of configuration changes to the syslog, use the **no** form of this command.

notify syslog [**contenttype** {**plaintext** | **xml**}]

no notify syslog [**contenttype** {**plaintext** | **xml**}]

Syntax Description

contenttype	(Optional) Allows you to choose a format for the configuration change messages that are sent via syslog.
plaintext	(Optional) Specifies that the configuration change messages are sent as plain text.
xml	(Optional) Specifies that the configuration change messages are sent in XML format.

Command Default

Notifications are not sent to the syslog.

Command Modes

Configuration change logger configuration (config-archive-log-config)

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	The **contenttype**, **plaintext**, and **xml** keywords were added.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Usage Guidelines

Enable the **notify syslog** command if you use the syslog to monitor your router. Syslog monitoring prevents the need to gather configuration log information manually.

Examples

The following example shows how to enable the router to send notifications (in XML format) to the syslog:

```
Router# configure terminal
!
Router(config)# archive
Router(config-archive)# log config
Router(config-archive-log-config)# notify syslog contenttype xml
Router(config-archive-log-config)# end
```

Related Commands

Command	Description
archive	Enters archive configuration mode.
hidekeys	Suppresses the display of password information in configuration log files.
log config	Enters configuration change logger configuration mode.
logging enable	Enables the logging of configuration changes.
logging size	Specifies the maximum number of entries retained in the configuration log.
show archive log config	Displays entries from the configuration log.

padding

To set the padding on a specific output character, use the **padding** command in line configuration mode. To remove padding for the specified output character, use the **no** form of this command.

padding *ascii-number count*

no padding *ascii-number*

Syntax Description

ascii-number	ACII decimal representation of the character.
count	Number of NULL bytes sent after the specified character, up to 255 padding characters in length.

Defaults

No padding

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command when the attached device is an old terminal that requires padding after certain characters (such as ones that scrolled or moved the carriage). See the "ASCII Character Set and Hex Values" appendix for a list of ASCII characters.

Examples

In the following example, the Return (decimal character 13) is padded with 25 NULL bytes on the console line:

```
Router(config)# line console
Router(config-line)# padding 13 25
```

Related Commands

Command	Description
terminal padding	Changes the character padding on a specific output character for the current session.

parity

To define generation of a parity bit, use the **parity** command in line configuration mode. To specify no parity, use the **no** form of this command.

parity {**none** | **even** | **odd** | **space** | **mark**}

no parity

Syntax Description

none	No parity. This is the default.
even	Even parity.
odd	Odd parity.
space	Space parity.
mark	Mark parity.

Defaults

No parity.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.4	This command was modified to enable parity setting on Cisco AS5350 and Cisco AS5400 NextPort lines.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Communication protocols provided by devices such as terminals and modems sometimes require a specific parity bit setting. Refer to the documentation for your device to determine required parity settings.

If you use this command to set parity on Cisco AS5350 and Cisco AS5400 NextPort lines, do not also set parity by means of S-register settings in a modemcap. (A modemcap is a series of parameter settings that are sent to your modem to configure it to interact with a Cisco device in a specified way. Cisco IOS software defines modemcaps that have been found to properly initialize most modems so that they function properly with Cisco routers and access servers.)

Examples

In the following example, even parity is configured for line 34:

```
Router(config)# line 34
Router(config-line)# parity even
```

Related Commands

Command	Description
terminal parity	Defines the generation of the parity bit for the current for the current session and line.

parser cache

To reenable the Cisco IOS software parser cache after disabling it, use the **parser cache** command in global configuration mode. To disable the parser cache, use the **no** form of this command.

parser cache

no parser cache

Syntax Description

This command has no arguments or keywords.

Defaults

Parser cache is enabled by default.

Command Modes

Global configuration

Command History

Release	Modification
12.1(5)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The Parser Cache feature optimizes the parsing (translation and execution) of Cisco IOS software configuration command lines by remembering how to parse recently encountered command lines, decreasing the time required to process large configuration files.

The parser cache is enabled by default. However, if you wish to disable the parser cache, you may do so using the **no parser cache** command in global configuration mode. To reenable the parser cache after it has been disabled, use the **parser cache** command.

When the **no parser cache** is issued, the command line appears in the running configuration file. However, if the parser cache is reenabled, no command line appears in the running configuration file.

Examples

In the following example, the Cisco IOS software Parser Cache feature is disabled:

```
Router(config)# no parser cache
```

Related Commands

Command	Description
clear parser cache	Clears the parse cache entries and hit/miss statistics stored for the Parser Cache feature.
show parser statistics	Displays statistics about the last configuration file parsed and the status of the Parser Cache feature.

parser command serializer

To enable configuration access only to the users holding a configuration lock and to prevent other clients from accessing the running configuration, use the **parser command serializer** command in global configuration mode. To disable this configuration, use the **no** form of this command.

parser command serializer

no parser command serializer

Syntax Description

This command has no arguments or keywords.

Command Default

Access is granted only to the user holding the lock.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SRE	This command was introduced.

Usage Guidelines

The Parser Concurrency and Locking Improvements feature ensures that exclusive access is granted only to a requested process and prevents other users from concurrently accessing the Cisco IOS configuration. That is, it prevents simultaneous execution of two or more commands. Use the **parser command serializer** command to configure the Parser Concurrency and Locking Improvements feature.

Examples

The following example shows how to configure the Parser Concurrency and Locking Improvements feature:

```
Router# configure terminal
Router(config)# parser command serializer
```

Related Commands

Command	Description
configuration mode exclusive	Enables single-user (exclusive) access functionality for the Cisco IOS CLI.
configure terminal lock	Locks the running configuration into exclusive configuration mode for the duration of your configuration session.
test parser session-lock	Tests the behavior of the Parser Concurrency and Locking Improvements feature.

parser config cache interface

To reduce the time required for the command-line interpreter to execute commands that manage the running system configuration files, use the **parser config cache interface** command in global configuration mode. To disable the reduced command execution time functionality, use the **no** form of this command.

parser config cache interface

no parser config cache interface

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration (config)

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Usage Guidelines

Enable the **parser config cache interface** command to reduce the execution time required for running configuration management commands such as the **show running-configuration**, **write terminal**, and **copy system:running-configuration** commands. Information for these configuration management commands is supplied by nonvolatile generation (NVGEN) processes that query the system for configuration details. The **parser config cache interface** command is especially useful for managing large system configurations that contain numerous interface configurations.

Once enabled, the command provides faster execution of the NVGEN commands that process the running system configuration by caching interface configurations in system memory, and by retrieving only configuration information that has changed. For this reason, the device on which this command is enabled must have enough memory available to store the interface configuration. For example, if the interface configurations take up 15 KB of memory, using this command would require having an additional 15 KB of memory space available.

The first time you display the configuration file, you will not see much evidence of improvement in performance because the interface cache will be filled up. However, you will notice performance improvements when you enter subsequent NVGEN-type commands such as the **show running-configuration** EXEC command.

Each time the interface configuration is changed, the interface cache is flushed. Entering an NVGEN-type command after modifying the interface configuration will once again not show any performance improvement until the next NVGEN-type command is entered.

Examples

The following example shows how to enable the functionality for reducing the time required for the command-line interpreter to execute commands that manage the running system configuration files:

```
Router(config)# parser config cache interface
```

Related Commands

Command	Description
copy system:running-configuration	Copies the running configuration to another destination.
show running-configuration	Displays the configuration currently running on the terminal.
write terminal	Displays the configuration currently running on the terminal.

parser config partition

To enable configuration partitioning, use the **parser config partition** command. To disable the partitioning of the running configuration, use the **no** form of this command.

parser config partition

no parser config partition

Syntax Description

No arguments or keywords.

Command Default

This command is enabled by default.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)SRB	This command was introduced as part of the Configuration Partitioning feature.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Usage Guidelines

This command controls (enables or disables) the Configuration Partitioning feature.

Note This command is not related to disk partitions or disk partitioning.

To display the list of commands that make up the current running configuration for a specific part ("partition") of the system's global running configuration, use the **show running-config partition** command in privileged Exec mode.

The Configuration Partitioning feature uses a small amount of system resources. The **no parser config partition** command allows you to disable this feature if the feature is not needed on your system.

Note Only the **no** form of this command will appear in configuration files. To determine if config partitioning is supported on your system and whether it is enabled, use the **show running-config parser ?** command.

Examples

The following example shows how to disable partitioning of the system running configuration:

```
Router> enable
Router# config t
Enter configuration commands, one per line.  End with CNTL/Z.
```

```
Router(config)# no parser config partition
System configured
```

Related Commands

Command	Description
show running-config partition	Displays the list of commands that make up the current running configuration for a specific part of the system's global running configuration. When used with the **?** CLI help keyword, can also be used to determine the availability and status of the Configuration Partitioning feature.

partition

To separate Flash memory into partitions on Class B file system platforms, use the **partition** command in global configuration mode. To undo partitioning and to restore Flash memory to one partition, use the **no** form of this command.

Cisco 1600 Series and Cisco 3600 Series Routers

partition *flash-filesystem***:** [*number-of-partitions*][*partition-size*]

no partition *flash-filesystem***:**

All Other Class B Platforms

partition flash *partitions* [*size1 size2*]

no partition flash

Syntax Description

*flash-filesystem***:**	One of the following Flash file systems, which must be followed by a colon (:). The Cisco 1600 series can only use the **flash:** keyword. • **flash:**—Internal Flash memory • **slot0:**—Flash memory card in PCMCIA slot 0 • **slot1:**—Flash memory card in PCMCIA slot 1
number-of-partitions	(Optional) Number of partitions in Flash memory.
partition-size	(Optional) Size of each partition. The number of partition size entries must be equal to the number of specified partitions.
partitions	Number of partitions in Flash memory. Can be 1 or 2.
size1	(Optional) Size of the first partition (in megabytes).
size2	(Optional) Size of the second partition (in megabytes).

Defaults

Flash memory consists of one partition.

If the partition size is not specified, partitions of equal size are created.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

For the Cisco 1600 series and Cisco 3600 series routers, to undo partitioning, use the **partition** *flash-filesystem***:1** or **no partition** *flash-filesystem***:** command. For other Class B platforms, use either the **partition flash 1** or **no partition flash** command. If there are files in a partition other than the first, you must use the **erase** *flash-filesystem:partition-number* command to erase the partition before reverting to a single partition.

When creating two partitions, you must not truncate a file or cause a file to spill over into the second partition.

Examples

The following example creates two partitions of 4 MB each in Flash memory:

```
Router(config)# partition flash 2 4 4
```

The following example divides the Flash memory card in slot 0 into two partitions, each 8 MB in size on a Cisco 3600 series router:

```
Router(config)# partition slot0: 2 8 8
```

The following example creates four partitions of equal size in the card on a Cisco 1600 series router:

```
Router(config)# partition flash: 4
```

path (archive configuration)

To specify the location and filename prefix for the files in the Cisco IOS configuration archive, use the **path** command in archive configuration mode. To disable this function, use the **no** form of this command.

path *url*

no path *url*

Syntax Description

url	URL (accessible by the Cisco IOS file system) used for saving archive files of the running configuration file in the Cisco IOS configuration archive.

Command Default

If this command is not configured, no location or filename prefix is specified for files in the Cisco IOS configuration archive.

Command Modes

Archive configuration (config-archive)

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was implemented on the Cisco 10000 series.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Usage Guidelines

When this command is entered, an archive file of the running configuration is saved when the **archive config**, **write-memory**, or **copy running-config startup-config** command is entered.

URLs are commonly used to specify files or location on the World Wide Web. On Cisco routers, URLs can be used to specify the location of a file or directory on a router or a remote file server. The **path** command uses a URL to specify the location and filename prefix for the Cisco IOS configuration archive.

The locations or file systems that you can specify in the *url* argument are as follows:

- If your platform has disk0—disk0:, disk1:, ftp:, pram:, rcp:, slavedisk0:, slavedisk1:, or tftp:
- If your platform does not have disk0—ftp:, http:, pram:, rcp:, or tftp:

The colon is required in the location format.

The filename of the first archive file is the filename specified in the *url* argument followed by -1. The filename of the second archive file is the filename specified in the *url* argument followed by -2 and so on.

Because some file systems are incapable of storing the date and time that a file was written, the filename of the archive file can contain the date, time, and router hostname. To include the router hostname in the archive file filename, enter the characters $h (for example, disk0:$h). To include the date and time in the archive file filename, enter the characters $t.

When a configuration archive operation is attempted on a local file system, the file system is tested to determine if it is writable and if it has sufficient space to save an archive file. If the file system is read-only or if there is not enough space to save an archive file, an error message is displayed.

If you specify the tftp: file server as the location with the **path** command, you need to create the configuration file on the TFTP file server and change the file's privileges before the **archive config** command works properly.

Examples

The following example of the **path** command shows how to specify the hostname, date, and time as the filename prefix for which to save archive files of the running configuration. In this example, the **time-period** command is also configured to automatically save an archive file of the running configuration every 20 minutes.

```
configure terminal
!
archive
 path disk0:$h$t
 time-period 20
 end
```

The following is sample output from the **show archive** command illustrating the format of the resulting configuration archive filenames.

```
Router# show archive

There are currently 3 archive configurations saved.
The next archive file will be named routerJan-16-01:12:23.019-4
Archive #  Name
   0
   1       disk0:routerJan-16-00:12:23.019-1
   2       disk0:routerJan-16-00:32:23.019-2
   3       disk0:routerJan-16-00:52:23.019-3 <- Most Recent
   4
   5
   6
   7
   8
   9
   10
   11
   12
   13
   14
```

Cisco IOS Configuration Archive on the TFTP File Server

The following example shows how to use the **path** command to specify the TFTP file server, address 10.48.71.226, as the archive configuration location and router-cfg as the configuration filename. First you create the configuration file on the TFTP server and change the file's privileges, then you can save the configuration file to the configuration archive.

The following example shows the commands to use to create the file and change the file's privileges on the TFTP server (UNIX commands):

```
> touch router-cfg-1
```

```
> chmod 777 router-cfg-1
```

The following example show how to create the configuration archive, save the running configuration to the archive, and display the files in the archive:

```
configure terminal
!
archive
 path tftp://10.48.71.226/router-cfg
 exit
exit
!
archive config

Router# show archive

The next archive file will be named tftp://10.48.71.226/router-cfg-2
 Archive #  Name
   0
   1       tftp://10.48.71.226/router-cfg-1 <- Most Recent
   2
   3
   4
   5
   6
   7
   8
   9
   10
   11
   12
   13
   14
```

The following is sample output from the **show archive** command if you did not create the configuration file on the TFTP server before attempting to archive the current running configuration file:

```
configure terminal
!
archive
 path tftp://10.48.71.226/router-cfg
 exit
exit

archive config

Router# show archive

The next archive file will be named tftp://10.48.71.226/router-cfg-1
 Archive #  Name
   0
   1
   2
   3
   4
   5
   6
   7
   8
   9
   10
   11
   12
```

```
13
14
```

Related Commands

Command	Description
archive	Enters archive configuration mode.
archive config	Saves a copy of the current running configuration to the Cisco IOS configuration archive.
configure confirm	Confirms replacement of the current running configuration with a saved Cisco IOS configuration file.
configure replace	Replaces the current running configuration with a saved Cisco IOS configuration file.
maximum	Sets the maximum number of archive files of the running configuration to be saved in the Cisco IOS configuration archive.
show archive	Displays information about the files saved in the Cisco IOS configuration archive.
time-period	Sets the time increment for automatically saving an archive file of the current running configuration in the Cisco IOS configuration archive.

periodic

To specify a recurring (weekly) time range for functions that support the time-range feature, use the **periodic** command in time-range configuration mode. To remove the time limitation, use the **no** form of this command.

periodic *days-of-the-week hh:mm* **to** [*days-of-the-week*] *hh:mm*

no periodic *days-of-the-week hh:mm* **to** [*days-of-the-week*] *hh:mm*

Syntax Description

days-of-the-week	The first occurrence of this argument is the starting day or day of the week that the associated time range is in effect. The second occurrence is the ending day or day of the week the associated statement is in effect. This argument can be any single day or combinations of days: **Monday**, **Tuesday**, **Wednesday**, **Thursday**, **Friday**, **Saturday**, and **Sunday**. Other possible values are: • **daily**—Monday through Sunday • **weekdays**—Monday through Friday • **weekend**—Saturday and Sunday If the ending days of the week are the same as the starting days of the week, they can be omitted.
hh:mm	The first occurrence of this argument is the starting hours:minutes that the associated time range is in effect. The second occurrence is the ending hours:minutes the associated statement is in effect. The hours:minutes are expressed in a 24-hour clock. For example, 8:00 is 8:00 a.m. and 20:00 is 8:00 p.m.
to	Entry of the **to** keyword is required to complete the range "from start-time to end-time."

Defaults

No recurring time range is defined.

Command Modes

Time-range configuration (config-time-range)

Command History

Release	Modification
12.0(1)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

For Cisco IOS Release 12.2(11)T, IP and Internetwork Packet Exchange (IPX) extended access lists are the only functions that can use time ranges. For further information on using these functions, refer to the *Cisco IOS IP Configuration Guide* and the *Cisco IOS AppleTalk and Novell IPX Configuration Guide*.

The **periodic** command is one way to specify when a time range is in effect. Another way is to specify an absolute time period with the **absolute** command. Use either of these commands after the **time-range** global configuration command, which specifies the name of the time range. Multiple **periodic** entries are allowed per **time-range** command.

If the end days-of-the-week value is the same as the start value, they can be omitted.

If a **time-range** command has both **absolute** and **periodic** values specified, then the **periodic** items are evaluated only after the **absolute start** time is reached, and are not further evaluated after the **absolute end** time is reached.

Note All time specifications are taken as local time. To ensure that the time range entries take effect at the desired times, you should synchronize the system software clock using Network Time Protocol (NTP).

Table 39 lists some typical settings for your convenience:

Table 39 Typical Examples of periodic Command Syntax

If you want:	Configure this:
Monday through Friday, 8:00 a.m. to 6:00 p.m. only	**periodic weekday 8:00 to 18:00**
Every day of the week, from 8:00 a.m. to 6:00 p.m. only	**periodic daily 8:00 to 18:00**
Every minute from Monday 8:00 a.m. to Friday 8:00 p.m.	**periodic monday 8:00 to friday 20:00**
All weekend, from Saturday morning through Sunday night	**periodic weekend 00:00 to 23:59**
Saturdays and Sundays, from noon to midnight	**periodic weekend 12:00 to 23:59**

Examples

The following example configuration denies HTTP traffic on Monday through Friday from 8:00 a.m. to 6:00 p.m.:

```
Router# show startup-config
.
.
.
time-range no-http
 periodic weekdays 8:00 to 18:00
!
ip access-list extended strict
 deny tcp any any eq http time-range no-http
!
interface ethernet 0
 ip access-group strict in
.
.
.
```

The following example configuration permits Telnet traffic on Mondays, Tuesdays, and Fridays from 9:00 a.m. to 5:00 p.m.:

```
Router# show startup-config
.
.
.
```

```
time-range testing
 periodic Monday Tuesday Friday 9:00 to 17:00
!
ip access-list extended legal
 permit tcp any any eq telnet time-range testing
!
interface ethernet 0
 ip access-group legal in
.
.
.
```

Related Commands

Command	Description
absolute	Specifies an absolute start and end time for a time range.
access-list (extended)	Defines an extended IP access list.
deny (IP)	Sets conditions under which a packet does not pass a named IP access list.
permit (IP)	Sets conditions under which a packet passes a named IP access list.
time-range	Enables time-range configuration mode and names a time range definition.

ping

To diagnose basic network connectivity on AppleTalk, ATM, Connectionless Network Service (CLNS), DECnet, IP, Novell IPX, or source-route bridging (SRB) networks, use the **ping** command in user EXEC or privileged EXEC mode.

ping [[*protocol* [**tag**] {*host-name* | *system-address*}]

Syntax Description

protocol	(Optional) Protocol keyword, either **appletalk**, **atm**, **clns**, **decnet**, **ipx**, or **srb**. If a protocol is not specified, a basic ping will be sent using IP (IPv4). For extended options for ping over IP, see the documentation for the **ping ip** command. The **ping atm interface atm**, **ping ip**, **ping ipv6**, **ping sna**, and **ping vrf** commands are documented separately.
tag	(Optional) Specifies a tag encapsulated IP (tagIP) ping.
host-name	Hostname of the system to ping. If a *host-name* or *system-address* is not specified at the command line, it will be required in the **ping** system dialog.
system-address	Address of the system to ping. If a *host-name* or *system-address* is not specified at the command line, it will be required in the **ping** system dialog.

Command Default

This command has no default values.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
12.0(7)T	The **ping sna** command was introduced.
12.1(12c)E	The **ping vrf** command was introduced.
12.2(2)T	Support for the IPv6 protocol was added.
12.2(13)T	The **atm** protocol keyword was added. The following keywords were removed because the Apollo Domain, Banyan VINES, and XNS protocols are no longer supported in Cisco IOS software: • **apollo** • **vines** • **xns**
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

The **ping** command sends an echo request packet to an address then waits for a reply. Ping output can help you evaluate path-to-host reliability, delays over the path, and whether the host can be reached or is functioning. For example, the **ping clns** command sends International Organization for Standardization (ISO) CLNS echo packets to test the reachability of a remote router over a connectionless Open System Interconnection (OSI) network.

If you enter the **ping** command without any keywords or argument values, an interactive system dialog prompts you for the additional syntax appropriate to the protocol you specify. (See the "Examples" section.)

To exit the interactive ping dialog before responding to all the prompts, type the escape sequence. The default escape sequence is **Ctrl**-^, **X** (Simultaneously press and release the **Ctrl**, **Shift**, and **6** keys and then press the **X** key). The escape sequence will vary depending on your line configuration. For example, another commonly used escape sequence is **Ctrl**-**c**.

Table 40 describes the test characters sent by the **ping** facility.

Table 40 ping Test Characters

Character	Description
!	Each exclamation point indicates receipt of a reply.
.	Each period indicates that the network server timed out while waiting for a reply.
U	A destination unreachable error protocol data unit (PDU) was received.
C	A congestion experienced packet was received.
I	User interrupted test.
M	A destination unreachable error protocol data unit (PDU) was received (Type 3) MTU required but DF bit set (code 4) with the "Next-Hop MTU" set to a non-zero value. If the "Next-hop MTU" is zero then 'U' is printed.
?	Unknown packet type.
&	Packet lifetime exceeded.

Note Not all protocols require hosts to support pings. For some protocols, the pings are Cisco defined and can be answered only by another Cisco router.

The availability of protocol keywords depends on what protocols are enabled on your system.

Issuing the **ping** command in user EXEC mode will generally offer fewer syntax options than issuing the **ping** command in privileged EXEC mode.

Examples

After you enter the **ping** command in privileged EXEC mode, the system prompts you for a protocol keyword. The default protocol is IP.

If you enter a hostname or address on the same line as the **ping** command, the default action is taken as appropriate for the protocol type of that name or address.

The following example is sample dialog from the **ping** command using default values. The specific dialog varies somewhat from protocol to protocol.

```
Router# ping

Protocol [ip]:
```

```
Target IP address: 192.168.7.27

Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.7.27, timeout is 2 seconds:
!!!!!
Success rate is 100 percent, round-trip min/avg/max = 1/2/4 ms
```

Table 41 describes the significant fields shown in the display.

Table 41 ping Field Descriptions for IP

Field	Description
Protocol [ip]:	Prompt for a supported protocol. Default: **ip**.
Target IP address:	Prompt for the IP address or hostname of the destination node you plan to ping. If you have specified a supported protocol other than IP, enter an appropriate address for that protocol here. Default: none.
Repeat count [5]:	Number of ping packets that will be sent to the destination address. Default: 5.
Datagram size [100]:	Size of the ping packet (in bytes). Default: 100 bytes.
Timeout in seconds [2]:	Timeout interval. Default: 2 (seconds).
Extended commands [n]:	Specifies whether a series of additional commands appears.
Sweep range of sizes [n]:	Allows you to vary the sizes of the echo packets being sent. This capability is useful for determining the minimum sizes of the maximum transmission units (MTUs) configured on the nodes along the path to the destination address. Packet fragmentation contributing to performance problems can then be reduced.
!!!!!	Each exclamation point (!) indicates receipt of a reply. A period (.) indicates that the network server timed out while waiting for a reply. Other characters may appear in the ping output display, depending on the protocol type.
Success rate is 100 percent	Percentage of packets successfully echoed back to the router. Anything less than 80 percent is usually considered problematic.
round-trip min/avg/max = 1/2/4 ms	Round-trip travel time intervals for the protocol echo packets, including minimum/average/maximum (in milliseconds).

The following example verifies connectivity to the neighboring ATM device for the ATM permanent virtual circuit (PVC) with the virtual path identifier (VPI)/virtual channel identifier (VCI) value 0/16:

```
Router# ping

Protocol [ip]:atm
```

```
ATM Interface:atm1/0
VPI value [0]:
VCI value [1]:16
Loopback - End(0), Segment(1) [0]:1
Repeat Count [5]:
Timeout [2]:
Type escape sequence to abort.
Sending 5, 53-byte segment OAM echoes, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
```

Table 42 describes the default **ping** fields shown in the display.

Table 42 ping Field Descriptions for ATM

Field	Description
Protocol [ip]:	Prompt for a supported protocol. Default: **ip**.
ATM Interface:	Prompt for the ATM interface.
VPI value [0]:	Prompt for the virtual path identifier. Default: 0.
VCI value [1]:	Prompt for the virtual channel identifier. Default:1.
Loopback - End(0), Segment(1) [0]:	Prompt to specify end loopback, which verifies end-to-end PVC integrity, or segment loopback, which verifies PVC integrity to the neighboring ATM device. Default: segment loopback.
Repeat Count [5]:	Number of ping packets that will be sent to the destination address. Default: 5.
Timeout [2]:	Timeout interval. Default: 2 (seconds).
!!!!!	Each exclamation point (!) indicates receipt of a reply. A period (.) indicates that the network server timed out while waiting for a reply. Other characters may appear in the ping output display, depending on the protocol type.
Success rate is 100 percent	Percentage of packets successfully echoed back to the router. Anything less than 80 percent is usually considered problematic.
round-trip min/avg/max = 1/1/1 ms	Round-trip travel time intervals for the protocol echo packets, including minimum/average/maximum (in milliseconds).

Related Commands

Command	Description
ping atm interface atm	Tests the connectivity of a specific PVC.
ping ip	Tests network connectivity on IP networks.
ping ipv6	Tests the connection to a remote host on the network using IPv6.
ping sna	Tests network integrity and timing characteristics over an SNA Switching network.
ping vrf	Tests the connection in the context of a specific VPN (VRF).

ping (privileged)

To diagnose basic network connectivity on Apollo, AppleTalk, Connectionless Network Service (CLNS), DECnet, IP, Novell IPX, VINES, or XNS networks, use the **ping** command in privileged EXEC command mode.

ping [*hostname* | *system-address* | [*protocol* | **tag**] {*hostname* | *system-address*}] [**data** [*hex-data-pattern*] | **df-bit** | **repeat** [*repeat-count*] | **size** [*datagram-size*] | **source** [*source-address* | **async** | **bvi** | **ctunnel** | **dialer** | **ethernet** | **fastethernet** | **lex** | **loopback** | **multilink** | **null** | **port-channel** | **tunnel** | **vif** | **virtual-template** | **virtual-tokenring** | **xtagatm**] | **timeout** [*seconds*] | **validate**]

Syntax Description

hostname	(Optional) Hostname of the system to ping.
system-address	(Optional) Address of the system to ping.
protocol	(Optional) Protocol to use for the ping. Valid values are: **apollo**, **appletalk**, **clns**, **decnet**, **ethernet**, **ip**, **ipv6**, **ipx**, **srb**, **vines**, **xns**.
tag	(Optional) Specifies a tag encapsulated IP ping.
data	(Optional) Specifies the data pattern.
hex-data-pattern	(Optional) Hexidecimal value of the data in the range of 0 to FFFF.
df-bit	(Optional) Enables the “do not fragment” bit in the IP header.
repeat	(Optional) Specifies the number of times the ping should be sent.
repeat-count	(Optional) Integer in the range of 1 to 2147483647. The default is 5.
size	(Optional) Size, in bytes, of the ping datagram.
datagram-size	(Optional) Integer in the range of 40 to 18024.
source	(Optional) Device sending the ping
source-address	(Optional) Address or name of the device sending the ping.
async	(Optional) Asynchronous interface.
bvi	(Optional) Bridge-Group Virtual interface.
ctunnel	(Optional) CTunnel interface.
dialer	(Optional) Dialer interface.
ethernet	(Optional) Ethernet IEEE 802.3 interface.
fastethernet	(Optional) FastEthernet IEEE 802.3 interface.
lex	(Optional) Lex interface.
loopback	(Optional) Loopback interface.
multilink	(Optional) Multilink-group interface.
null	(Optional) Null interface.
port-channel	(Optional) Ethernet channel of interfaces.
tunnel	(Optional) Tunnel interface
vif	(Optional) Pragmatic General Multicast (PGM) host interface
virtual-template	(Optional) Virtual Template interface.
virtual-tokenring	(Optional) Virtual TokenRing.
xtagatm	(Optional) Extended Tag ATM interface.
timeout	(Optional) Specifies the timeout interval in seconds.

seconds	(Optional) Integer in the range of 0 to 3600. The default is 2.
validate	(Optional) Validates the reply data.

Command Default

A ping operation is not performed.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.0	The following keywords were added in Cisco IOS Release 12.0: **data**, **df-bit**, **repeat**, **size**, **source**, **timeout**, **validate**.
12.2(33)SRA	The **ethernet** option for *protocol* was added in Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **ping** (packet internet groper) command tests the reachability of a remote router over a connectionless Open System Interconnection (OSI) network. The command sends ISO CLNS echo packets to an address and waits for a reply. Ping output can help you evaluate path-to-host reliability, delays over the path, and whether the host can be reached or is functioning.

When you type the **ping** command, you are prompted to enter options before the **ping** command executes. The characters in brackets ([]) indicate default values. When you want to use a default value, press Enter on your keyboard.

If you enter a hostname or system address when you enter the **ping** command, the default action is taken for the protocol type of that hostname or system address.

The optional **data**, **df-bit**, **repeat**, **size**, **source**, **timeout**, and **validate** keywords can be used to prevent extended **ping** command output. You can use as many of these keywords as you need, and you can use them in any order after the *hostname* or *system-address* arguments.

When you enter the **ethernet** protocol option, you will be prompted to enter MAC address and maintenance domain in addition to the information common across protocols.

To terminate a ping session before it completes, type the escape sequence (Ctrl-^ X) by simultaneously pressing and releasing the Ctrl, Shift, and 6 keys and then pressing the X key.

Note Not all protocols require hosts to support pings. For some protocols, the pings are defined by Cisco and answered only by a Cisco router.

Table 43 describes the test characters that the ping operation uses.

Table 43 ping Command Response Characters and Their Meanings

Character	Description
!	Receipt of a reply.
.	Network server timed out while waiting for a reply.

Table 43 ping Command Response Characters and Their Meanings (continued)

Character	Description
U	Destination unreachable error protocol data unit (PDU) was received.
C	Congestion experienced packet was received.
I	User interrupted test.
?	Unknown packet type.
&	Packet lifetime exceeded.

Examples

The following example shows a **ping** command and output. The precise dialog varies from protocol to protocol, but all are similar to the ping session shown here using default values.

```
Router# ping
Protocol [ip]:
Target IP address: 192.168.7.27
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.7.27, timeout is 2 seconds:
!!!!
Success rate is 100 percent, round-trip min/avg/max = 1/2/4 ms
```

The following example shows how to send a ping specifying the **ethernet** protocol option, MAC address, and maintenance domain and using the default values for the remaining parameters:

```
Router# ping
Protocol [ip]: ethernet
Mac Address : aabb.cc00.0410
Maintenance Domain : DOMAIN_PROVIDER_L5_1 VLAN [0]: 2 Source MPID [1522]:
Repeat Count [5]:
Datagram Size [107]:
Timeout in seconds [2]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5 Ethernet CFM loopback messages, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/8 ms.
```

Related Commands

Command	Description
ping ethernet	Sends Ethernet CFM loopback messages to a destination MAC address.
ping (user)	Tests the connection to a remote host on the network.
ping vrf	Tests the connection to a remote device in a VPN.

ping ip

To test network connectivity on IP networks, use the **ping ip** command in privileged EXEC mode.

ping ip {*host-name* | *ip-address*} [**data** [*hex-data-pattern*] | **df-bit** | **repeat** [*repeat-count*] | **size** [*datagram-size*] [**source** {*source-address* | *source-interface*}] [**timeout** *seconds*] [**validate**] [**verbose**]

Syntax Description

host-name	Host name of the system to ping.
system-address	Address of the system to ping.
data *hex-data-pattern*	(Optional) Specifies the data pattern. Range is from 0 to FFFF.
df-bit	(Optional) Enables the "do-not-fragment" bit in the IP header.
repeat *repeat-count*	(Optional) Specifies the number of pings sent. The range is from 1 to 2147483647. The default is 5.
size	(Optional) Specifies the datagram size. Datagram size is the number of bytes in each ping.
datagram-size	(Optional) Range is from 40 to 18024.
source	(Optional) Specifies the source address or source interface.
source-address	(Optional) IP address to use as the source in the ping packets.
source-interface	(Optional) Name of the interface from which the ping should be sent, and the Interface ID (slot/port/number). Interface name keywords include the following: • **async** (Asynchronous Interface) • **bvi** (Bridge-Group Virtual Interface) • **ctunnel** • **dialer** • **ethernet** • **fastEthernet** • **lex** • **loopback** • **multilink** (Multilink-group interface) • **null** • **port-channel** (Ethernet channel of interfaces) • **tunnel** • **vif** (PGM Multicast Host interface) • **virtual-template** • **virtual-tokenring** • **xtagatm** (Extended Tag ATM interface) The availability of these keywords depends on your system hardware.
timeout *seconds*	(Optional) Specifies the timeout interval in seconds. The default is 2 seconds. Range is from 0 to 3600.

validate	(Optional) Validates the reply data.
verbose	(Optional) Enables verbose output, which lists individual ICMP packets, as well as Echo Responses.

Command Modes

Privileged Exec

Command History

Release	Modification
10.0	This command was introduced.
12.0	The **data**, **df-bit**, **repeat**, **size**, **source**, **timeout**, and **validate** keywords were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **ping** command sends an echo request packet to an address, then awaits a reply. Ping output can help you evaluate path-to-host reliability, delays over the path, and whether the host can be reached or is functioning.

To abnormally terminate a ping session, type the escape sequence—by default, **Ctrl-^ X**. You type the default by simultaneously pressing and releasing the **Ctrl**, **Shift**, and **6** keys, and then pressing the **X** key.

Table 44 describes the test characters that the ping facility sends.

Table 44 ping Test Characters

Character	Description
!	Each exclamation point indicates receipt of a reply.
.	Each period indicates that the network server timed out while waiting for a reply.
U	A destination unreachable error protocol data unit (PDU) was received.
C	A congestion experienced packet was received.
I	User interrupted test.
?	Unknown packet type.
&	Packet lifetime exceeded.

Note Not all protocols require hosts to support pings. For some protocols, the pings are Cisco-defined and are only answered by another Cisco router.

Examples

After you enter the **ping** command in privileged mode, the system prompts you for a protocol keyword**.** The default protocol is IP.

If you enter a host name or address on the same line as the **ping** command, the default action is taken as appropriate for the protocol type of that name or address.

The optional **data**, **df-bit**, **repeat**, **size**, **source**, **timeout**, and **validate** keywords can be used to avoid extended **ping** command output. You can use as many of these keywords as you need, and you can use them in any order after the *host-name* or *system-address* arguments.

Although the precise dialog varies somewhat from protocol to protocol, all are similar to the ping session using default values shown in the following output:

```
Router# ping

Protocol [ip]:
Target IP address: 192.168.7.27
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.7.27, timeout is 2 seconds:
!!!!!
Success rate is 100 percent, round-trip min/avg/max = 1/2/4 ms
```

Table 45 describes the default **ping** fields shown in the display.

Table 45 ping Field Descriptions

Field	Description
Protocol [ip]:	Prompts for a supported protocol. The default is IP.
Target IP address:	Prompts for the IP address or host name of the destination node you plan to ping. If you have specified a supported protocol other than IP, enter an appropriate address for that protocol here. The default is none.
Repeat count [5]:	Prompts for the number of ping packets that will be sent to the destination address. The default is 5 packets.
Datagram size [100]:	Prompts for the size of the ping packet (in bytes). The default is 100 bytes.
Timeout in seconds [2]:	Prompts for the timeout interval. The default is 2 seconds.
Extended commands [n]:	Specifies whether a series of additional commands appears.
Sweep range of sizes [n]:	Allows you to vary the sizes of the echo packets being sent. This capability is useful for determining the minimum sizes of the MTUs configured on the nodes along the path to the destination address. Packet fragmentation contributing to performance problems can then be reduced.
!!!!!	Each exclamation point (!) indicates receipt of a reply. A period (.) indicates that the network server timed out while waiting for a reply. Other characters may appear in the ping output display, depending on the protocol type.
Success rate is 100 percent	Indicates the percentage of packets successfully echoed back to the router. Anything less than 80 percent is usually considered problematic.
round-trip min/avg/max = 1/2/4 ms	Indicates the round-trip travel time intervals for the protocol echo packets, including minimum/average/maximum (in milliseconds).

Related Commands

Command	Description
ping ipv6	Tests the connection to a remote host on the network using IPv6.
ping vrf	Tests the connection in the context of a specific VPN (VRF).

ping vrf

To test a connection in the context of a specific VPN connection, use the **ping vrf** command in user EXEC or privileged EXEC mode.

ping vrf *vrf-name* [**tag**] [*connection*] *target-address* [*connection-options*]

Syntax Description

vrf-name	The name of the VPN (VRF context).
tag	(Optional) Specifies a tag encapsulated IP (tagIP) ping.
connection	(Optional) Connection options include **atm**, **clns**, **decnet**, **ip**, **ipv6**, **ipx**, **sna**, or **srb**. The default is **ip**.
target-address	The destination ID for the ping operation. Usually, this is the IPv4 address of the host. For example, the target for an IPv4 ping in a VRF context would be the IPv4 address or domain name of the target host. The target for an IPv6 ping in a VRF context would be the IPv6 prefix or domain name of the target host. • If the target address is not specified, the CLI will enter the interactive dialog for ping.
connection-options	(Optional) Each connection type may have its own set of connection options. For example, connection options for IPv4 include **source**, **df-bit**, and **timeout**. See the appropriate **ping** command documentation for details.

Command Default

The default connection type for ping is IPv4.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.1(12c)E, 12.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

A VPN routing/forwarding (VRF) instance is used to identify a VPN. To check if a configured VRF is working, you can use the **ping vrf** command.

When attempting to ping from a provider edge (PE) router to a customer edge (CE) router, or from a PE router to PE router, the standard **ping** command will not usually work. The **ping vrf** command allows you to ping the IP addresses of LAN interfaces on CE routers.

If you are on a PE router, be sure to indicate the specific VRF (VPN) name, as shown in the “Examples” section.

If all required information is not provided at the command line, the system will enter the interactive dialog (extended mode) for ping.

Examples

In the following example, the target host in the domain 209.165.201.1 is pinged (using IP/ICMP) in the context of the "Customer_A" VPN connection.

```
Router# ping vrf Customer_A 209.165.201.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.201.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 176/264/576 ms
```

Pressing the Enter key before providing all of the required options will begin the interactive dialog for ping. In the following example, the interactive dialog is started after the "ip" protocol is specified, but no address is given:

```
Router# ping vrf Customer_B ip

Target IP address: 209.165.200.225
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]: y
Source address or interface:
Type of service [0]:
Set DF bit in IP header? [no]:
Validate reply data? [no]:
Data pattern [0xABCD]:
Loose, Strict, Record, Timestamp, Verbose[none]: Record
Number of hops [ 9 ]:
Loose, Strict, Record, Timestamp, Verbose[RV]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.165.200.225, timeout is 2 seconds:
Packet has IP options:  Total option bytes= 39, padded length=40
 Record route: <*>
   (0.0.0.0)
   (0.0.0.0)
   (0.0.0.0)
   (0.0.0.0)
   (0.0.0.0)
   (0.0.0.0)
   (0.0.0.0)
   (0.0.0.0)
   (0.0.0.0)
 .
 .
 .
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
```

The following example shows the various options for IP in the **ping vrf** command:

```
Router# show parser dump exec | include ping vrf

1 ping vrf <string>
1 ping vrf <string> ip <string>
1 ping vrf <string> ip (interactive)
1 ping vrf <string> ip <string>
1 ping vrf <string> ip <string> source <address>
1 ping vrf <string> ip <string> source <interface>
1 ping vrf <string> ip <string> repeat <1-2147483647>
1 ping vrf <string> ip <string> size Number
1 ping vrf <string> ip <string> df-bit
1 ping vrf <string> ip <string> validate
1 ping vrf <string> ip <string> data <0-65535>
1 ping vrf <string> ip <string> timeout <0-3600>
```

```
1 ping vrf <string> ip <string> verbose
1 ping vrf <string> ip <string> data <0-65535>
1 ping vrf <string> ip <string> timeout <0-3600>
1 ping vrf <string> tag
1 ping vrf <string> atm
1 ping vrf <string> ipv6
1 ping vrf <string> appletalk
1 ping vrf <string> decnet
1 ping vrf <string> clns
1 ping vrf <string> ipx
1 ping vrf <string> sna
1 ping vrf <string> srb
```

Related Commands

Command	Description
ping	Diagnoses basic network connectivity to a specific host.
ping atm interface atm	Tests the connectivity of a specific PVC.
ping ip	Tests the connection to a remote host on the network using IPv4.
ping ipv6	Tests the connection to a remote host on the network using IPv6.
ping sna	Tests network integrity and timing characteristics over an SNA Switching network.

platform shell

To grant shell access and enter shell access grant configuration mode, use the **platform shell** command in global configuration mode. To disable this function, use the **no** form of this command.

platform shell

no platform shell

Syntax Description

This command has no arguments or keywords.

Command Default

This command is disabled.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(33)XNC	This command was introduced.

Usage Guidelines

This command should be entered before using the **request platform software system shell** command.

Examples

The following example shows how to grant shell access:

```
Router(config)# platform shell
Router(config)#
```

Related Commands

Command	Description
request platform software system shell	Requests platform shelll access.

power enable

To turn on power for the modules, use the **power enable** command in global configuration mode. To power down a module, use the **no** form of this command.

power enable module *slot*

no power enable module *slot*

Syntax Description

module *slot*	Specifies a module slot number; see the "Usage Guidelines" section for valid values.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(18)SXD	This command was changed to allow you to disable power to empty slots.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

When you enter the **no power enable module** *slot* command to power down a module, the module's configuration is not saved.

When you enter the **no power enable module** *slot* command to power down an empty slot, the configuration is saved.

The *slot* argument designates the module number. Valid values for *slot* depend on the chassis that is used. For example, if you have a 13-slot chassis, valid values for the module number are from 1 to 13.

Examples

This example shows how to turn on the power for a module that was previously powered down:

```
Router(config)# power enable module 5
Router(config)#
```

This example shows how to power down a module:

```
Router(config)# no power enable module 5
Router(config)#
```

Related Commands

Command	Description
show power	Displays information about the power status.

power redundancy-mode

To set the power-supply redundancy mode, use the **power redundancy-mode** command in global configuration mode.

power redundancy-mode {**combined** | **redundant**}

Syntax Description

combined	Specifies no redundancy (combine power-supply outputs).
redundant	Specifies redundancy (either power supply can operate the system).

Defaults

redundant

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to set the power supplies to the no-redundancy mode:

```
Router(config)# power redundancy-mode combined
Router(config)#
```

This example shows how to set the power supplies to the redundancy mode:

```
Router(config)# power redundancy-mode redundant
Router(config)#
```

Related Commands

Command	Description
show power	Displays information about the power status.

printer

To configure a printer and assign a server tty line (or lines) to it, use the **printer** command in global configuration mode. To disable printing on a tty line, use the **no** form of this command.

printer *printer-name* {**line** *number* | **rotary** *number*} [**newline-convert** | **formfeed**]

no printer

Syntax Description

printer-name	Printer name.
line *number*	Assigns a tty line to the printer.
rotary *number*	Assigns a rotary group of tty lines to the printer.
newline-convert	(Optional) Converts newline (linefeed) characters to a two-character sequence “carriage-return, linefeed” (CR+LF).
formfeed	(Optional) Causes the Cisco IOS software to send a form-feed character (ASCII 0x0C) to the printer tty line immediately following each print job received from the network.

Defaults

No printers are defined by default.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command enables you to configure a printer for operations and assign either a single tty line or a group of tty lines to it. To make multiple printers available through the same printer name, specify the number of a rotary group.

In addition to configuring the printer with the **printer** command, you must modify the file /etc/printcap on your UNIX system to include the definition of the remote printer in the Cisco IOS software. Refer to the *Cisco IOS Configuration Fundamentals Configuration Guide* for additional information.

Use the optional **newline-convert** keyword in UNIX environments that cannot handle single-character line terminators. This converts newline characters to a carriage-return, linefeed sequence. Use the **formfeed** keyword when using the line printer daemon (lpd) protocol to print and your system is unable to separate individual output jobs with a form feed (page eject). You can enter the **newline-convert** and **formfeed** keywords together and in any order.

Examples

In the following example a printer named printer1 is configured and output is assigned to tty line 4:

```
Router(config)# printer printer1 line 4
```

Related Commands

Command	Description
clear line	Returns a terminal line to idle state.

private

To save user EXEC command changes between terminal sessions, use the **private** command in line configuration mode. To restore the default condition, use the **no** form of this command.

private

no private

Syntax Description

This command has no arguments or keywords.

Defaults

User-set configuration options are cleared with the **exit** EXEC command or when the interval set with the **exec-timeout** line configuration command has passed.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command ensures that the terminal parameters set by the user remain in effect between terminal sessions. This behavior is desirable for terminals in private offices.

Examples

In the following example, line 15 (in this example, vty 1) is configured to keep all user-supplied settings at system restarts:

```
Router(config)# line 15
Router(config-line)# private
```

Related Commands

Command	Description
exec-timeout	Sets the interval that the EXEC command interpreter waits until user input is detected.
exit	Exits any configuration mode, or closes an active terminal session and terminates the EXEC.

privilege

To configure a new privilege level for users and associate commands with that privilege level, use the **privilege** command in global configuration mode. To reset the privilege level of the specified command or commands to the default and remove the privilege level configuration from the running configuration file, use the **no** form of this command.

Note As of Cisco IOS Releases 12.3(6) and 12.3(6)T, the **no** form of the **privilege** command and the **reset** keyword perform the same functions.

privilege *mode* [**all**] {**level** *level* | **reset**} *command-string*

no privilege *mode* [**all**] {**level** *level* | **reset**} *command-string*

Syntax Description

mode	Configuration mode for the specified command. See Table 46 in the "Usage Guidelines" section for a list of options for this argument.
all	(Optional) Changes the privilege level for all the suboptions to the same level.
level *level*	Specifies the privilege level you are configuring for the specified command or commands. The level argument must be a number from 0 to 15.
reset	Resets the privilege level of the specified command or commands to the default and removes the privilege level configuration from the running configuration file. **Note** For Cisco IOS software releases earlier than Release 12.3(6) and Release 12.3(6)T, you use the **no** form of this command to reset the privilege level to the default. The default form of this command will still appear in the configuration file. To completely remove a privilege configuration, use the **reset** keyword.
command-string	Command associated with the specified privilege level. If the **all** keyword is used, specifies the command and subcommands associated with the privilege level.

Defaults

User EXEC mode commands are privilege level 1.

Privileged EXEC mode and configuration mode commands are privilege level 15.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.0(22)S, 12.2(13)T	The **all** keyword was added.
12.3(6), 12.3(6)T	The **no** form of the command performs the same function as the **reset** keyword.
12.2(33)SRA	This command was integrated into Cisco IOS release 12.(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.2(33)SRE	This command was integrated into Cisco IOS release 12.(33)SRE.

Usage Guidelines

The password for a privilege level defined using the **privilege** global configuration command is configured using the **enable secret** command.

Level 0 can be used to specify a more-limited subset of commands for specific users or lines. For example, you can allow user “guest” to use only the **show users** and **exit** commands.

Note There are five commands associated with privilege level 0: **disable**, **enable**, **exit**, **help**, and **logout**. If you configure AAA authorization for a privilege level greater than 0, these five commands will not be included.

When you set the privilege level for a command with multiple words, note that the commands starting with the first word will also have the specified access level. For example, if you set the **show ip route** command to level 15, the **show** commands and **show ip** commands are automatically set to privilege level 15—unless you set them individually to different levels. This is necessary because you can’t execute, for example, the **show ip** command unless you have access to **show** commands.

To change the privilege level of a group of commands, use the **all** keyword. When you set a group of commands to a privilege level using the **all** keyword, all commands which match the beginning string are enabled for that level, and all commands which are available in submodes of that command are enabled for that level. For example, if you set the **show ip** keywords to level 5, show and ip will be changed to level 5 and all the options that follow the **show ip** string (such as **show ip accounting**, **show ip aliases**, **show ip bgp**, and so on) will be available at privilege level 5.

Table 46 shows some of the keyword options for the mode argument in the **privilege** command. The available mode keywords will vary depending on your hardware and software version. To see a list of available mode options on your system, use the **privilege ?** command.

Table 46 mode Argument Options

Command	Description
accept-dialin	VPDN group accept dialin configuration mode
accept-dialout	VPDN group accept dialout configuration mode
address-family	Address Family configuration mode
alps-ascu	ALPS ASCU configuration mode
alps-circuit	ALPS circuit configuration mode
atm-bm-config	ATM bundle member configuration mode

Table 46 mode Argument Options (continued)

Command	Description
atm-bundle-config	ATM bundle configuration mode
atm-vc-config	ATM virtual circuit configuration mode
atmsig_e164_table_mode	ATMSIG E164 Table
cascustom	Channel-associated signalling (cas) custom configuration mode
config-rtr-http	RTR HTTP raw request Configuration
configure	Global configuration mode
controller	Controller configuration mode
crypto-map	Crypto map config mode
crypto-transform	Crypto transform config modeCrypto transform configuration mode
dhcp	DHCP pool configuration mode
dspfarm	DSP farm configuration mode
exec	Exec mode
flow-cache	Flow aggregation cache configuration mode
gateway	Gateway configuration mode
interface	Interface configuration mode
interface-dlci	Frame Relay DLCI configuration mode
ipenacl	IP named extended access-list configuration mode
ipsnacl	IP named simple access-list configuration mode
ip-vrf	Configure IP VRF parameters
lane	ATM Lan Emulation Lecs Configuration Table
line	Line configuration mode
map-class	Map class configuration mode
map-list	Map list configuration mode
mpoa-client	MPOA Client
mpoa-server	MPOA Server
null-interface	Null interface configuration mode
preaut	AAA Preauth definitions
request-dialin	VPDN group request dialin configuration mode
request-dialout	VPDN group request dialout configuration mode
route-map	Route map configuration mode
router	Router configuration mode
rsvp_policy_local	
rtr	RTR Entry Configuration
sg-radius	RADIUS server group definition
sg-tacacs+	TACACS+ server group

Table 46 mode Argument Options (continued)

Command	Description
sip-ua	SIP UA configuration mode
subscriber-policy	Subscriber policy configuration mode
tcl	Tcl mode
tdm-conn	TDM connection configuration mode
template	Template configuration mode
translation-rule	Translation Rule configuration mode
vc-class	VC class configuration mode
voiceclass	Voice Class configuration mode
voiceport	Voice configuration mode
voipdialpeer	Dial Peer configuration mode
vpdn-group	VPDN group configuration mode

Examples

The following example shows how to set the **configure** command to privilege level 14 and establish SecretPswd14 as the password users must enter to use level 14 commands:

```
privilege exec level 14 configure
enable secret level 14 SecretPswd14
```

The following example shows how to set the **show** and **ip** keywords to level 5. The suboptions coming under **ip** will also be allowed to users with privilege level 5 access:

```
Router(config)# privilege exec all level 5 show ip
```

The following two examples demonstate the difference in behavior between the **no** form of the command and the use of the **reset** keyword when using Cisco IOS software releases earlier than Releases 12.3(6) and Release 12.3(6)T.

Note As of Cisco IOS Releases 12.3(6) and 12.3(6)T, the **no** form of the **privilege** command and the **reset** keyword perform the same functions.

```
! show currently configured privilege commands
Router# show running-config | include priv
privilege configure all level 3 interface
privilege exec level 3 configure terminal
privilege exec level 3 configure

Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# no privilege exec level 3 configure terminal
Router(config)# end
! show currently configured privilege commands
Router# show running-config | include priv
privilege configure all level 3 interface
privilege exec level 15 configure terminal
privilege exec level 15 configure
```

Note that in the **show running-config** output above, the privilege command for "configure terminal" still appears, but now has the default privilege level assigned.

To remove a previously configured privilege command entirely from the configuration, use the **reset** keyword, as shown in the following example:

```
! show currently configured privilege commands
Router# show running-config | include priv
privilege configure all level 3 interface
privilege exec level 3 configure terminal
privilege exec level 3 configure

Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# privilege exec reset configure terminal
Router(config)#
Router# show running-config | include priv
privilege configure all level 3 interface
Router#
```

Related Commands

Command	Description
enable password	Sets a local password to control access to various privilege levels.
enable secret	Specifies an additional layer of security over the **enable password** command.
privilege level	Sets the default privilege level for a line.

process cpu statistics limit entry-percentage

To set the process entry limit and the size of the history table for CPU utilization statistics, use the **process cpu statistics limit entry-percentage** command in global configuration mode. To disable CPU utilization statistics, use the **no** form of this command.

process cpu statistics limit entry-percentage *number* [**size** *seconds*]

no process cpu statistics limit entry-percentage

Syntax Description

number	Integer from 1 to 100 that indicates the percentage of CPU utilization that a process must use to become part of the history table.
size *seconds*	(Optional) Changes the duration of time in seconds for which CPU statistics are stored in the history table. Valid values are 5 to 86400. The default is 600.

Command Default

size *seconds*: 600 seconds

Command Modes

Global configuration

Command History

Release	Modification
12.0(26)S	This command was introduced.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.

Usage Guidelines

Use the **process cpu statistics limit entry-percentage** command to set the entry limit and size of CPU utilization statistics.

Examples

The following example shows how to set an entry limit at 40 percent and a size of 300 seconds:

```
configure terminal
!
process cpu statistics limit entry-percentage 40 size 300
end
```

Related Commands

Command	Description
process cpu threshold type	Defines CPU usage thresholds that, when crossed, cause a CPU threshold notification.
snmp-server enable traps cpu	Enables CPU threshold violations traps.
snmp-server host	Specifies the recipient of SNMP notifications.

process cpu threshold type

To set CPU thresholding notification types and values, use the **process cpu threshold type** command in global configuration mode. To disable CPU thresholding notifications, use the **no** form of this command.

process cpu threshold type {**total** | **process** | **interrupt**} **rising** *percentage* **interval** *seconds* [**falling** *fall-percentage* **interval** *seconds*]

no process cpu threshold type {**total** | **process** | **interrupt**}

Syntax Description

total	Sets the CPU threshold type to total CPU utilization.
process	Sets the CPU threshold type to CPU process utilization.
interrupt	Sets the CPU threshold type to CPU interrupt utilization.
rising *percentage*	The percentage (1 to 100) of CPU resources that, when exceeded for the configured interval, triggers a CPU thresholding notification.
interval *seconds*	The duration of the CPU threshold violation, in seconds (5 to 86400), that must be met to trigger a CPU thresholding notification.
falling *fall-percentage*	(Optional) The percentage (1 to 100) of CPU resources that, when usage falls below this level for the configured interval, triggers a CPU thresholding notification. • This value must be equal to or less than the **rising** *percentage* value. • If not specified, the **falling** *fall-percentage* value is set to the same value as the **rising** *percentage* value.

Command Default

CPU thresholding notifications are disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.0(26)S	This command was introduced.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.

Usage Guidelines

This command defines CPU usage thresholds that, when crossed, cause a CPU thresholding notification. When this command is enabled, Cisco IOS software polls the system at the configured interval. Notification occurs in two situations:

- When a configured CPU usage threshold is exceeded (**rising** *percentage*)
- When CPU usage falls below the configured threshold (**falling** *fall-percentage*)

Examples

The following example shows how to set the total CPU utilization notification threshold at 80 percent for a rising threshold notification and 20 percent for a falling threshold notification, with a 5-second polling interval:

```
configure terminal
!
process cpu threshold type total rising 80 interval 5 falling 20 interval 5
end
```

Related Commands

Command	Description
process cpu statistics limit entry	Sets the entry limit and size of CPU utilization statistics.
snmp-server enable traps cpu	Enables CPU threshold violations traps.
snmp-server host	Specifies the recipient of SNMP notifications.

process-max-time

To configure the amount of time after which a process should voluntarily yield to another process, use the **process-max-time** command in global configuration mode. To reset this value to the system default, use the **no** form of this command.

process-max-time *milliseconds*

no process-max-time *milliseconds*

Syntax Description

milliseconds	Maximum duration (in milliseconds) that a process can run before suspension. The range is from 20to 200 milliseconds.

Defaults

The default maximum process time is 200 milliseconds.

Command Modes

Global configuration

Command History

Release	Modification
12.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Lowering the maximum time a process can run is useful in some circumstances to ensure equitable division of CPU time among different tasks.

Only use this command if recommended to do so by the Cisco Technical Assistance Center (TAC).

Examples

The following example limits the duration that a process will run to 100 milliseconds:

```
Router(config)# process-max-time 100
```

prompt

To customize the CLI prompt, use the **prompt** command in global configuration mode. To revert to the default prompt, use the **no** form of this command.

prompt *string*

no prompt [*string*]

Syntax Description

string	Text that will be displayed on screen as the CLI prompt, including any desired prompt variables.

Defaults

The default prompt is either `Router` or the name defined with the **hostname** global configuration command, followed by an angle bracket (>) for user EXEC mode or a pound sign (#) for privileged EXEC mode.

Command Modes

Global configuration

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can include customized variables when specifying the prompt. All prompt variables are preceded by a percent sign (%). Table 47 lists the available prompt variables.

Table 47 Custom Prompt Variables

Prompt Variable	Interpretation
%h	Host name. This is either *Router* or the name defined with the **hostname** global configuration command.
%n	Physical terminal line (tty) number of the EXEC user.
%p	Prompt character itself. It is either an angle bracket (>) for user EXEC mode or a pound sign (#) for privileged EXEC mode.
%s	Space.
%t	Tab.
%%	Percent sign (%)

Issuing the **prompt %h** command has the same effect as issuing the **no prompt** command.

Examples

The following example changes the EXEC prompt to include the tty number, followed by the name and a space:

```
Router(config)# prompt TTY%n@%h%s%p
```

The following are examples of user and privileged EXEC prompts that result from the previous command:

```
TTY17@Router1 > enable
TTY17@Router1 #
```

Related Commands

Command	Description
hostname	Specifies or modifies the host name for the network server.

pwd

To show the current setting of the **cd** command, use the **pwd** command in EXEC mode.

pwd

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC

Priviledged EXEC

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use the **pwd** command to show which directory or file system is specified as the default by the **cd** command. For all EXEC commands that have an optional *filesystem* argument, the system uses the file system specified by the **cd** command when you omit the optional *filesystem* argument.

For example, the **dir** command contains an optional *filesystem* argument and displays a list of files on a particular file system. When you omit this *filesystem* argument, the system shows a list of the files on the file system specified by the **cd** command.

Examples

The following example shows that the present working file system specified by the **cd** command is slot 0:

```
Router> pwd
slot0:/
```

The following example uses the **cd** command to change the present file system to slot 1 and then uses the **pwd** command to display that present working file system:

```
Router> cd slot1:
Router> pwd
slot1:/
```

Related Commands

Command	Description
cd	Changes the default directory or file system.
dir	Displays a list of files on a file system.

refuse-message

To define and enable a line-in-use message, use the **refuse-message** command in line configuration mode. To disable the message, use the **no** form of this command.

refuse-message *d message d*

no refuse-message

Syntax Description

d	Delimiting character of your choice—a pound sign (#), for example. You cannot use the delimiting character in the message.
message	Message text.

Defaults

Disabled (no line-in-use message is displayed).

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Follow this command with one or more blank spaces and a delimiting character of your choice. Then enter one or more lines of text, terminating the message with the second occurrence of the delimiting character. You cannot use the delimiting character within the text of the message.

When you define a message using this command, the Cisco IOS software performs the following steps:

1. Accepts the connection.
2. Prints the custom message.
3. Clears the connection.

Examples

In the following example, line 5 is configured with a line-in-use message, and the user is instructed to try again later:

```
line 5
refuse-message  /The dial-out modem is currently in use.

Please try again later./
```

reload

To reload the operating system, use the **reload** command in privileged EXEC or diagnostic mode.

reload [**/verify** | **/noverify]** [**line** | **in** [*hhh*:*mm* | *mmm* [*text*]] | **at** *hh*:*mm* [*text*] | **reason** [*reason string*] | **cancel**]

Syntax Description

/verify	(Optional) Verifies the digital signature of the file that will be loaded onto the operating system.
/noverify	(Optional) Does not verify the digital signature of the file that will be loaded onto the operating system. **Note** This keyword is often issued if the **file verify auto** command is enabled, which automatically verifies the digital signature of all images that are copied.
line	(Optional) Reason for reloading; the string can be from 1 to 255 characters long.
in *hhh*:*mm* | *mmm*	(Optional) Schedules a reload of the software to take effect in the specified minutes or hours and minutes. The reload must take place within approximately 24 days.
text	(Optional) Reason for reloading; the string can be from 1 to 255 characters long.
at *hh*:*mm*	(Optional) Schedules a reload of the software to take place at the specified time (using a 24-hour clock). If you specify the month and day, the reload is scheduled to take place at the specified time and date. If you do not specify the month and day, the reload takes place at the specified time on the current day (if the specified time is later than the current time) or on the next day (if the specified time is earlier than the current time). Specifying 00:00 schedules the reload for midnight. The reload must take place within 24 days.
day	(Optional) Number of the day in the range from 1 to 31.
reason *reason string*	(Optional) Used to specify a reason for reloading.
cancel	(Optional) Cancels a scheduled reload.

Command Modes

Privileged EXEC (#)
Diagnostic (diag)

Command History

Release	Modification
10.0	This command was introduced.
12.2(14)SX	Support for this command was added for the Supervisor Engine 720.
12.3(2)T	The **warm** keyword was added.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S. The **/verify** and **/noverify** keywords were added.
12.2(20)S	Support was added for the Cisco 7304 router. The Cisco 7500 series router in not supported in Cisco IOS Release 12.2(20)S.
12.0(26)S	The **/verify** and **/noverify** keywords were integrated into Cisco IOS Release 12.0(26)S.

Release	Modification
12.3(4)T	The **/verify** and **/noverify** keywords were integrated into Cisco IOS Release 12.3(4)T.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.3(11)T	The **file** keyword and *url* argument were added.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
15.0(1)M	The **reason** keyword and *reason string* argument were added.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Router and was made available in diagnostic mode.

Usage Guidelines

The **reload** command halts the system. If the system is set to restart on error, it reboots itself. Use the **reload** command after configuration information is entered into a file and saved to the startup configuration.

You cannot reload from a virtual terminal if the system is not set up for automatic booting. This restriction prevents the system from using an image stored in the ROM monitor and taking the system out of the remote user's control.

If you modify your configuration file, the system prompts you to save the configuration. During a save operation, the system prompts whether you want to proceed with the save if the CONFIG_FILE variable points to a startup configuration file that no longer exists. If you respond "yes" in this situation, the system enters setup mode upon reload.

When you schedule a reload to occur at a later time (using the **in** keyword), it must take place within 24 days.

The **at** keyword can be used only if the system clock has been set on the router (either through Network Time Protocol [NTP], the hardware calendar, or manually). The time is relative to the configured time zone on the router. To schedule reloads across several routers to occur simultaneously, synchronize the time on each router with NTP.

When you specify the reload time using the **at** keyword, if you specify the month and day, the reload takes place at the specified time and date. If you do not specify the month and day, the reload takes place at the specified time on the current day (if the specified time is later than the current time), or on the next day (if the specified time is earlier than the current time). Specifying 00:00 schedules the reload for midnight. The reload must take place within 24 days.

To display information about a scheduled reload, use the **show reload** command.

The /verify and /noverify Keywords

If the **/verify** keyword is specified, the integrity of the image will be verified before it is reloaded onto a router. If verification fails, the image reload will not occur. Image verification is important because it assures the user that the image is protected from accidental corruption, which can occur at any time during transit, starting from the moment the files are generated by Cisco until they reach the user.

The **/noverify** keyword overrides any global automatic image verification that may be enabled via the **file verify auto** command.

The warm Keyword

If you issue the **reload** command after you have configured the **warm-reboot** global configuration command, a cold reboot will occur. Thus, if you want to reload your system, but do not want to override the warm reboot functionality, you should specify the **warm** keyword with the **reload** command. The warm reboot functionality allows a Cisco IOS image to reload without ROM monitor intervention. That is, read-write data is saved in RAM during a cold startup and restored during a warm reboot. Warm rebooting allows the router to reboot quicker than conventional rebooting (where control is transferred to ROM monitor and back to the image) because nothing is copied from flash to RAM.

Examples

The following example shows how to immediately reload the software on the router:

```
Router# reload
```

The following example shows how to reload the software on the router in 10 minutes:

```
Router# reload in 10

Router# Reload scheduled for 11:57:08 PDT Fri Apr 21 1996 (in 10 minutes)
Proceed with reload? [confirm]
```

The following example shows how to reload the software on the router at 1:00 p.m. today:

```
Router# reload at 13:00

Router# Reload scheduled for 13:00:00 PDT Fri Apr 21 1996 (in 1 hour and 2 minutes)
Proceed with reload? [confirm]
```

The following example shows how to reload the software on the router on April 21 at 2:00 a.m.:

```
Router# reload at 02:00 apr 21

Router# Reload scheduled for 02:00:00 PDT Sat Apr 21 1996 (in 38 hours and 9 minutes)
Proceed with reload? [confirm]
```

The following example shows how to cancel a pending reload:

```
Router# reload cancel

%Reload cancelled.
```

The following example shows how to perform a warm reboot at 4:00 today:

```
Router# reload warm at 4:00
```

The following example shows how to specify a reason for the reload:

```
Router# reload reason reason string
```

The following example shows how to specify image verification via the **/verify** keyword before reloading an image onto the router:

```
Router# reload /verify

Verifying file integrity of bootflash:c7200-kboot-mz.121-8a.E
%ERROR:Signature not found in file bootflash:c7200-kboot-mz.121-8a.E.
Signature not present. Proceed with verify? [confirm]
Verifying file disk0:c7200-js-mz
.....................................................................
.....................................................Done!
Embedded Hash     MD5 :CFA258948C4ECE52085DCF428A426DCD
```

```
Computed Hash     MD5 :CFA258948C4ECE52085DCF428A426DCD
CCO Hash          MD5 :44A7B9BDDD9638128C35528466318183
Signature Verified

Proceed with reload? [confirm]n
```

Related Commands

Command	Description
copy system:running-config nvram:startup-config	Copies any file from a source to a destination.
file verify auto	Enables automatic image verification.
show reload	Displays the reload status on the router.
warm-reboot	Enables router reloading with reading images from storage.

remote command

To execute a Cisco 7600 series router command directly on the switch console or a specified module without having to log into the Cisco 7600 series router first, use the **remote command** command in privileged EXEC mode.

remote command {**module** *num* | **standby-rp** | **switch**} *command*

Syntax Description

module *num*	Specifies the module to access; see the "Usage Guidelines" section for valid values.
standby-rp	Specifies the standby route processor.
switch	Specifies the active switch processor.
command	Command to be executed.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(18)SXD	The **standby-rp** keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **module** *num* keyword and argument designate the module number. Valid values depend on the chassis that is used. For example, if you have a 13-slot chassis, valid values are from 1 to 13. The **module** *num* keyword and argument are supported on DFC-equipped modules and the standby supervisor engine only.

When you execute the **remote command switch** command, the prompt changes to Switch-sp#.

This command is supported on DFC-equipped modules and the supervisor engine only.

This command does not support command completion, but you can use shortened forms of the command (for example, entering **sh** for **show**).

Examples

This example shows how to execute the **show calendar** command from the standby route processor:

```
Router# remote command standby-rp show calendar
Switch-sp#
09:52:50 UTC Mon Nov 12 2001
Router#
```

Related Commands

Command	Description
remote login	Accesses the Cisco 7600 series router console or a specific module.

remote login

To access the Cisco 7600 series router console or a specific module, use the **remote login** command in privileged EXEC mode.

remote login {**module** *num* | **standby-rp** | **switch**}

Syntax Description

module *num*	Specifies the module to access; see the "Usage Guidelines" section for valid values.
standby-rp	Specifies the standby route processor.
switch	Specifies the active switch processor.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(18)SXD	This command was changed to include the **standby-rp** keyword.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Caution When you enter the **attach** or **remote login** command to access another console from your switch, if you enter global or interface configuration mode commands, the switch might reset.

The **module** *num* keyword and argument designate the module number. Valid values depend on the chassis that is used. For example, if you have a 13-slot chassis, valid values are from 1 to 13. The **module** *num* keyword and argument are supported on DFC-equipped modules and the standby supervisor engine only.

When you execute the **remote login module** *num* command, the prompt changes to Router-dfcx# or Switch-sp#, depending on the type of module to which you are connecting.

When you execute the **remote login standby-rp** command, the prompt changes to Router-sdby#.

When you execute the **remote login switch** command, the prompt changes to Switch-sp#.

The **remote login module** *num* command is identical to the **attach** command.

There are two ways to end the session:

- You can enter the **exit** command as follows:

```
Switch-sp# exit
```

```
[Connection to Switch closed by foreign host]
Router#
```

- You can press **Ctrl-C** three times as follows:

```
Switch-sp# ^C
Switch-sp# ^C
Switch-sp# ^C
Terminate remote login session? [confirm] y
[Connection to Switch closed by local host]
Router#
```

Examples

This example shows how to perform a remote login to a specific module:

```
Router# remote login module 1

Trying Switch ...
Entering CONSOLE for Switch
Type "^C^C^C" to end this session


Switch-sp#
```

This example shows how to perform a remote login to the Cisco 7600 series router processor:

```
Router# remote login switch

Trying Switch ...
Entering CONSOLE for Switch
Type "^C^C^C" to end this session
Switch-sp#
```

This example shows how to perform a remote login to the standby route processor:

```
Router# remote login standby-rp

Trying Switch ...
Entering CONSOLE for Switch
Type "^C^C^C" to end this session
Router-sdby#
```

Related Commands

Command	Description
attach	Connects to a specific module from a remote location.

remote-span

To configure a virtual local area network (VLAN) as a remote switched port analyzer (RSPAN) VLAN, use the **remote-span** command in config-VLAN mode. To remove the RSPAN designation, use the **no** form of this command.

remote-span

no remote-span

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Config-VLAN mode

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is not supported in the VLAN database mode.

You can enter the **show vlan remote-span** command to display the RSPAN VLANs in the Cisco 7600 series router.

Examples

This example shows how to configure a VLAN as an RSPAN VLAN:

```
Router(config-vlan)# remote-span
Router(config-vlan)
```

This example shows how to remove the RSPAN designation:

```
Router(config-vlan)# no remote-span
Router(config-vlan)
```

Related Commands

Connect	Description
show vlan remote-span	Displays a list of RSPAN VLANs.

rename

To rename a file in a Class C Flash file system, use the **rename** command in EXEC, privileged EXEC, or diagnostic mode.

rename *url1 url2*

Syntax Description

url1	The original path and filename.
url2	The new path and filename.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
11.3 AA	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Router and was made available in diagnostic mode.

Usage Guidelines

This command is valid only on Class C Flash file systems.

Examples

In the following example, the file named Karen.1 is renamed test:

```
Router# dir

Directory of disk0:/Karen.dir/

  0  -rw-           0   Jan 21 1998 09:51:29  Karen.1
  0  -rw-           0   Jan 21 1998 09:51:29  Karen.2
  0  -rw-           0   Jan 21 1998 09:51:29  Karen.3
  0  -rw-           0   Jan 21 1998 09:51:31  Karen.4
243  -rw-         165   Jan 21 1998 09:53:17  Karen.cur

340492288 bytes total (328400896 bytes free)

Router# rename disk0:Karen.dir/Karen.1 disk0:Karen.dir/test
Router# dir

Directory of disk0:/Karen.dir/

  0  -rw-           0   Jan 21 1998 09:51:29  Karen.2
  0  -rw-           0   Jan 21 1998 09:51:29  Karen.3
  0  -rw-           0   Jan 21 1998 09:51:31  Karen.4
243  -rw-         165   Jan 21 1998 09:53:17  Karen.cur
  0  -rw-           0   Apr 24 1998 09:49:19  test
340492288 bytes total (328384512 bytes free)
```

request platform software package describe file

To gather descriptive information about an individual module or a Cisco IOS-XE image file, use the **request platform software package describe file** command in privileged EXEC or diagnostic mode.

request platform software package describe file *URL* [**detail**] [**verbose**]

Syntax Description

URL	Specifies the URL to the file. The *URL* contains the file system, directories, and the filename.
detail	Specifies detailed output.
verbose	Displays verbose information, meaning all information that can be displayed on the console about the file will be displayed.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
IOS XE Release 2.1	This command was introduced.

Usage Guidelines

This command can only be used to gather information on individual module and Cisco IOS-XE image files. Using this command to collect information on any other file will generate output, but the generated output is useless.

The output of this command can be used for the following functions:

- To confirm the individual module files that are part of a Cisco IOS-XE image.
- To confirm whether or not a file is bootable.
- To confirm the contexts in which a file must be reloaded or booted.
- To confirm whether or not a file is corrupted.
- To confirm file and header sizes, build dates, and various other general information.

Examples

In the following example, this command is entered to gather information about an individual SIP Base module file on the bootflash: file system.

```
Router# request platform software package describe file
bootflash:asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
Package: asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
  Size: 36954316
  Timestamp: 2007-12-05 15:36:27 UTC
  Canonical path:
/bootflash/asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
```

```
  Raw disk-file SHA1sum:
    3ee37cdbe276316968866b16df7d8a5733a1502e

  Computed SHA1sum:
    f2db80416a1245a5b1abf2988088860b38ce7898
  Contained SHA1sum:
    f2db80416a1245a5b1abf2988088860b38ce7898
  Hashes match. Package is valid.

  Header size:     204 bytes
  Package type:    10000
  Package flags:   0
  Header version:  0

  Internal package information:
    Name: cc
    BuildTime: 2007-12-04_05.24
    ReleaseDate: Tue 04-Dec-07 01:00
    RouteProcessor: rp1
    Platform: ASR1000
    User: mcpre
    PackageName: sipbase
    Build: v122_33_xn_asr_rls0_throttle_20071204_051318


  Package is bootable on SIP when specified
  by packages provisioning file.
```

In the following example, this command is used to gather information about a Cisco IOS-XE image on the bootflash: file system.

```
Router# request platform software package describe file
bootflash:ASR1000rp1-advipservicesk9.01.00.00.12-33.XN.bin
Package: ASR1000rp1-advipservicesk9.01.00.00.12-33.XN.bin
  Size: 218783948
  Timestamp: 2007-12-04 17:14:09 UTC
  Canonical path: /bootflash/ASR1000rp1-advipservicesk9.01.00.00.12-33.XN.bin

  Raw disk-file SHA1sum:
    d2999fc7e27e01344903a42ffacd62c156eba4cc

  Computed SHA1sum:
    5f8cda8518d01d8282d80ecd34f7715783f4a813
  Contained SHA1sum:
    5f8cda8518d01d8282d80ecd34f7715783f4a813
  Hashes match. Package is valid.

  Header size:     204 bytes
  Package type:    30000
  Package flags:   0
  Header version:  0

  Internal package information:
    Name: rp_super
    BuildTime: 2007-12-04_05.24
    ReleaseDate: Tue 04-Dec-07 01:00
    RouteProcessor: rp1
    Platform: ASR1000
    User: mcpre
    PackageName: advipservicesk9
    Build: v122_33_xn_asr_rls0_throttle_20071204_051318
```

```
Package is bootable from media and tftp.
Package contents:

Package: asr1000rp1-espbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
  Size: 52072652
  Timestamp: 2007-12-04 13:33:13 UTC

  Raw disk-file SHA1sum:
    f1aad6d687256aa327a4efa84deab949fbed12b8

  Computed SHA1sum:
    15502fd1b8f9ffd4af4014ad4d8026c837929fe6
  Contained SHA1sum:
    15502fd1b8f9ffd4af4014ad4d8026c837929fe6
  Hashes match. Package is valid.

  Header size:     204 bytes
  Package type:    20000
  Package flags:   0
  Header version:  0

  Internal package information:
    Name: fp
    BuildTime: 2007-12-04_05.24
    ReleaseDate: Tue 04-Dec-07 01:00
    RouteProcessor: rp1
    Platform: ASR1000
    User: mcpre
    PackageName: espbase
    Build: v122_33_xn_asr_rls0_throttle_20071204_051318


  Package is bootable on ESP when specified
  by packages provisioning file.

Package: asr1000rp1-rpaccess-k9.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
  Size: 21844172
  Timestamp: 2007-12-04 13:33:01 UTC

  Raw disk-file SHA1sum:
    025e6159dd91cef9d254ca9fff2602d8ce065939

  Computed SHA1sum:
    ea1b358324ba5815b9ea623b453a98800eae1c78
  Contained SHA1sum:
    ea1b358324ba5815b9ea623b453a98800eae1c78
  Hashes match. Package is valid.

  Header size:     204 bytes
  Package type:    30004
  Package flags:   0
  Header version:  0

  Internal package information:
    Name: rp_security
    BuildTime: 2007-12-04_05.24
    ReleaseDate: Tue 04-Dec-07 01:00
    RouteProcessor: rp1
    Platform: ASR1000
    User: mcpre
    PackageName: rpaccess-k9
    Build: v122_33_xn_asr_rls0_throttle_20071204_051318
```

```
  Package is not bootable.

Package: asr1000rp1-rpbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
  Size: 21520588
  Timestamp: 2007-12-04 13:33:06 UTC

  Raw disk-file SHA1sum:
    432dfa61736d8a51baefbb2d70199d712618dcd2

  Computed SHA1sum:
    83c0335a3adcea574bff237a6c8640a110a045d4
  Contained SHA1sum:
    83c0335a3adcea574bff237a6c8640a110a045d4
  Hashes match. Package is valid.

  Header size:     204 bytes
  Package type:    30001
  Package flags:   0
  Header version:  0

  Internal package information:
    Name: rp_base
    BuildTime: 2007-12-04_05.24
    ReleaseDate: Tue 04-Dec-07 01:00
    RouteProcessor: rp1
    Platform: ASR1000
    User: mcpre
    PackageName: rpbase
    Build: v122_33_xn_asr_rls0_throttle_20071204_051318


  Package is bootable on RP when specified
  by packages provisioning file.

Package: asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
  Size: 24965324
  Timestamp: 2007-12-04 13:33:08 UTC

  Raw disk-file SHA1sum:
    eb964b33d4959c21b605d0989e7151cd73488a8f

  Computed SHA1sum:
    19b58886f97c79f885ab76c1695d1a6f4348674e
  Contained SHA1sum:
    19b58886f97c79f885ab76c1695d1a6f4348674e
  Hashes match. Package is valid.

  Header size:     204 bytes
  Package type:    30002
  Package flags:   0
  Header version:  0

  Internal package information:
    Name: rp_daemons
    BuildTime: 2007-12-04_05.24
    ReleaseDate: Tue 04-Dec-07 01:00
    RouteProcessor: rp1
    Platform: ASR1000
    User: mcpre
    PackageName: rpcontrol
    Build: v122_33_xn_asr_rls0_throttle_20071204_051318
```

```
    Package is not bootable.

  Package:
asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
    Size: 48515276
    Timestamp: 2007-12-04 13:33:13 UTC

    Raw disk-file SHA1sum:
      bc13462d6a4af7a817a7346a44a0ef7270e3a81b

    Computed SHA1sum:
      f1235d703cc422e53bce850c032ff3363b587d70
    Contained SHA1sum:
      f1235d703cc422e53bce850c032ff3363b587d70
    Hashes match. Package is valid.

    Header size:     204 bytes
    Package type:    30003
    Package flags:   0
    Header version:  0

    Internal package information:
      Name: rp_iosd
      BuildTime: 2007-12-04_05.24
      ReleaseDate: Tue 04-Dec-07 01:00
      RouteProcessor: rp1
      Platform: ASR1000
      User: mcpre
      PackageName: rpios-advipservicesk9
      Build: v122_33_xn_asr_rls0_throttle_20071204_051318


    Package is not bootable.

  Package: asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
    Size: 36954316
    Timestamp: 2007-12-04 13:33:11 UTC

    Raw disk-file SHA1sum:
      3ee37cdbe276316968866b16df7d8a5733a1502e

    Computed SHA1sum:
      f2db80416a1245a5b1abf2988088860b38ce7898
    Contained SHA1sum:
      f2db80416a1245a5b1abf2988088860b38ce7898
    Hashes match. Package is valid.

    Header size:     204 bytes
    Package type:    10000
    Package flags:   0
    Header version:  0

    Internal package information:
      Name: cc
      BuildTime: 2007-12-04_05.24
      ReleaseDate: Tue 04-Dec-07 01:00
      RouteProcessor: rp1
      Platform: ASR1000
      User: mcpre
      PackageName: sipbase
      Build: v122_33_xn_asr_rls0_throttle_20071204_051318


    Package is bootable on SIP when specified
```

```
  by packages provisioning file.

Package: asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
  Size: 19933388
  Timestamp: 2007-12-04 13:33:06 UTC

  Raw disk-file SHA1sum:
    44b6d15cba31fb0e9b27464665ee8a24b92adfd2

  Computed SHA1sum:
    b1d5faf093b183e196c7c8e1023fe1f7aafdd36d
  Contained SHA1sum:
    b1d5faf093b183e196c7c8e1023fe1f7aafdd36d
  Hashes match. Package is valid.

  Header size:     204 bytes
  Package type:    10001
  Package flags:   0
  Header version:  0

  Internal package information:
    Name: cc_spa
    BuildTime: 2007-12-04_05.24
    ReleaseDate: Tue 04-Dec-07 01:00
    RouteProcessor: rp1
    Platform: ASR1000
    User: mcpre
    PackageName: sipspa
    Build: v122_33_xn_asr_rls0_throttle_20071204_051318


  Package is not bootable.
```

Related Commands

Command	Description
request platform software package install file	Upgrades an individual package or a superpackage file.

request platform software package expand file

To extract the individual modules from a Cisco IOS-XE image, use the **request platform software package expand file** command in privileged EXEC or diagnostic mode.

request platform software package expand file *source-URL* [**to** *destination-URL*] [**force**] [**verbose**] [**wipe**]

Syntax Description

source-URL	Specifies the URL to the Cisco IOS-XE file that stores the contents that will be extracted.
to *destination-URL*	Specifies the destination URL where the files that were extracted from the Cisco IOS-XE file are left after the operation is complete. If this option is not entered, the Cisco IOS-XE image file contents are extracted onto the same directory where the Cisco IOS-XE image file is currently stored.
force	(Optional) Specifies that the operation will be forced, meaning that the upgrade will proceed despite any warning messages.
verbose	(Optional) Displays verbose information, meaning all output that can be displayed on the console during the process will be displayed.
wipe	(Optional) Erases all content on the destination snapshot directory before extracting the files and placing them on the snapshot directory.

Command Default

No default behavior or values

Command Modes

Privileged EXEC (#)

Diagnostic Mode (diag)

Command History

Release	Modification
IOS XE Release 2.1	This command was introduced.

Usage Guidelines

This command only extracts individual module files and a provisioning file from the Cisco IOS-XE image. Additional configuration is needed to configure the router to boot using the provisioning files and run using the individual modules.

When this command is used, copies of each module and the provisioning file within the Cisco IOS-XE image are copied and placed on the destination directory. The Cisco IOS-XE image file is unchanged after the operation is complete.

If the **to** *destination-URL* option is not entered, the Cisco IOS-XE image contents will be extracted onto the same directory where the Cisco IOS-XE image is currently stored.

If this command is used to extract individual module files onto a directory that already contains individual module files, the files that would have been extracted onto the same directory are instead extracted to an automatically created directory on the destination device.

Examples

The following example shows how to extract the individual modules and the provisioning file from a Cisco IOS-XE image that has already been placed in the directory where the user wants to store the individual modules and the provisioning file.

Output of the directory before and after the extraction is given to confirm the files were extracted.

```
Router# dir bootflash:
Directory of bootflash:/

   11  drwx       16384   Dec 4 2007 11:26:07 +00:00  lost+found
14401  drwx        4096   Dec 4 2007 11:27:41 +00:00  .installer
   12  -rw-   218783948   Dec 4 2007 12:12:16 +00:00
ASR1000rp1-advipservicesk9.01.00.00.12-33.XN.bin

Router# request platform software package expand file
bootflash:ASR1000rp1-advipservicesk9.01.00.00.12-33.XN.bin
Verifying parameters
Validating package type
Copying package files

Router# dir bootflash:
Directory of bootflash:/

   11  drwx       16384   Dec 4 2007 11:26:07 +00:00  lost+found
14401  drwx        4096   Dec 4 2007 11:27:41 +00:00  .installer
   12  -rw-   218783948   Dec 4 2007 12:12:16 +00:00
ASR1000rp1-advipservicesk9.01.00.00.12-33.XN.bin
28803  -rw-    52072652   Dec 4 2007 12:14:17 +00:00
asr1000rp1-espbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
28804  -rw-    21844172   Dec 4 2007 12:14:17 +00:00
asr1000rp1-rpaccess-k9.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
28805  -rw-    21520588   Dec 4 2007 12:14:18 +00:00
asr1000rp1-rpbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
28806  -rw-    24965324   Dec 4 2007 12:14:19 +00:00
asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
28807  -rw-    48515276   Dec 4 2007 12:14:20 +00:00
asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
28808  -rw-    36954316   Dec 4 2007 12:14:21 +00:00
asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
28809  -rw-    19933388   Dec 4 2007 12:14:22 +00:00
asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
28802  -rw-        7145   Dec 4 2007 12:14:22 +00:00  packages.conf

928833536 bytes total (483700736 bytes free)
```

The following example shows how to extract the individual modules and the provisioning file from a Cisco IOS-XE image that has already been placed on the router in a directory that will not store the individual modules and the provisioning file. In this particular example, the contents of a Cisco IOS-XE image stored in usb0: are extracted into bootflash:.

Output of the bootflash: directory before and after the extraction is given to confirm the files were extracted.

```
Router# dir usb0:
Directory of usb0:/

1120  -rwx   213225676   Dec 4 2007 10:50:36 +00:00
asr1000rp1-advipservicesk9.v122_33_xn_asr_rls0_throttle.bin

Router# dir bootflash:
Directory of bootflash:/

   11  drwx       16384   Dec 4 2007 12:32:46 +00:00  lost+found
```

```
86401  drwx        4096   Dec 4 2007 14:06:24 +00:00  .ssh
14401  drwx        4096   Dec 4 2007 14:06:36 +00:00  .rollback_timer
43201  drwx        4096   Dec 4 2007 12:34:45 +00:00  .installer

Router# request platform software package expand file
usb0:asr1000rp1-advipservicesk9.v122_33_xn_asr_rls0_throttle.bin to bootflash:
Verifying parameters
Validating package type
Copying package files

Router# dir bootflash:
Directory of bootflash:/

   11  drwx       16384   Dec 4 2007 12:32:46 +00:00  lost+found
86401  drwx        4096   Dec 4 2007 14:06:24 +00:00  .ssh
14401  drwx        4096   Dec 4 2007 14:06:36 +00:00  .rollback_timer
43201  drwx        4096   Dec 4 2007 12:34:45 +00:00  .installer
28803  -rw-    51986636   Dec 4 2007 16:40:38 +00:00
asr1000rp1-espbase.v122_33_xn_asr_rls0_throttle.pkg
28804  -rw-    21838028   Dec 4 2007 16:40:39 +00:00
asr1000rp1-rpaccess-k9.v122_33_xn_asr_rls0_throttle.pkg
28805  -rw-    21508300   Dec 4 2007 16:40:39 +00:00
asr1000rp1-rpbase.v122_33_xn_asr_rls0_throttle.pkg
28806  -rw-    24963276   Dec 4 2007 16:40:40 +00:00
asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle.pkg
28807  -rw-    48419020   Dec 4 2007 16:40:41 +00:00
asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle.pkg
28808  -rw-    36946124   Dec 4 2007 16:40:43 +00:00
asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle.pkg
28809  -rw-    14670028   Dec 4 2007 16:40:43 +00:00
asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg
28802  -rw-        6563   Dec 4 2007 16:40:43 +00:00  packages.conf

928862208 bytes total (708186112 bytes free)
```

Related Commands

Command	Description
request platform software package install file	Upgrades an individual module or a Cisco IOS-XE file.

request platform software package install commit

To cancel the rollback timer and commit a software upgrade, use the **request platform software package install commit** command in privileged EXEC or diagnostic mode.

request platform software package install rp *rp-slot-number* **commit** [**verbose**]

Syntax Description

rp *rp-slot-number*	Specifies the RP slot number.
commit	Specifies that an upgrade that was done using a rollback timer that has not expired can be committed.
verbose	(Optional) Displays verbose information, meaning all information that can be displayed on the console during the process will be displayed.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC (#)

Diagnostic Mode (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced.

Usage Guidelines

This command is entered after the **request platform software package install rp** *rp-slot-number* **file** command is used with the **auto-rollback** *minutes* option to begin an individual sub-package or a consolidated package upgrade. When the **auto-rollback** *minutes* option is used in this context, a rollback timer that cancels the upgrade after the number of specified *minutes* cancels the upgrade if the **request platform software package install rp** *rp-slot-number* **commit** command is not entered to commit the upgrade.

If this command is not entered after the **request platform software package install rp** *rp-slot-number* **file** command is used with the **auto-rollback** *minutes* option to upgrade an individual sub-package or a consolidated package and the rollback timer expires, the upgrade does not complete and the router continues running the previous sub-package or consolidated package.

Examples

In the following example, this command is entered to commit an upgrade:

```
request platform software package install rp 1 commit
```

Related Commands

Command	Description
request platform software package install file	Upgrades a consolidated package or sub-package.
request platform software package install rollback	Rolls back a previous software upgrade.

request platform software package install file

To upgrade a consolidated package or an individual sub-package, use the **request platform software package install file** command in privileged EXEC or diagnostic mode.

request platform software package install rp *rp-slot-number* **file** *file-URL* [**auto-rollback** *minutes*] [**provisioning-file** *URL*] [**slot** *slot-number*] [**bay** *bay-number*] [**force**] [**on-reboot**] [**verbose**]

Syntax Description

rp *rp-slot-number*	Specifies the RP slot number.
file *file-URL*	Specifies the URL to the consolidated package or sub-package.
auto-rollback *minutes*	Specifies the setting of a rollback timer, and sets the number of minutes on the rollback timer before the rollback timer expires.
provisioning-file *provisioning-file-URL*	Specifies the URL to the provisioning file. A provisioning file is used for booting only when a Cisco ASR 1000 Series Router is booted using individual sub-packages.
slot *slot-number*	Specifies the router slot number where a SIP can be installed.
bay *bay-number*	Specifies the SPA bay number within a SIP.
force	Specifies that the operation will be forced, meaning that the upgrade will proceed despite any warning messages.
on-reboot	Specifies that the installation will not be completed until the next RP reboot.
verbose	Displays verbose information, meaning all output that can be displayed on the console during the process will be displayed.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced.

Usage Guidelines

This command is used to upgrade consolidated packages and individual sub-packages.

When this command is used to upgrade a SIPBASE sub-package, the **slot** *slot-number* of the SIP must be specified.

When this command is used to upgrade a SIPSPA sub-package, the **slot** *slot-number* of the SIP and the **bay** *bay-number* of the SPA must be specified.

When the **auto-rollback** *minutes* option is used, the **request platform software package install rp** *rp-slot-number* **commit** command must be entered before the rollback timer expires to complete the upgrade. If this command is not entered, the router rolls back to the previous software version. The rollback timer expires after the number of specified *minutes*. If the **auto-rollback** *minutes* option is not used, the upgrade simply occurs.

Examples

Managing and Configuring a consolidated package using the request platform package command

In the following example, the **request platform software package install** command is used to upgrade a consolidated package running on RP 0. The **force** option, which forces the upgrade past any prompt (such as already having the same consolidated package installed), is used in this example.

```
Router# request platform software package install rp 0 file
bootflash:ASR1000rp1-advipservicesk9.01.00.00.12-33.XN.bin force
--- Starting installation state synchronization ---
Finished installation state synchronization

--- Starting file path checking ---
Finished file path checking

--- Starting image file verification ---
Checking image file names
Verifying image file locations
Locating image files and validating name syntax
Inspecting image file types

Processing image file constraints

Extracting super package content
Verifying parameters
Validating package type

Copying package files

Checking and verifying packages contained in super package
Creating candidate provisioning file

  WARNING:
  WARNING: Candidate software will be installed upon reboot
  WARNING:

Finished image file verification

--- Starting candidate package set construction ---
Verifying existing software set
Processing candidate provisioning file

Constructing working set for candidate package set
Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Finished candidate package set construction

--- Starting compatibility testing ---
Determining whether candidate package set is compatible

WARNING:
WARNING: Candidate software combination not found in compatibility database
WARNING:
```

```
Determining whether installation is valid
Determining whether installation is valid ... skipped
Checking IPC compatibility with running software
Checking IPC compatibility with running software ... skipped
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Checking infrastructure compatibility with running software ... skipped
Finished compatibility testing

--- Starting commit of software changes ---
Updating provisioning rollback files
Creating pending provisioning file
Committing provisioning file
Finished commit of software changes

SUCCESS: Software provisioned.  New software will load on reboot.

Router# reload
```

Note A reload must be performed to finish this procedure.

SIP Sub-package Installation with Verbose Option

In the following example, the SIP sub-package for the SIP in slot 1 is installed using the **request platform software package install** command. In this example, the **force** option, which forces the upgrade past any prompt (such as already having the same sub-package installed), and the **verbose** option, which displays all possible output during the installation, are used.

```
Router# request platform software package install rp 0 file
bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg slot 1 force verbose
--- Starting installation state synchronization ---

Finished installation state synchronization

--- Starting file path checking ---
Finished file path checking

--- Starting image file verification ---
Checking image file names
... file names checked
Verifying image file locations
... image file locations verified
Locating image files and validating name syntax
... image file names validated
Inspecting image file types
... image file types acceptable
Processing image file constraints
... constraints satisfied
Creating candidate provisioning file

... created candidate provisioning file
Finished image file verification

--- Starting candidate package set construction ---
Verifying existing software set
... verified existing software set is valid
Processing candidate provisioning file

... candidate provisioning file processed
Constructing working set for candidate package set
... working set constructed
Constructing working set for running package set
```

```
... working set for running package set constructed
Checking command output
... command output is consistent with command set
Constructing merge of running and candidate packages
... merged running and candidate packages
Finished candidate package set construction

--- Starting compatibility testing ---
Determining whether candidate package set is compatible

WARNING:
WARNING: Candidate software combination not found in compatibility database
WARNING:

... candidate package set is valid
Determining whether installation is valid
Software is unchanged
Software sets are identified as compatible

... installation is valid
Checking IPC compatibility with running software
calling minime_merge.sh for /tmp/tdlresolve/compat/_tmp_issu_provision_sw_
minime_merge done for /tmp/tdlresolve/compat/_tmp_issu_provision_sw_
... IPC is compatible with running software
Checking candidate package set infrastructure compatibility
... candidate package set infrastructure is compatible
Checking infrastructure compatibility with running software
... infrastructure is compatible with running software
Finished compatibility testing

--- Starting impact testing ---
Checking operational impact of change
... operational impact of change is allowable
Finished impact testing

--- Starting commit of software changes ---
Updating provisioning rollback files
... rollback provisioning files updated
Creating pending provisioning file
  Ensuring that cached content is written to media

... cached content flushed to media
... pending provisioning file created
Committing provisioning file
  Ensuring that cached content is written to media
  ... cached content flushed to media
... running provisioning file committed
Finished commit of software changes

--- Starting analysis of software changes ---
------------ changes to running software ------------
0 0 cc

----------------------------------------------------
Finished analysis of software changes

--- Starting update running software ---
Blocking peer synchronization of operating information
... peer synchronization blocked
Creating the command set placeholder directory
  Finding latest command set
  ... latest command set identified
  Assembling CLI output libraries
  ... CLI output libraries assembled
```

```
  Assembling CLI input libraries
  ... CLI input libraries assembled
  Applying interim IPC and database definitions
    interim IPC and database definitions applied
      Replacing running software
      ... running software replaced
      Replacing CLI software
      ... CLI software replaced
      Restarting software
Restarting CC0
Restarting CC0
      ... software restarted
      Applying interim IPC and database definitions

*Oct  9 09:52:25.333: %MCP_OIR-6-OFFLINECARD: Card (cc) offline in slot 0
*Oct  9 09:52:25.334: %MCP_OIR-6-REMSPA: SPA removed from subslot 0/0,
interfaces disabled
*Oct  9 09:52:25.334: %MCP_OIR-6-REMSPA: SPA removed from subslot 0/1,
interfaces disabled
*Oct  9 09:52:25.334: %MCP_OIR-6-REMSPA: SPA removed from subslot 0/2,
interfaces disabled
*Oct  9 09:52:25.334: %MCP_OIR-6-REMSPA: SPA removed from subslot 0/3,
interfaces disabled      ... interim IPC and database definitions applied
      Notifying running software of updates
      ... running software notified
      Unblocking peer synchronization of operating information
      ... peer synchronization unblocked
    ... unmount of old packages scheduled
    Unmounting old packages
    ... inactive old packages unmounted
    Cleaning temporary installation files
    ... temporary installation files cleaned
    Finished update running software

SUCCESS: Finished installing software.

Router#
```

Upgrading SIP Sub-package without using the verbose option

In the following example, the SIP sub-package for the SIP in slot 1 is installed using the **request platform software package install** command. In this example, the **force** option, which forces the upgrade past any prompt (such as already having the same sub-package installed), is used. The **verbose** option is not used in this example.

```
Router# request platform software package install rp 0 file
bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg slot 1 force
--- Starting installation state synchronization ---
Finished installation state synchronization

--- Starting file path checking ---
Finished file path checking

--- Starting image file verification ---
Checking image file names
Verifying image file locations
Locating image files and validating name syntax
Inspecting image file types
Processing image file constraints
Creating candidate provisioning file

Finished image file verification
```

```
--- Starting candidate package set construction ---
Verifying existing software set
Processing candidate provisioning file
Constructing working set for candidate package set
Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Finished candidate package set construction

--- Starting compatibility testing ---
Determining whether candidate package set is compatible


WARNING:
WARNING: Candidate software combination not found in compatibility database
WARNING:

Determining whether installation is valid
Software sets are identified as compatible
Checking IPC compatibility with running software
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Finished compatibility testing

--- Starting impact testing ---
Checking operational impact of change
Finished impact testing

--- Starting commit of software changes ---
Updating provisioning rollback files
Creating pending provisioning file

Committing provisioning file
Finished commit of software changes

--- Starting analysis of software changes ---
Finished analysis of software changes

--- Starting update running software ---
Blocking peer synchronization of operating information
Creating the command set placeholder directory
  Finding latest command set
  Assembling CLI output libraries
  Assembling CLI input libraries
  Applying interim IPC and database definitions
    interim IPC and database definitions applied
      Replacing running software
      Replacing CLI software
      Restarting software
Restarting CC1
Restarting CC1
      Applying interim IPC and database definitions

*Oct  9 09:54:55.365: %MCP_OIR-6-OFFLINECARD: Card (cc) offline in slot 1
*Oct  9 09:54:55.365: %MCP_OIR-6-REMSPA: SPA removed from subslot 1/1,
interfaces disabled
*Oct  9 09:54:55.365: %MCP_OIR-6-REMSPA: SPA removed from subslot 1/2,
interfaces disabled      Notifying running software of updates
      Unblocking peer synchronization of operating information
    Unmounting old packages
    Cleaning temporary installation files
      Finished update running software

SUCCESS: Finished installing software.
```

```
Router#
```

Upgrading IOS Sub-package

In the following example, the **request platform software package install** command is used to upgrade an IOS sub-package. In this example, the **force** option, which forces the upgrade past any prompt (such as already having the same module installed), is used.

```
Router# request platform software package install rp 0 file
bootflash:asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle_20071204_051318.pk
g force
--- Starting installation state synchronization ---
Finished installation state synchronization

--- Starting file path checking ---
Finished file path checking

--- Starting image file verification ---
Checking image file names
Verifying image file locations
Locating image files and validating name syntax
Inspecting image file types
    WARNING: In-service installation of IOSD package
    WARNING: requires software redundancy on target RP
    WARNING: or on-reboot parameter
    WARNING: Automatically setting the on-reboot flag
Processing image file constraints
Creating candidate provisioning file

Finished image file verification

--- Starting candidate package set construction ---
Verifying existing software set

Processing candidate provisioning file
Constructing working set for candidate package set
Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Finished candidate package set construction

--- Starting compatibility testing ---
Determining whether candidate package set is compatible

WARNING:
WARNING: Candidate software combination not found in compatibility database
WARNING:

Determining whether installation is valid
Determining whether installation is valid ... skipped
Checking IPC compatibility with running software
Checking IPC compatibility with running software ... skipped
Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Checking infrastructure compatibility with running software ... skipped
Finished compatibility testing

--- Starting commit of software changes ---
Updating provisioning rollback files
Creating pending provisioning file

Committing provisioning file
```

```
Finished commit of software changes

SUCCESS: Software provisioned.  New software will load on reboot.

Router#
```

Note that the new RPIOS sub-package will become active only after a reboot. Reboot the router to finish this procedure.

Upgrading SPA Sub-package

In the following example, the **request platform software package install** command is use to upgrade a SIPSPA sub-package for the SPA in bay 0 of router slot 1. In this example, the **force** option, which forces the upgrade past any prompt (such as already having the same module installed), is used.

```
Router# request platform software package install rp 0 file
bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg slot 1 bay 0
force
--- Starting installation state synchronization ---
Finished installation state synchronization

--- Starting file path checking ---
Finished file path checking

--- Starting image file verification ---
Checking image file names
Verifying image file locations
Locating image files and validating name syntax
Inspecting image file types
Processing image file constraints
Creating candidate provisioning file
Finished image file verification

--- Starting candidate package set construction ---
Verifying existing software set
Processing candidate provisioning file

Constructing working set for candidate package set
Constructing working set for running package set
Checking command output
Constructing merge of running and candidate packages
Finished candidate package set construction

--- Starting compatibility testing ---
Determining whether candidate package set is compatible

WARNING:
WARNING: Candidate software combination not found in compatibility database
WARNING:

Determining whether installation is valid
Software sets are identified as compatible
Checking IPC compatibility with running software

Checking candidate package set infrastructure compatibility
Checking infrastructure compatibility with running software
Finished compatibility testing

--- Starting impact testing ---
Checking operational impact of change
Finished impact testing
```

```
--- Starting commit of software changes ---
Updating provisioning rollback files
Creating pending provisioning file

Committing provisioning file
Finished commit of software changes

--- Starting analysis of software changes ---
Finished analysis of software changes

--- Starting update running software ---
Blocking peer synchronization of operating information
Creating the command set placeholder directory
  Finding latest command set
  Assembling CLI output libraries
  Assembling CLI input libraries
  Applying interim IPC and database definitions
    interim IPC and database definitions applied
      Replacing running software
      Replacing CLI software
      Restarting software
Restarting SPA CC1/0
      Applying interim IPC and database definitions
      Notifying running software of updates
      Unblocking peer synchronization of operating information
    Unmounting old packages
    Cleaning temporary installation files
      Finished update running software

SUCCESS: Finished installing software.

Router#
```

Related Commands

Command	Description
request platform software package install commit	Cancel the rollback timer and commits a software upgrade.
request platform software package install rollback	Rolls back a previous software upgrade.
request platform software package install snapshot	Creates a snapshot directory that will contain all the files extracted from a consolidated package.

request platform software package install rollback

To roll back a previous software upgrade, use the **request platform software package install rollback** command in privileged EXEC or diagnostic mode.

request platform software package install rp *rp-slot-number* **rollback** [**as-booted** | **provisioning-file** *provisioning-file-URL*] [**force**] [**on-reboot**] [**verbose**]

Syntax Description

rp *rp-slot-number*	Specifies the slot number of the RP doing the request.
as-booted	Specifies that the software update will not occur, and that the router will instead boot using the same procedure that it used during the last bootup.
provisioning-file *provisioning-file-URL*	Specifies that the software update will not occur, and that the router will instead boot using the specified provisioning file.
force	Specifies that the operation will be forced, meaning that the upgrade will proceed despite any warning messages.
on-reboot	Specifies that the installation will not be completed until the next RP reboot.
verbose	Displays verbose information, meaning all output that can be displayed on the console during the process will be displayed.

Command Default

No default behavior or values

Command Modes

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced.

Usage Guidelines

This command rolls back a configuration that has an active rollback timer. Active rollback timers are used when the **auto-rollback** option is entered when software is being upgraded using the **request platform software package install file** command.

Examples

In the following example, an upgrade that was using a rollback timer is rolled back to the previous configuration instead of upgraded:

```
request platform software package install rp 0 rollback
```

Related Commands

Command	Description
request platform software package install commit	Cancel the rollback timer and commits a software upgrade.
request platform software package install file	Upgrades a consolidated package or an individual sub-package.

request platform software package install snapshot

To create a snapshot directory that contains all the files extracted from a consolidated package, use the **request platform software package install snapshot** command in privileged EXEC or diagnostic mode.

request platform software package install rp *rp-slot-number* **snapshot to** *URL* [**as** *snapshot-provisioning-filename*] [**force**] [**verbose**] [**wipe**]

Syntax Description

rp *rp-slot-number*	Specifies the slot number.
snapshot to *URL*	Creates a directory and extracts all files from the consolidated package into that directory. The directory is named in the command-line as part of the *URL_FS*. If the *URL_FS* is specified as a file system, the files in the consolidated package will be extracted onto the file system and not a directory on the file system.
as *snapshot-provisioning-filename*	(Optional) Renames the provisioning file in the snapshot directory. If this option is not used, the existing provisioning filename of the provisioning file in the consolidated package is used as the provisioning filename.
wipe	(Optional) Erases all content on the destination snapshot directory before extracting the files and placing them on the snapshot directory.
force	(Optional) Specifies that the operation will be forced, meaning that the upgrade will proceed despite any warning messages.
verbose	(Optional) Displays verbose information, meaning all output that can be displayed on the console during the process will be displayed.

Command Default

No default behavior or values

Command Modes

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced.

Usage Guidelines

This command is used to create a directory at the destination device and extract the individual sub-packages in a consolidated package to that directory.

The **request platform software package expand** command is the only other command that can be used to extract individual sub-packages from a consolidated package.

Examples

In the following example, a snapshot directory named snapdir1_snap is created in the bootflash: file system, and the individual sub-package files from the consolidated package are extracted into the snapshot directory.

The second portion of the example first sets up the router to reboot using the files in the snapshot directory (deletes all previous boot system commands, configures the configuration register, then enters a boot system command to boot using the extracted provisioning file), saves the new configuration, then reboots so the router will boot using the extracted provisioning file, which allows the router to run using the extracted individual sub-package files.

```
Router(diag)# request platform software package install rp 0 snapshot to
bootflash:snapdir1_snap
--- Starting active image file snapshot --- Validating snapshot parameters Creating
destination directory Copying files to destination media
   Copied provisioning file as packages.conf
   Copying package file asr1000rp1-rpbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
   Copying package file
asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
   Copying package file
asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
   Copying package file
asr1000rp1-rpaccess-k9.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
   Copying package file
asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
   Copying package file asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
   Copying package file
asr1000rp1-espbase.v122_33_xn_asr_rls0_throttle_20071204_051318.pkg
Moving files into final location Finished active image file snapshot

Router(config)# no boot system
Router(config)# config-register 0x1
Router(config)# boot system harddisk:snapdir1_snap/packages.conf
Router(config)# exit
*May 11 01:31:04.815: %SYS-5-CONFIG_I: Configured from console by con
Router# write mem
Building configuration...
[OK]
Router# reload
```

Related Commands

Command	Description
request platform software package install file	Upgrades a consolidated package or an indivual sub-package.

request platform software process release

To restart processes that have been placed in the hold down state by the Process Manager on the Cisco ASR 1000 Series Routers, use the **request platform software process release** command in privileged EXEC or diagnostic mode.

request platform software process release *slot* **all**

Syntax Description

slot	Specifies the hardware slot. Options include: • *number*—The number of the SIP slot of the hardware module where the trace level is being set. For instance, if you wanted to specify the SIP in SIP slot 2 of the router, enter 2 as the *number*. • **f0**—The ESP in ESP slot 0. • **f1**—The ESP in ESP slot 1 • **fp active**—The active ESP. • **fp standby**—The standby ESP. • **r0**—The RP in RP slot 0. • **r1**—The RP in RP slot 1. • **rp active**—The active RP. • **rp standby**—The standby RP.
all	Specifies that all processes currently in the holddown state within the selected slot will be restarted.

Command Default

No default behavior or values

Command Modes

Privileged EXEC (#)
Diagnostic Mode (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced.

Usage Guidelines

This command is used to restart processes in the holddown state. If a process is in the holddown state, a console message is generated to notify the user that the process is helddown.

Before placing any process in the holddown state, the Process Manager makes up to 5 attempts over 120 seconds to enable the process. These attempts to enable the process also happen automatically at startup. If the Process Manager is unable to enable the process after these attempts, the process will then be placed in the holddown state.

When this command is entered, it only attempts to restart processes currently in the holddown state. Active processes will not be affected by entering this command.

Examples

In the following example, this command is entered to restart any process currently on RP 0 in the holddown state:

```
request platform software process release r0 all
```

request platform software system shell

To request platform shell access, use the **request platform software system shell** command in privileged EXEC mode.

request platform software system shell [**rp | esp | sip**]

Syntax Description

rp	Specifies the Route Processor (RP); it can be either active or standby.
esp	Specifies the Embedded Services Processor (ESP) control processor; it can be either active or standby.
sip	Specifies the SPA Interface Processor (SIP).

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)XNC	This command was introduced.

Usage Guidelines

The **platform shell** command needs to be entered before before using the **request platform software system shell** command. Providing shell access would not be necessary. However, there might be some cases where the command may not be available, or the IOS process hangs, or IOS console may not be available. In such cases, you can login to the shell and see the status of the system.

The shell should be accessed under Cisco supervision, and no support is provided if accessed without supervision. The following message is displayed , before the shell access is granted:

"Activity within this shell can jeopardize the functioning of the system.

Use this functionality only under supervision of Cisco Support."

Examples

In the following example, a request to theplatform shell is made

```
Router(config)# platform shell
Router(config)# exit
Router# request platform software shell system
Activity within this shell can jeopardize the functioning of the system.
Are you sure you want to continue? [y/n] y
**********************************************************************
Activity within this shell can jeopardize the functioning
of the system.
Use this functionality only under supervision of Cisco Support.
```

Related Commands

Command	Description
platform shell	Grants shell and enters shell access grant configuration mode.

request platform software shell session output format

To modify the format of the output of some **show** commands on the Cisco ASR1000 Series Routers, use the **request platform software shell session output format** command in privileged EXEC and diagnostic mode.

request platform software shell session output format *format*

Syntax Description

format	Specifies the output format for **show** command output. Options include: • **html**—Specifies Hypertext Markup Language (HTML) output. • **raw**—Specifies the raw message output. • **text**—Specifies plaintext output, which is the default. • **xml**—Specifies Extensible Markup Language (XML) output

Command Default

All **show** command output is seen in plaintext (the **text** *format)* by default.

Command Modes

Privileged EXEC (#)
Diagnostic Mode (diag)

Command History

Release	Modification
IOS XE Release 2.1	This command was introduced

Usage Guidelines

Entering this command can only change the output of some **show** commands that are available in both privileged EXEC and diagnostic mode. At the current time, most of these commands are **show platform software** and **show platform hardware** commands.

Only a small subset of commands currently produce output using the **html** option.

Examples

In the following example, the **request platform software shell session output format** command is used to change the show output format from **text** to **raw**. The output of the **show platform hardware slot r0 alarms visual** command is shown both before and after the **request platform software shell session output format** command was entered to illustrate the change in output format.

```
Router# show platform hardware slot r0 alarms visual
Current Visual Alarm States

Critical: On
Major   : On
Minor   : Off

Router# request platform software shell session output format raw

Router# show platform hardware slot r0 alarms visual
message@alarms_msg: {
```

```
  tdl_cman_alarms_data@tdl_cman_alarms_data: {
    critical@tdl_boolean:TDL_TRUE
    major@tdl_boolean:TDL_TRUE
    minor@tdl_boolean:TDL_FALSE
  }
}
message@ui_req_msg: {
  ui_req@ui_req: {
    request_id@U64:2
    client@ui_client: {
      location@svc_loc: {
        fru@b_fru:BINOS_FRU_RP
        slotnum@I16:0
        baynum@I16:0
      }
      client_type@ui_client_type:UICLIENT_INVALID
      term_type@ui_terminal_type:UITT_INVALID
      ttynum@U32:0
      tty_name@NS:
      user_name@NS:
    }
    command@NS:
    request_name@NS:
    flags@ui_req_flag:
  }
}
```

In the following example, the **request platform software shell session output format** command is used to change the show output format from **text** to **xml**. The output of the **show platform hardware slot r0 alarms visual** command is shown both before and after the **request platform software shell session output format** command was entered to illustrate the change in output format.

```
Router# show platform hardware slot r0 alarms visual
Current Visual Alarm States

Critical: On
Major   : On
Minor   : Off

Router# request platform software shell session output format xml

Router# show platform hardware slot r0 alarms visual
<?xml version="1.0"?>
<iossr-response action="3">
<cmd-response>
<alarms_msg><tdl_cman_alarms_data><critical><TDL_TRUE/></critical>
<major><TDL_TRUE/></major>
<minor><TDL_FALSE/></minor>
</tdl_cman_alarms_data>
</alarms_msg>
<ui_req_msg><ui_req><request_id>4</request_id>
<client><location><fru><BINOS_FRU_RP/></fru>
<slotnum>0</slotnum>
<baynum>0</baynum>
</location>
<client_type><UICLIENT_INVALID/></client_type>
<term_type><UITT_INVALID/></term_type>
<ttynum>0</ttynum>
<tty_name></tty_name>
<user_name></user_name>
</client>
```

```
<command></command>
<request_name></request_name>
<flags></flags>
</ui_req>
</ui_req_msg>
</cmd-response>
</iossr-response>
```

request platform software vty attach

To enter EXEC mode on a router after persistent SSH or persistent Telnet is configured to connect to the router in diagnostic mode, use the **request platform software vty attach** command in diagnostic mode.

request platform software vty attach [**permanent**]

Syntax Description

permanent	(Optional) Specifies that the router should not return to diagnostic mode if EXEC mode is exited.

Command Default

No default behavior or values

Command Modes

Diagnostic (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced.

Usage Guidelines

If persistent Telnet or persistent SSH is configured to make users wait for an IOS vty line before allowing them to access the IOS CLI, this command can be used to attach to an IOS vty line and place the user in EXEC mode. Exiting EXEC mode returns the user to diagnostic mode unless the **permanent** keyword is entered. When the **permanent** keyword is entered, exiting EXEC mode exits the router.

The vty lines must be configured to allow local login for this command to work. The vty lines must also be configured to accept the type of transport traffic (SSH or Telnet) being used to connect to the router for the session in which the **request platform software vty attach** command is entered.

Examples

In the following example, this command is used to leave diagnostic mode and enter privileged EXEC mode:

```
Router(diag)# request platform software vty attach
Router#
```

In the following example, this command is used to leave diagnostic mode and enter privileged EXEC mode. The user then re-enters diagnostic mode by exiting privileged EXEC mode:

```
Router(diag)# request platform software vty attach
Router# exit
Router(diag)#
```

In the following example, this command is used with the **permanent** option to leave diagnostic mode and enter privileged EXEC mode. The user then exits the router by exiting privileged EXEC mode:

```
Router(diag)# request platform software vty attach permanent
Router# exit
Connection to Router closed.
```

revision

To set the revision number for the Multiple Spanning Tree (802.1s) (MST) configuration, use the **revision** command in MST configuration submode. To return to the default settings, use the **no** form of this command.

revision *version*

no revision

Syntax Description

version	Revision number for the configuration; valid values are from 0 to 65535.

Defaults

version is **0**.

Command Modes

MST configuration submode

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Two Cisco 7600 series routers that have the same configuration but different revision numbers are considered to be part of two different regions.

Caution Be careful when using the **revision** command to set the revision number of the MST configuration because a mistake can put the switch in a different region.

Examples

This example shows how to set the revision number of the MST configuration:

```
Router(config-mst)# revision 5
Router(config-mst)#
```

Related Commands

Command	Description
instance	Maps a VLAN or a set of VLANs to an MST instance.
name (MST configuration submode)	Sets the name of an MST region.
show	Verifies the MST configuration.
show spanning-tree	Displays information about the spanning-tree state.
spanning-tree mst configuration	Enters MST-configuration submode.

rmdir

To remove an existing directory in a Class C Flash file system, use the **rmdir** command in EXEC, privileged EXEC, or diagnostic mode.

rmdir *directory*

Syntax Description

directory	Directory to delete.

Command Modes

User EXEC

Privileged EXEC

Diagnostic

Command History

Release	Modification
11.3 AA	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR1000 Series Router and was made available in diagnostic mode.

Usage Guidelines

This command is valid only on Class C Flash file systems.

Caution You can use the **rmdir** command to remove a directory that another user is currently accessing in read-only mode, for example if it is that user's default working directory. If you use the **rmdir** command to remove such a directory and a user whose current directory is set to the deleted directory then uses the **pwd** command to display the current working directory, the following error message is displayed: Cannot determine current directory.

Examples

The following example deletes the directory named newdir:

```
Router# dir

Directory of flash:

  2  drwx           0   Mar 13 1993 13:16:21  newdir

8128000 bytes total (8126976 bytes free)
Router# rmdir newdir
Rmdir file name [newdir]?
Delete flash:newdir? [confirm]
Removed dir flash:newdir
Router# dir
Directory of flash:

No files in directory
8128000 bytes total (8126976 bytes free)
```

Related Commands

Command	Description
dir	Displays a list of files on a file system.
mkdir	Creates a new directory in a Class C Flash file system.

rommon-pref

To select a ReadOnly or Upgrade ROMmon image to be booted on the next reload of a Cisco 7200 VXR router or Cisco 7301 router when you are in ROMmon, use the **rommon-pref** command in ROM monitor mode.

rommon-pref [readonly | upgrade]

Syntax Description

readonly	Selects the ReadOnly ROMmon image to be booted on the next reload.
upgrade	Selects the Upgrade, second ROMmon image to be booted on the next reload.

Defaults

No default behavior or values

Command Modes

ROM monitor mode

Command History

Release	Modification
12.0(28)S	This command was introduced on the Cisco 7200 VXR router. It was introduced in ROMmon version 12.3(4r)T1 for the Cisco 7200 VXR router.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T and supported on the Cisco 7200 VXR router and Cisco 7301 router. It was introduced in ROMmon version 12.3(4r)T2 for the Cisco 7301 router.
12.3(9)	This command was integrated into Cisco IOS Release 12.3(9) and supported on the Cisco 7200 VXR router and Cisco 7301 router.

Usage Guidelines

You might select the ReadOnly ROMmon image to be booted on the next reload because the Upgrade image has features or side effects you do not like.

When you are in ROMmon, there is no descriptive output to inform you whether the ReadOnly ROMmon image was reloaded. To confirm the reload, use the **showmon** command after entering the **rommon-pref readonly** command.

Use this command when you are in ROMmon mode. Use the **upgrade rom-monitor preference** command when you are in Cisco IOS.

Examples

The following example, applicable to both the Cisco 7200 VXR and Cisco 7301 routers, shows how to select the ReadOnly ROMmon image to be booted on the next reload of the router when you are already in ROMmon mode:

```
rommon 2 > rommon-pref readonly
```

Related Commands

Command	Description
showmon	Shows both the ReadOnly and the Upgrade ROMmon image versions when you are in ROMmon mode, as well as which ROMmon image is running.

route-converge-interval

To configure the time interval after which the old FIB entries are purged, use the **route-converge-interval** command in main CPU submode. To return to the default settings, use the **no** form of this command.

route-converge-interval *seconds*

no route-converge-interval

Syntax Description

seconds	Time interval, in seconds, after which the old FIB entries are purged; valid values are from 60 to 3600 seconds.

Defaults

seconds is **120** seconds (2 minutes).

Command Modes

Main CPU submode

Command History

Release	Modification
12.2(17b)SXA	Support for this command was introduced on the Supervisor Engine 720.
12.2(18)SXD	This command is supported on releases prior to Release 12.2(18)SXD.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

SRM/SSO is supported in the following releases only.

- Release 12.2(17b)SXA and later rebuilds of Release 12.2(17b)SXA
- Release 12.2(17d)SXB and later rebuilds of Release 12.2(17d)SXB

This command is not supported in Cisco 7600 series routers that are configured with a Supervisor Engine 2.

The time interval for route-converge delay is needed to simulate the route-converge time when routing protocols restart on switchover.

Examples

This example shows how to set the time interval for the route-converge delay:

```
Router(config)# redundancy
Router(config-red)# main-cpu
Router(config-red-main)# route-converge-interval 90
Router(config-red-main)#
```

This example shows how to return to the default time interval for the route-converge delay:

```
Router(config)# redundancy
Router(config-red)# main-cpu
Router(config-red-main)# no route-converge-interval
Router(config-red-main)#
```

Related Commands

Command	Description
redundancy	Enters redundancy configuration mode.

rsh

To execute a command remotely on a remote shell protocol (rsh) host, use the **rsh** command in privileged EXEC mode.

rsh {*ip-address* | *host*} [**/user** *username*] *remote-command*

Syntax Description

ip-address	IP address of the remote host on which to execute the **rsh** command. Either the IP address or the host name is required.
host	Name of the remote host on which to execute the command. Either the host name or the IP address is required.
/user *username*	(Optional) Remote username.
remote-command	Command to be executed remotely.

Defaults

If you do not specify the **/user** *username* keyword and argument, the Cisco IOS software sends a default remote username. As the default value of the remote username, the software sends the username associated with the current tty process, if that name is valid. For example, if the user is connected to the router through Telnet and the user was authenticated through the **username** command, then the software sends that username as the remote username. If the tty username is invalid, the software uses the host name as the both the remote and local usernames.

Note For Cisco, tty lines are commonly used for access services. The concept of tty originated with UNIX. For UNIX systems, each physical device is represented in the file system. Terminals are sometimes called tty devices (tty stands for teletype, the original UNIX terminal).

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use the **rsh** command to execute commands remotely. The host on which you remotely execute the command must support the rsh protocol, and the *.rhosts* files on the rsh host must include an entry that permits you to remotely execute commands on that host.

For security reasons, the software does not default to a remote login if no command is specified, as does UNIX. Instead, the router provides Telnet and connect services that you can use rather than rsh.

Examples

The following command specifies that the user named sharon attempts to remotely execute the UNIX **ls** command with the *-a* argument on the remote host named mysys.cisco.com. The command output resulting from the remote execution follows the command example:

```
Router1# rsh mysys.cisco.com /user sharon ls -a
.
.
.
.alias
.cshrc
.emacs
.exrc
.history
.login
.mailrc
.newsrc
.oldnewsrc
.rhosts
.twmrc
.xsession
jazz
```

scheduler allocate

To guarantee CPU time for processes, use the **scheduler allocate** command in global configuration mode. To restore the default, use the **no** form of this command.

scheduler allocate *interrupt-time process-time*

no scheduler allocate

Syntax Description

interrupt-time	Integer (in microseconds) that limits the maximum number of microseconds to spend on fast switching within any one network interrupt context. The range is from 400 to 60000 microseconds. The default is 4000 microseconds.
process-time	Integer (in microseconds) that guarantees the minimum number of microseconds to spend at the process level when network interrupts are disabled. The range is from 100 to 4000 microseconds.The default is 200 microseconds. The default for Catalyst 6500 series switches and Cisco 7600 series routers is 800 microseconds.

Defaults

Approximately 5 percent of the CPU is available for process tasks.

Command Modes

Global configuration

Command History

Release	Modification
11.2	This command was introduced.
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17a)SX	This command was changed as follows: • The *process-time* default setting was changed from 200 microseconds to 800 microseconds. • The **no scheduler allocate** action was changed to return to the default settings.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to the 12.2(17d)SXB release.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command applies to the Catalyst 6500 series switches, Cisco 7200 series, Cisco 7500 series, and Cisco 7600 series routers.

Caution We recommend that you do not change the default settings. Changing settings associated with CPU processes can negatively impact system performance.

Entering the **scheduler allocate** command without arguments is the same as entering the **no scheduler allocate** or the **default scheduler allocate** command.

Examples

The following example makes 20 percent of the CPU available for process tasks:

```
Router(config)# scheduler allocate 2000 500
```

Related Commands

Command	Description
scheduler interval	Controls the maximum amount of time that can elapse without running system processes.

scheduler heapcheck process

To perform a "sanity check" for corruption in memory blocks when a process switch occurs, use the **scheduler heapcheck process** command in global configuration mode. To disable this feature, use the **no** form of this command.

scheduler heapcheck process [**memory** [**fast**] [**io**] [**multibus**] [**pci**] [**processor**] [**checktype** {**all** | **magic** | **pointer** | **refcount** | **lite-chunks**}]]

no scheduler heapcheck process

Syntax Description

memory	(Optional) Specifies checking all memory blocks and memory pools.
fast	(Optional) Specifies checking the fast memory block.
io	(Optional) Specifies checking the I/O memory block.
multibus	(Optional) Specifies checking the multibus memory block.
pci	(Optional) Specifies checking the process control information (PCI) memory block.
processor	(Optional) Specifies checking the processor memory block.
checktype	(Optional) Specifies checking specific memory pools.
all	(Optional) Specifies checking the value of the block magic, red zone, size, refcount, and pointers (next and previous).
magic	(Optional) Specifies checking the value of the block magic, red zone, and size.
pointer	(Optional) Specifies checking the value of the next and previous pointers.
refcount	(Optional) Specifies checking the value of the block magic and refcount.
lite-chunks	(Optional) Specifies checking the memory blocks allocated by the memory allocation lite (malloc_lite) feature.

Defaults

This command is disabled by default. If no keywords are specified, a sanity check will be performed on all the memory blocks and memory pools.

Command Modes

Global configuration

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.3(11)T	The **lite-chunks** keyword was added.

Usage Guidelines

When configuring this command, you can choose none or all memory block keywords (**fast**, **io**, **multibus**, **pci**, **processor**, and **checktype**).

Enabling this command has a significant impact on router performance.

Examples

The following example shows how to sanity check for corruption in the I/O memory block when a process switch occurs. In this example, the values of only the block magic, red zone, and size will be checked.

```
scheduler heapcheck process memory io checktype magic
```

The following example shows how to sanity check for corruption in the processor memory block when a process switch occurs. In this example, the values of only the next and previous pointers will be checked.

```
scheduler heapcheck process memory processor checktype pointer
```

Related Commands

Command	Description
memory lite	Enables the malloc_lite feature.
memory sanity	Performs a “sanity check” for corruption in buffers and queues.

scheduler interrupt mask profile

To start interrupt mask profiling for all processes running on the system, use the **scheduler interrupt mask profile** command in global configuration mode. To stop interrupt mask profiling, use the **no** form of this command.

scheduler interrupt mask profile

no scheduler interrupt mask profile

Syntax Description

This command has no arguments or keywords.

Defaults

Interrupt mask profiling is disabled by default.

Command Modes

Global configuration

Command History

Release	Modification
12.4(2)T	This command was introduced.

Usage Guidelines

This command enables the collection of details regarding the total amount of time a process has masked interrupts since the interrupt mask profiler was enabled.

Examples

The following example shows how to enable interrupt mask profiling:

```
Router(config)# scheduler interrupt mask profile
```

Related Commands

Command	Description
clear processes interrupt mask detail	Clears the interrupt masked details for all processes and stack traces that have been dumped into the interrupt mask buffer.
scheduler interrupt mask size	Configures the maximum number of entries that can exist in the interrupt mask buffer.
scheduler interrupt mask time	Configures the maximum allowed time that a process can run with interrupts masked.
show process interrupt mask buffer	Displays the information stored in the interrupt mask buffer.
show processes interrupt mask detail	Displays interrupt masked details for the specified process or all processes in the system.

scheduler interrupt mask size

To configure the maximum number of entries that can exist in the interrupt mask buffer, use the **scheduler interrupt mask size** command in global configuration mode. To reset the maximum number of entries that can exist in the interrupt mask buffer to the default, use the no form of this command.

scheduler interrupt mask size *buffersize*

no scheduler interrupt mask size

Syntax Description

buffersize	Specifies the number of entries that can exist in the interrupt mask buffer.

Defaults

The default buffer size is 50 entries.

Command Modes

Global configuration

Command History

Release	Modification
12.4(2)T	This command was introduced.

Examples

The following example shows how to configure 100 entries the maximum number of entries that can exist in the interrupt mask buffer:

```
Router(config)# scheduler interrupt mask size 100
```

Related Commands

Command	Description
clear processes interrupt mask detail	Clears the interrupt masked details for all processes and stack traces that have been dumped into the interrupt mask buffer.
scheduler interrupt mask profile	Enables or disables interrupt mask profiling for all processes running on the system.
scheduler interrupt mask time	Configures the maximum amount of time a process can run with interrupts masked.
show processes interrupt mask buffer	Displays interrupt masked details for the specified process or all processes in the system and displays information stored in the interrupt mask buffer.
show processes interrupt mask detail	Displays interrupt masked details for the specified or all processes in the system.

scheduler interrupt mask time

To configure the maximum time that a process can run with interrupts masked before another entry is created in the interrupt mask buffer, use the **scheduler interrupt mask time** command in global configuration mode. To reset the threshold time to the default, use the **no** form of this command.

scheduler interrupt mask time *threshold-time*

no scheduler interrupt mask time

Syntax Description

threshold-time	Specifies the maximum amount of timein microseconds a process can be in interrupt masked state without creating an entry in the interrupt mask buffer.

Defaults

The default threshold time value is 50 microseconds.

Command Modes

Global configuration

Command History

Release	Modification
12.4(2)T	This command was introduced.

Examples

The following shows how to configure 100 microseconds as the maximum time a process can run with interrupts masked before another entry is created in the interrupt mask buffer:

```
Router(config)# scheduler interrupt mask time 100
```

Related Commands

Command	Description
clear processes interrupt mask detail	Clears the interrupt masked details for all processes and stack traces that have been dumped into the interrupt mask buffer.
scheduler interrupt mask profile	Enables or disables interrupt mask profiling for all processes running on the system.
scheduler interrupt mask size	Configures the maximum number of entries that can exist in the interrupt mask buffer.
show processes interrupt mask buffer	Displays the information stored in the interrupt mask buffer.
show processes interrupt mask detail	Displays interrupt masked details for the specified process or all processes in the system.

scheduler interval

To control the maximum amount of time that can elapse without running system processes, use the **scheduler interval** command in global configuration mode. To restore the default, use the **no** form of this command.

scheduler interval *milliseconds*

no scheduler interval

Syntax Description

milliseconds	Integer that specifies the interval (in milliseconds). The minimum interval that you can specify is 500 milliseconds; there is no maximum value.

Defaults

High-priority operations are allowed to use as much of the CPU as needed.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The normal operation of the network server allows the switching operations to use as much of the central processor as is required. If the network is running unusually heavy loads that do not allow the processor the time to handle the routing protocols, give priority to the system process scheduler. High-priority operations are allowed to use as much of the CPU as needed.

Note Changing settings associated with CPU processes can negatively impact system performance.

On the Cisco 7200 series and Cisco 7500 series, use the **scheduler allocate** global configuration command instead of the **scheduler interval** command.

Examples

The following example changes the low-priority process schedule to an interval of 750 milliseconds:

```
Router(config)# scheduler interval 750
```

Related Commands

Command	Description
scheduler allocate	Guarantees CPU time for processes.

send

To send messages to one or all terminal lines, use the **send** command in EXEC mode.

send {*line-number* | ***** | **aux** *number* | **console** *number* | **tty** *number* | **vty** *number*}

Syntax Description

line-number	Line number to which the message will be sent.
*****	Sends a message to all lines.
aux *number*	Sends a message to the specified AUX port.
console *number*	Sends a message to the specified console port.
tty *number*	Sends a message to the specified asynchronous line.
vty *number*	Sends a message to the specified virtual asynchronous line.

Defaults

No messages are sent.

Command Modes

User EXEC

Priviledged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

After entering this command, the system prompts for the message to be sent, which can be up to 500 characters long. Enter **Ctrl-Z** to end the message. Enter **Ctrl-C** to abort this command.

Caution Be aware that in some circumstances text sent using the **send** command may be interpreted as an executable command by the receiving device. For example, if the receiving device is Unix workstation, and the receiving device is in a state (shell) where commands can be executed, the incoming text, if a properly formated Unix command, will be accepted by the workstation as a command. For this reason, you should limit your exposure to potential messages from terminal servers or other Cisco IOS-based devices when running an interactive shell.

Examples

The following example sends a message to all lines:

```
2509# send *
Enter message, end with CTRL/Z; abort with CTRL/C:
The system 2509 will be shut down in 10 minutes for repairs.^Z
Send message? [confirm]
2509#
```

```
***
***
*** Message from tty0 to all terminals:
***
The system 2509 will be shut down in 10 minutes for repairs.
```

service compress-config

To compress startup configuration files, use the **service compress-config** command in global configuration mode. To disable compression, use the **no** form of this command.

service compress-config

no service compress-config

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

After you configure the **service compress-config** command, the router will compress configuration files every time you save a configuration to the startup configuration. For example, when you enter the **copy system:running-config nvram:startup-config** command, the running configuration will be compressed before storage in NVRAM.

If the file compression succeeds, the following message is displayed:

```
Compressing configuration from configuration-size to compressed-size
[OK]
```

If the boot ROMs do not recognize a compressed configuration, the following message is displayed:

```
Boot ROMs do not support NVRAM compression Config NOT written to NVRAM
```

If the file compression fails, the following message is displayed:

```
Error trying to compress nvram
```

One way to determine whether a configuration file will be compressed enough to fit into NVRAM is to use a text editor to enter the configuration, then use the UNIX **compress** command to check the compressed size. To get a closer approximation of the compression ratio, use the UNIX **compress -b12** command.

Once the configuration file has been compressed, the router functions normally. At boot time, the system recognizes that the configuration file is compressed, uncompresses it, and proceeds normally. A **partition nvram:startup-config** command uncompresses the configuration before displaying it.

To disable compression of the configuration file, enter configuration mode and specify the **no service compress-config** command. Then, exit global configuration mode and enter the **copy system:running-config nvram:startup-config** command. The router displays an OK message if it is

able to write the uncompressed configuration to NVRAM. Otherwise, the router displays an error message indicating that the configuration is too large to store. If the configuration file is larger than the physical NVRAM, the following message is displayed:

```
##Configuration too large to fit uncompressed in NVRAM Truncate configuration? [confirm]
```

When the file is truncated, commands at the end of the file are erased. Therefore, you will lose part of your configuration. To truncate and save the configuration, type **Y**. To not truncate and not save the configuration, type **N**.

Examples

In the following example, the configuration file is compressed:

```
Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# service compress-config
Router(config)# end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router# copy system:running-config nvram:startup-config
Building configuration...
Compressing configuration from 1179 bytes to 674 bytes
[OK]
```

Related Commands

Command	Description
partition nvram:startup-config	Separates Flash memory into partitions on Class B file system platforms.

service config

To enable autoloading of configuration files from a network server, use the **service config** command in global configuration mode. To restore the default, use the **no** form of this command.

service config

no service config

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled, except on systems without NVRAM or with invalid or incomplete information in NVRAM. In these cases, autoloading of configuration files from a network server is enabled automatically.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Usually, the **service config** command is used in conjunction with the **boot host** or **boot network** command. You must enter the **service config** command to enable the router to automatically configure the system from the file specified by the **boot host** or **boot network** command.

With IOS software versions 12.3(2)T , 12.3(1)B, and later, you no longer have to specify the **service config** command for the **boot host** or **boot network** command to be active.

If you specify both the **no service config** command and the **boot host** command, the router attempts to find the specified host configuration file. The **service config** command can also be used without the **boot host** or **boot network** command. If you do not specify host or network configuration filenames, the router uses the default configuration files. The default network configuration file is network-confg. The default host configuration file is host-confg, where host is the hostname of the router. If the Cisco IOS software cannot resolve its hostname, the default host configuration file is router-confg.

Examples

In the following example, a router is configured to autoload the default network and host configuration files. Because no **boot host** or **boot network** commands are specified, the router uses the broadcast address to request the files from a TFTP server.

```
Router(config)# service config
```

The following example changes the network configuration filename to bridge_9.1, specifies that rcp is to be used as the transport mechanism, and gives 172.16.1.111 as the IP address of the server on which the network configuration file resides:

```
Router(config)# service config
Router(config)# boot network rcp://172.16.1.111/bridge_9.1
```

Related Commands

Command	Description
boot host	Changes the default name of the host configuration filename from which to load configuration commands.
boot network	Changes the default name of the network configuration file from which to load configuration commands.

service counters max age

To set the time interval for retrieving statistics, use the **service counters max age** command in global configuration mode. To return to the default settings, use the **no** form of this command.

service counters max age *seconds*

no service counters max age

Syntax Description

seconds	Maximum age, in seconds, of the statistics retrieved from the CLI or SNMP; valid values are from 0 to 60 seconds.

Defaults

seconds is **5** seconds.

Command Modes

Global configuration

Command History

Release	Modification
12.2(18)SXD	Support for this command was introduced on the Supervisor Engine 720 and the Supervisor Engine 2.
12.2(18)SXF	This command was changed as follows: • The default was changed from 10 seconds to 5 seconds. • The valid values for seconds was changed from 1 to 60 seconds to 0 to 60 seconds.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

A fully loaded Catalyst 6500 series switch chassis running Cisco IOS software version 12.2(18)SXF or its minor variants (SXF through SXF5) takes 1-2 minutes to update the SNMP counters maintained under ifTable and ifXTable.

Polling the ifTable/ifXTable is done with the need to understand how much traffic is being handled by a specific port/interface. The typical polling interval to meet this need is 3-5 minutes. No gain is achived by reducing the polling interval to intervals lesser than 3 minutes.

Note If you decrease the time interval for retrieving statistics from the default setting (5 seconds), traffic congestion may result in situations where frequent SNMP (SMNP bulk) retrievals occur.

Examples

This example shows how to set the time interval for retrieving statistics:

```
Router(config)# service counters max age 10
Router(config)#
```

This example shows how to return to the default setting:

```
Router(config)# no service counters max age
Router(config)#
```

service decimal-tty

To specify that line numbers be displayed and interpreted as octal numbers rather than decimal numbers, use the **no service decimal-tty** command in global configuration mode. To restore the default, use the **service decimal-tty** command.

service decimal-tty

no service decimal-tty

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled (line numbers displayed as decimal numbers)

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

In the following example, the router is configured to display decimal rather than octal line numbers:

```
Router(config)# service decimal-tty
```

service exec-wait

To delay the startup of the EXEC on noisy lines, use the **service exec-wait** command in global configuration mode. To disable the delay function, use the **no** form of this command.

service exec-wait

no service exec-wait

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command delays startup of the EXEC until the line has been idle (no traffic seen) for 3 seconds. The default is to enable the line immediately on modem activation.

This command is useful on noisy modem lines or when a modem attached to the line is configured to ignore MNP/V.42 negotiations, and MNP/V.42 modems may be dialing in. In these cases, noise or MNP/V.42 packets may be interpreted as usernames and passwords, causing authentication failure before the user has a chance to type a username or password. The command is not useful on nonmodem lines or lines without some kind of login configured.

Examples

The following example delays the startup of the EXEC:

```
Router(config)# service exec-wait
```

service finger

The **service finger** command has been replaced by the **ip finger** command. However, the **service finge**r and **no service finger** commands continue to function to maintain backward compatibility with older versions of Cisco IOS software. Support for this command may be removed in a future release. See the description of the **ip finger** command for more information.

service hide-telnet-address

To hide addresses while trying to establish a Telnet session, use the **service hide-telnet-address** command in global configuration mode. To disable this service, use the **no** form of this command.

service hide-telnet-address

no service hide-telnet-address

Syntax Description

This command has no arguments or keywords.

Defaults

Addresses are displayed.

Command Modes

Global configuration

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

When you attempt to connect to a device, the router displays addresses and other messages (for example, "Trying router1 (171.69.1.154, 2008)...)." With the hide feature, the router suppresses the display of the address (for example, "Trying router1 address #1..."). The router continues to display all other messages that would normally be displayed during a connection attempt, such as detailed error messages if the connection was not successful.

The hide feature improves the functionality of the busy-message feature. When you configure only the **busy-message** command, the normal messages generated during a connection attempt are not displayed; only the busy-message is displayed. When you use the hide and busy features together you can customize the information displayed during Telnet connection attempts. When you configure the **service hide-telnet-address** command and the **busy-message** command, the router suppresses the address and displays the message specified with the **busy-message** command if the connection attempt is not successful.

Examples

The following example hides Telnet addresses:

```
Router(config)# service hide-telnet-address
```

Related Commands

Command	Description
busy-message	Creates a "host failed" message that is displayed when a connection fails.

service linenumber

To configure the Cisco IOS software to display line number information after the EXEC or incoming banner, use the **service linenumber** command in global configuration mode. To disable this function, use the **no** form of this command.

service linenumber

no service linenumber

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

With the **service linenumber** command, you can have the Cisco IOS software display the host name, line number, and location each time an EXEC process is started, or an incoming connection is made. The line number banner appears immediately after the EXEC banner or incoming banner. This feature is useful for tracking problems with modems, because the host and line for the modem connection are listed. Modem type information can also be included.

Examples

In the following example, a user Telnets to Router2 before and after the **service linenumber** command is enabled. The second time, information about the line is displayed after the banner.

```
Router1> telnet Router2

Trying Router2 (172.30.162.131)... Open

Welcome to Router2.

User Access Verification

Password:
Router2> enable
Password:
Router2# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router2(config)# service linenumber
Router2(config)# end
Router2# logout

[Connection to Router2 closed by foreign host]
```

```
Router1> telnet Router2
Trying Router2 (172.30.162.131)... Open

Welcome to Router2.

Router2 line 10


User Access Verification

Password:
Router2>
```

Related Commands

Command	Description
show users	Displays information about the active lines on the router.

service nagle

To enable the Nagle congestion control algorithm, use the **service nagle** command in global configuration mode. To disable the algorithm, use the **no** form of this command.

service nagle

no service nagle

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

When using a standard TCP implementation to send keystrokes between machines, TCP tends to send one packet for each keystroke typed. On larger networks, many small packets use up bandwidth and contribute to congestion.

The algorithm developed by John Nagle (RFC 896) helps alleviate the small-packet problem in TCP. In general, it works this way: The first character typed after connection establishment is sent in a single packet, but TCP holds any additional characters typed until the receiver acknowledges the previous packet. Then the second, larger packet is sent, and additional typed characters are saved until the acknowledgment comes back. The effect is to accumulate characters into larger chunks, and pace them out to the network at a rate matching the round-trip time of the given connection. This method is usually effective for all TCP-based traffic. However, do not use the **service nagle** command if you have XRemote users on X Window system sessions.

Examples

The following example enables the Nagle algorithm:

```
Router(config)# service nagle
```

service prompt config

To display the configuration prompt (config), use the **service prompt config** command in global configuration mode. To remove the configuration prompt, use the **no** form of this command.

service prompt config

no service prompt config

Syntax Description

This command has no arguments or keywords.

Defaults

The configuration prompts appear in all configuration modes.

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

In the following example, the **no service prompt config** command prevents the configuration prompt from being displayed. The prompt is still displayed in EXEC mode. When the **service prompt config** command is entered, the configuration mode prompt reappears.

```
Router# configure terminal

Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# no service prompt config
hostname newname
end
newname# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
service prompt config
newname(config)# hostname Router
Router(config)# end
Router#
```

Related Commands

Command	Description
hostname	Specifies or modifies the host name for the network server.
prompt	Customizes the prompt.

service sequence-numbers

To enable visible sequence numbering of system logging messages, use the **service sequence-numbers** command in global configuration mode. To disable visible sequence numbering of logging messages, use the **no** form of this command.

service sequence-numbers

no service sequence-numbers

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled.

Command Modes

Global configuration

Command History

Release	Modification
12.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Each system status messages logged in the system logging process have a sequence reference number applied. This command makes that number visible by displaying it with the message. The sequence number is displayed as the first part of the system status message. See the description of the **logging** commands for information on displaying logging messages.

Examples

In the following example logging message sequence numbers are enabled:

```
.Mar 22 15:28:02 PST: %SYS-5-CONFIG_I: Configured from console by console
Router# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# service sequence-numbers
Router(config)# end
Router#
000066: .Mar 22 15:35:57 PST: %SYS-5-CONFIG_I: Configured from console by console
```

Related Commands

Command	Description
logging on	Enables system logging globally.
service timestamps	Enables time-stamping of system logging messages or debugging messages.

service slave-log

To allow slave Versatile Interface Processor (VIP) cards to log important error messages to the console, use the **service slave-log** command in global configuration mode. To disable slave logging, use the **no** form of this command.

service slave-log

no service slave-log

Syntax Description

This command has no arguments or keywords.

Defaults

This command is enabled by default.

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command allows slave slots to log error messages of level 2 or higher (critical, alerts, and emergencies).

Examples

In the following example, the router is configured to log important messages from the slave cards to the console:

```
Router(config)# service slave-log
```

The following is sample output generated when this command is enabled:

```
%IPC-5-SLAVELOG: VIP-SLOT2:
 IPC-2-NOMEM: No memory available for IPC system initialization
```

The first line indicates which slot sent the message. The second line contains the error message.

service tcp-keepalives-in

To generate keepalive packets on idle incoming network connections (initiated by the remote host), use the **service tcp-keepalives-in** command in global configuration mode. To disable the keepalives, use the **no** form of this command.

service tcp-keepalives-in

no service tcp-keepalives-in

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

In the following example, keepalives on incoming TCP connections are generated:

```
Router(config)# service tcp-keepalives-in
```

Related Commands

Command	Description
service tcp-keepalives-out	Generates keepalive packets on idle outgoing network connections (initiated by a user).

service tcp-keepalives-out

To generate keepalive packets on idle outgoing network connections (initiated by a user), use the **service tcp-keepalives-out** command in global configuration mode. To disable the keepalives, use the **no** form of this command.

service tcp-keepalives-out

no service tcp-keepalives-out

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

In the following example, keepalives on outgoing TCP connections are generated:

```
Router(config)# service tcp-keepalives-out
```

Related Commands

Command	Description
service tcp-keepalives-in	Generates keepalive packets on idle incoming network connections (initiated by the remote host).

service tcp-small-servers

To access minor TCP/IP services available from hosts on the network, use the **service tcp-small-servers** command in global configuration mode. To disable these services, use the **no** form of the command.

service tcp-small-servers

no service tcp-small-servers

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

By default, the TCP servers for Echo, Discard, Chargen, and Daytime services are disabled.

When the minor TCP/IP servers are disabled, access to the Echo, Discard, Chargen, and Daytime ports cause the Cisco IOS software to send a TCP RESET packet to the sender and discard the original incoming packet.

Examples

The following example enables minor TCP/ IP services available from the network:

```
Router(config)# service tcp-small-servers
```

service telnet-zero-idle

To set the TCP window to zero (0) when the Telnet connection is idle, use the **service telnet-zero-idle** command in global configuration mode. To disable this service, use the **no** form of this command.

service telnet-zero-idle

no service telnet-zero-idle

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Normally, data sent to noncurrent Telnet connections is accepted and discarded. When the **service telnet-zero-idle** command is enabled, if a session is suspended (that is, some other connection is made active or the EXEC is sitting in command mode), the TCP window is set to zero. This action prevents the remote host from sending any more data until the connection is resumed. Use this command when it is important that all messages sent by the host be seen by the users and the users are likely to use multiple sessions.

Do not use this command if your host will eventually time out and log out a TCP user whose window is zero.

Examples

The following example sets the TCP window to zero when the Telnet connection is idle:

```
Router(config)# service telnet-zero-idle
```

Related Commands

Command	Description
resume	Switches to another open Telnet, rlogin, LAT, or PAD session.

service timestamps

To configure the system to apply a time stamp to debugging messages or system logging messages, use the **service timestamps** command in global configuration mode. To disable this service, use the **no** form of this command.

service timestamps [**debug** | **log**] [**uptime** | **datetime** [**msec**]] [**localtime**] [**show-timezone**] [**year**]

no service timestamps [**debug** | **log**]

Syntax Description

debug	(Optional) Indicates time-stamping for debugging messages.
log	(Optional) Indicates time-stamping for system logging messages.
uptime	(Optional) Specifies that the time stamp should consist of the time since the system was last rebooted. For example “4w6d” (time since last reboot is 4 weeks and 6 days). • This is the default time-stamp format for both debugging messages and logging messages. • The format for uptime varies depending on how much time has elapsed: – *HHHH*:*MM*:*SS* (*HHHH* hours: *MM* minutes: *SS* seconds) for the first 24 hours – *D*d*HH*h (*D* days *HH* hours) after the first day – *W*w*D*d (*W* weeks *D* days) after the first week
datetime	(Optional) Specifies that the time stamp should consist of the date and time. • The time-stamp format for **datetime** is MMM DD HH:MM:SS, where MMM is the month, DD is the date, HH is the hour (in 24-hour notation), MM is the minute, and SS is the second. • If the **datetime** keyword is specified, you can optionally add the **msec** **localtime**, **show-timezone**, or **year** keywords. • If the **service timestamps datetime** command is used without addtional keywords, time stamps will be shown using UTC, without the year, without milliseconds, and without a time zone name.
msec	(Optional) Includes milliseconds in the time stamp, in the format *HH***:***DD***:***MM***:***SS***.***mmm*, where *.mmm* is milliseconds
localtime	(Optional) Time stamp relative to the local time zone.
year	(Optional) Include the year in the date-time format.
show-timezone	(Optional) Include the time zone name in the time stamp. **Note** If the **localtime** keyword option is not used (or if the local time zone has not been configured using the **clock timezone** command), time will be displayed in Coordinated Universal Time (UTC).

Command Default Time stamps are applied to debug and logging messages.

Command Modes Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.
11.3(5)	Service time stamps are enabled by default.
12.3(1)	The **year** keyword was added.
12.3(2)T	This command was integrated into Cisco IOS Release 12.3(2)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.

Usage Guidelines Time stamps can be added to either debugging messages (**service timestamp debug**) or logging messages (**service timestamp log**) independently.

If the **service timestamps** command is specified with no arguments or keywords, the default is **service timestamps debug uptime**.

The **no service timestamps** command by itself disables time stamps for both debug and log messages.

The **uptime** form of the command adds time stamps (such as “2w3d”) that indicating the time since the system was rebooted. The **datetime** form of the command adds time stamps (such as “Sep 5 2002 07:28:20”) that indicate the date and time according to the system clock.

Entering the **service timestamps** {**debug** | **log**} command a second time will overwrite any previously configured **service timestamp** {**debug** | **log**} commands and associated options.

To set the local time zone, use the **clock timezone** *zone hours-offset* command in global configuration mode.

The time stamp will be preceeded by an asterisk or period if the time is potentially inaccurate. Table 48 describes the symbols that proceed the time stamp.

Table 48 Time-Stamping Symbols for syslog Messages

Symbol	Description	Example
(blank)	Time is authoritative: the software clock is in sync or has just been set manually	15:29:03.158 UTC Tue Feb 25 2003:
*	Time is not authoritative: the software clock has not been set, or is not in sync with configured Network Time Protocol (NTP) servers.	*15:29:03.158 UTC Tue Feb 25 2003:
.	Time is authoritative, but the NTP is not synchronized: the software clock was in sync, but has since lost contact with all configured NTP servers.	.15:29:03.158 UTC Tue Feb 25 2003:

Examples

In the following example, the router begins with time-stamping disabled. Then, the default time-stamping is enabled (uptime time stamps applied to debug output). Then, the default time-stamping for logging is enabled (uptime time stamps applied to logging output).

```
Router# show running-config | include time

no service timestamps debug uptime
no service timestamps log uptime

Router# config terminal
Router(config)# service timestamps
! issue the show running-config command in config mode using do
Router(config)# do show running-config | inc time
! shows that debug timestamping is enabled, log timestamping is disabled

service timestamps debug uptime
no service timestamps log uptime

! enable timestamps for logging messages
Router(config)# service timestamps log
Router(config)# do show run | inc time

service timestamps debug uptime
service timestamps log uptime

Router(config)# service sequence-numbers
Router(config)# end
000075: 5w0d: %SYS-5-CONFIG_I: Configured from console by console

! The following is a level 5 system logging message
! The leading number comes from the service sequence-numbers command.
! 4w6d indicates the timestamp of 4 weeks, 6 days

000075: 4w6d: %SYS-5-CONFIG_I: Configured from console by console
```

In the following example, the user enables time-stamping on logging messages using the current time and date in Coordinated Universal Time/Greenwich Mean Time (UTC/GMT), and enables the year to be shown.

```
Router(config)#
! The following line shows the timestamp with uptime (1 week 0 days)

1w0d: %SYS-5-CONFIG_I: Configured from console by console

Router(config)# service timestamps log datetime show-timezone year
Router(config)# end

! The following line shows the timestamp with datetime (11:13 PM March 22nd)

.Mar 22 2004 23:13:25 UTC: %SYS-5-CONFIG_I: Configured from console by console
```

The following example shows the change from UTC to local time:

```
Router# configure terminal

! Logging output can be quite long; first changing line width to show full
! logging message

Router(config)# line 0
Router(config-line)# width 180
Router(config-line)# logging synchronous
Router(config-line)# end
```

```
! Timestamping already enabled for logging messages; time shown in UTC.
Oct 13 23:20:05 UTC: %SYS-5-CONFIG_I: Configured from console by console

Router# show clock

23:20:53.919 UTC Wed Oct 13 2004

Router# configure terminal

Enter configuration commands, one per line.  End with the end command.

! Timezone set as Pacific Standard Time, with an 8 hour offset from UTC

Router(config)# clock timezone PST -8

Router(config)#

Oct 13 23:21:27 UTC: %SYS-6-CLOCKUPDATE:
System clock has been updated from 23:21:27 UTC Wed Oct 13 2004
to 15:21:27 PST Wed Oct 13 2004, configured from console by console.

Router(config)#
! Pacific Daylight Time (PDT) configured to start in April and end in October.
! Default offset is +1 hour.

Router(config)# clock summer-time PDT recurring first Sunday April 2:00 last Sunday
October 2:00

Router(config)#

! Time changed from 3:22 P.M. Pacific Standard Time (15:22 PST)
! to 4:22 P.M. Pacific Daylight (16:22 PDT)

Oct 13 23:22:09 UTC: %SYS-6-CLOCKUPDATE:
System clock has been updated from 15:22:09 PST Wed Oct 13 2004
to 16:22:09 PDT Wed Oct 13 2004, configured from console by console.

! Change the timestamp to show the local time and timezone.

Router(config)# service timestamps log datetime localtime show-timezone
Router(config)# end

Oct 13 16:23:19 PDT: %SYS-5-CONFIG_I: Configured from console by console

Router# show clock
16:23:58.747 PDT Wed Oct 13 2004
Router# config t
Enter configuration commands, one per line.  End with the end command.
Router(config)# service sequence-numbers
Router(config)# end
Router#
```

In the following example, the **service timestamps log datetime** command is used to change previously configured options for the date-time time stamp.

```
Router(config)# service timestamps log datetime localtime show-timezone

Router(config)# end

! The year is not displayed.

Oct 13 15:44:46 PDT: %SYS-5-CONFIG_I: Configured from console by console

Router# config t
```

```
Enter configuration commands, one per line.  End with the end command.
Router(config)# service timestamps log datetime show-timezone year
Router(config)# end

! note: because the localtime option was not specified again, that option is
! removed from the output, and time is displayed in UTC (the default)

Oct 13 2004 22:45:31 UTC: %SYS-5-CONFIG_I: Configured from console by console
```

Related Commands

Command	Description
clock set	Manually sets the system clock.
ntp	Controls access to the system's NTP services.
service sequence-numbers	Stamps system logging messages with a sequence number.

service udp-small-servers

To access minor User Datagram Protocol (UDP) services available from hosts on the network, use the **service udp-small-servers** command in global configuration mode. To disable these services, use the **no** form of this command.

service udp-small-servers

no service udp-small-servers

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

By default the UPD servers for Echo, Discard, and Chargen services are disabled.

When the servers are disabled, access to Echo, Discard, and Chargen ports causes the Cisco IOS software to send an "ICMP port unreachable" message to the sender and discard the original incoming packet.

Examples

In the following example, the UDP server (UDP services) is enabled:

```
Router(config)# service udp-small-servers
```

service-module apa traffic-management

To configure traffic management on the router, use the **service-module apa traffic-management** command in interface configuration mode.

service-module apa traffic-management [monitor | inline]

Syntax Description

monitor	Enables promiscuous monitoring.
inline	Enables inline monitoring.

Command Default

None

Command Modes

Interface configuration mode

Command History

Release	Modification
12.4(20)YA	This command was introduced for the NME-APA on Cisco 2811, 2821, 2851, and Cisco 3800 Series Integrated Services Routers.

Usage Guidelines

To perform traffic management, you enable or disable the flow of packets by configuring the service module interface and the router interface.

- Configure the router interface with the **service-module apa traffic-management [monitor | inline]** command.

  Two traffic management options are available:

  – Monitor—will copy the packet and designate the copy as the one forwarded to the Application Performance Assurance module (NME-APA).

  – Inline—will send the packet to the NME-APA, rather than sending a copy of the packet. After the NME-APA has processes the packet, it sends it back to the router.

  Note Enable only one traffic management option on the router, but not both concurrently.

- Configure the service module interface with the Application Performance Assurance (APA) graphical user interface (GUI). See the *Cisco Application Performance Assurance User Guide* on Cisco.com for details.

Examples

The following example configures an interface on a Cisco 2851 Integrated Services Router for inline traffic management.

```
Router> enable
Router# configure terminal
Router(config)# interface gigabitethernet 0/1
Router(config-if)# ip address 10.10.10.43 255.255.255.0
Router(config-if)# service-module apa traffic-management inline
Router(config-if)# exit
end
```

Related Commands

Command	Description
interface gigabitethernet	Defines the interface on the router
ip address	Defines the IP address and subnet mask on the interface

service-module wlan-ap bootimage

To configure the boot image on the service module, use the **service-module wlan-ap bootimage** command in privileged EXEC mode.

service-module wlan-ap *interface number* **bootimage [autonomous|unified]**

Syntax Description

interface number	The interface number for the wireless device. Always use 0.
autonomous	Autonomous software image.
unified	Upgrade image with Lightweight Access Point Protocol (LWAPP).

Command Default

Autonomous software image

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(20) T	This command was introduced for wireless-enabled Cisco 880 Series and Cisco 890 Series Integrated Services Routers.

Usage Guidelines

When running the advanced IP services feature set on either Cisco 880 Series routers or Cisco 890 Series routers, use the **service-module wlan-ap 0 bootimage unified** command to enable the Cisco unified software upgrade image on the embedded wireless access point. After enabling the unified image, use the **service-module wlan-ap 0 reload** command to perform a graceful shutdown and reboot of the access point.

Note The **service-module wlan-ap 0 bootimage** command does not support recovery images on the embedded access point. Use the **service-module wlan-ap 0 reload** command to shutdown and reboot the access point.

Cisco 880 Series and Cisco 890 Series routers with embedded access point running the unified software image require DHCP to obtain an IP address for the access point. An IP address is needed to communicate with the Wireless LAN Controller (WLC) and to download its image upon boot up. The host router can provide DHCP server functionality through the DHCP pool to reach the WLC, and setup option 43 for the controller IP address in the DHCP pool configuration.

Use the following guideline to setup a DHCP pool on the host router.

```
ip dhcp pool embedded-ap-pool
    network 60.0.0.0 255.255.255.0
    default router 60.0.0.1
    option 43 hex f104.0a0a.0a0f  /* Single WLC IP address (10.10.10.15) in HEX format */
int vlan 1  /* Default Vlan */
ip address 60.0.0.1 255.255.255.0
int Wlan-GigabitEthernet0 /* internal switch-port to AP */
switchport access vlan 1
```

Examples

The following example upgrades the embedded access point image from autonomous to unified.

```
Router#configure terminal
Router(config)#service-module wlan-ap 0 bootimage unified *Jan 18 05:31:58.172:
%WLAN_AP_SM-6-UNIFIED_IMAGE: Embedded AP will change boot image to mini-IOS also called
LWAPP recovery Please check router config to ensure connectivity between WLC and AP. Use
service-module wlan-ap 0 reload to bootup mini-IOS image on AP

Router(config)#end
Router#
*Jan 18 05:32:04.136: %SYS-5-CONFIG_I: Configured from console by console
Router#service-module wlan-ap 0 reload Reload will save AP config....
Do you want to proceed with reload?[confirm] Trying to reload Service Module wlan-ap0.

Router#
Service Module saved config, start reset.

Received reload request from router
Saving configuration...
Building configuration...
```

Related Commands

Command	Description
interface wlan-ap	Enters wireless interface configuration mode to configure an interface.
service-module wlan-ap reload	Performs a graceful shutdown and reboot of the service module.
service-module wlan-ap reset	Resets the service module hardware.

service-module wlan-ap reload

To perform a graceful shutdown and reboot of the service module use the **service-module wlan-ap reload** command in privileged EXEC mode.

service-module wlan-ap *interface number* **reload**

Syntax Description

interface number	The interface number for the wireless device. Always use 0.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(20)T	This command was introduced for wireless-enabled Cisco 860, 880, and 890 Integrated Services Routers.

Usage Guidelines

Autonomous Mode

At the confirmation prompt, press **Enter** to confirm the action, or press **n** to cancel.

Note When running in autonomous mode, the reload command saves the configuration before rebooting. If the attempt is unsuccessful, the following message displays:

Failed to save service module configuration.

Unified Mode

The service module reload command is usually handled by the Wireless LAN Controller (WLC).

Note When running in Unified mode, the reload command will produce the following message:

The embedded wireless device is in Unified mode. Reload/reset is normally handled by WLC controller.

Still want to proceed? [yes]

Examples

The following examples show a graceful shut down and reboot of the service module:

Autonomous Mode

```
Router# service-module wlan-ap0 reload
Do you want to proceed with reload?[confirm]

Router# reload
Do you want to reload the internal AP ? [yes/no]:
Do you want to save the configuration of the AP ? [yes/no]:
System configuration has been modified. Save [yes/no]:
Proceed with reload? [confirm]
```

Unified Mode

```
Router# service-module wlan-ap0 reload

The embedded AP is in Unified mode. Reload/reset is normally handled by WLC controller.
Still want to proceed? [yes]

Router# reload
The embedded AP is in Unified mode. Reload/reset is normally handled by WLC controller.
Do you want to reload the internal AP [yes/no]:
System configuration has been modified. Save [yes/no]:
Proceed with reload [Confirm]
```

Related Commands

Command	Description
interface wlan-ap	Enters wireless interface configuration mode to configure an interface.
service-module wlan-ap reset	Resets the service module hardware.

service-module wlan-ap reset

To reset the service module hardware, software, and configuration, use the **service-module wlan-ap reset** command in privileged EXEC mode.

service-module wlan-ap *interface number* **reset [bootloader | default-config]**

Syntax Description

interface number	The interface number for the wireless device. Always use 0.
bootloader	Resets the wireless device to the bootloader for manual image recovery.
default-config	Resets the wireless device to the factory default configuration.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(20)T	This command was introduced for wireless-enabled Cisco 860, 880, and 890 Integrated Services Routers.

Usage Guidelines

At the confirmation prompt, press **Enter** to confirm the action, or press **n** to cancel.

Caution Because you may lose data, use the **service-module wlan-ap reset** command only to recover from a shutdown or failed state.

Examples

The following example resets a wireless device on a router that is operating in either autonomous mode or LWAPP mode:

Autonomous Mode

```
Router# service-module wlan-ap0 reset
Use reset only to recover from shutdown or failed state.
```

LWAPP Mode

```
Router# service-module wlan-ap0 reset
The embedded device is in LWAPP mode. Reload/reset is normally handled by WLC controller.
Still want to proceed? [yes]
```

Resetting the Factory Default Configuration on the Wireless Device

The following example resets the wireless device to the default configuration.

```
Router#service-module wlan-ap 0 reset default-config
Router#
```

Recovering the Image on the Wireless Device

The following example resets the wireless device down to the bootloader level for manual image recovery.

```
Router#service-module wlan-ap0 reset bootloader
Router#
```

Related Commands

Command	Description
interface wlan-ap	Enters wireless interface configuration mode to configure an interface.
service-module wlan-ap reload	Performs a graceful shutdown and reboot of the service module.

service-module wlan-ap session

To begin a configuration session with a service module through a console connection use the **service-module wlan-ap session** command in privileged EXEC mode.

service-module wlan-ap *interface number* **session** [**clear | disconnect**]

Syntax Description

interface number	The interface number for the wireless device. Always use 0.
clear	(Optional) Clears the wireless device configuration session.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(20)T	This command was introduced for wireless-enabled Cisco 860, 880, and 890 Integrated Services Routers.

Usage Guidelines

Only one session is allowed at a time into the wireless device from a router console-port connection. After starting a session, perform configuration tasks on the wireless device. You first access the router in a user-level shell. To access the privileged EXEC command shell, where most commands are available, use the **enable** command.

When you finish configuring the device, and would like to exit the console session, type Ctrl-Shift 6x to return to the router's console. Type **service-module wlan-ap session clear** or **disconnect** to close the session with the device. At the confirmation prompt, press **Enter** twice to confirm the action or **n** to cancel.

Note If you do not **clear** or **disconnect** the session on the service module, it will remain open in the background after you return to the router's console prompt. When the session is open in the background, pressing **Enter** will toggle you back to the wireless device prompt.

Examples

The following example shows a session being opened on a service-module in an ISR:

```
Router# service-module wlan-ap 0 session

Trying 1.2.3.4, 2002 ... Open
AP#
```

The following example clears the session on the service-module in the ISR:

```
Router#service-module wlan-ap 0 session clear
[confirm]
 [OK]
```

Related Commands

Command	Description
enable	Enters privileged EXEC mode.
interface wlan-ap	Enters wireless interface configuration mode to configure an interface.

service-module wlan-ap statistics

To display reset and reload information for a service module and its operating system software, use the **service-module wlan-ap statistics** command in privileged EXEC mode.

service-module wlan-ap *interface number* **statistics**

Syntax Description

interface number	The interface number for the wireless device. Always use 0.

Command Default

none

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(20)T	This command was introduced for wireless-enabled Cisco 860, 880, and 890 Integrated Services Routers.

Examples

The following example displays information for wireless-enabled Cisco ISRs:

```
Router#service-module wlan-ap 0 statistics
Module Reset Statistics:
  CLI reset count = 0
  CLI reload count = 1
  Registration request timeout reset count = 0
  Error recovery timeout reset count = 0
  Module registration count = 10

The last IOS initiated event was a cli reload at *04:27:32.041 UTC Fri Mar 8 2007
```

Related Commands

Command	Description
interface wlan-ap	Enters wireless interface configuration mode and configures a wireless device.
service-module wlan-ap reset	Resets the wireless device.
service-module wlan-ap reload	Performs a graceful shutdown and reboot on the wireless device.

service-module wlan-ap status

To display configuration information related to hardware and software on the service module, use the **service-module wlan-ap status** command in privileged EXEC mode.

service-module wlan-ap *interface number* **status**

Syntax Description

interface number	The interface number for the wireless device. Aways use 0.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(20)T	This command was introduced for wireless-enabled Cisco 860, 880, and 890 Integrated Services Routers.

Usage Guidelines

Use the **service-module wlan-ap status** command to

- Display the wireless device's software release version
- Check the wireless device's status (steady or down)
- Display hardware information for the wireless device, including image, memory, interface, and system uptime

Examples

The following example displays information for the wireless device on a Cisco Integrated Services Router:

```
Router#service-module wlan-ap 0 status
Service Module is Cisco wlan-ap0
Service Module supports session via TTY line 2
Service Module is in Steady state
Service Module reset on error is disabled
Getting status from the Service Module, please wait..

Image path = flash:c8xx_19xx_ap-k9w7-mx.acregr/c8xx_19xx_ap-k9w7-mx.acre
gr
System uptime = 0 days, 4 hours, 28 minutes, 5 seconds
Router#d was introduced for embedded wireless LAN access points on Cisco 860 and 880
Series Integrated Services Routers.
```

Related Commands

Command	Description
interface wlan-ap	Enters wireless service module's console interface.

session slot

To open a session with a module (for example, the Multilayer Switch Module (MSM), Network Analysis Module (NAM), or Asynchronous Transfer Mode (ATM)), use the **session slot** command in EXEC mode.

session slot *mod* **processor** *processor-id*

Syntax Description

mod	Slot number.
processor *processor-id*	Specifies the processor ID.

Defaults

This command has no default settings.

Command Modes

EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

To end the session, enter the **quit** command.

This command allows you to use the module-specific CLI.

Examples

This example shows how to open a session with an MSM (module 4):

```
Router# session slot 4 processor 2
Router#
```

set memory debug incremental starting-time

To set the current time as the starting time for incremental analysis, use the **set memory debug incremental starting-time** command in privileged EXEC mode.

set memory debug incremental starting-time [**none**]

Syntax Description

none	(Optional) Resets the defined start time for incremental analysis.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(8)T1	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

For incremental analysis, a starting point can be defined by using the **set memory debug incremental starting-time** command. When a starting time is set, only memory allocated after that starting time will be considered for reporting as leaks.

Examples

The following example shows the command used to set the starting time for incremental analysis to the time when the command was issued:

```
Router# set memory debug incremental starting-time
```

Related Commands

Command	Description
show memory debug incremental allocation	Displays all memory blocks that were allocated after the issue of the **set memory debug incremental starting-time** command.
show memory debug incremental leaks	Displays only memory that was leaked after the issue of the **set memory debug incremental starting-time** command.
show memory debug incremental leaks lowmem	Forces incremental memory leak detection to work in low memory mode. Displays only memory that was leaked after the issue of the **set memory debug incremental starting-time** command.
show memory debug incremental status	Displays if the starting point of incremental analysis has been defined and the time elapsed since then.
show memory debug leaks	Displays detected memory leaks.

setup

To enter Setup mode, use the **setup** command in privileged EXEC mode.

setup

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Setup mode gives you the option of configuring your system without using the Cisco IOS Command Line Interface (CLI). For some tasks, you may find it easier to use Setup than to enter Cisco IOS commands individually. For example, you might want to use Setup to add a protocol suite, to make major addressing scheme changes, or to configure a newly installed interface. Although you can use the CLI to make these changes, Setup provides you with a high-level view of the configuration and guides you through the configuration process.

If you are not familiar with Cisco products and the CLI, Setup is a particularly valuable tool because it prompts you for the specific information required to configure your system.

Note If you use the Setup mode to modify a configuration because you have added or modified the hardware, be sure to verify the physical connections using the **show version** EXEC command. Also, verify the logical port assignments using the **show running-config** EXEC command to ensure that you configure the correct port. Refer to the hardware documentation for your platform for more information on physical and logical port assignments.

Before using the Setup mode, you should have the following information so that you can configure the system properly:

- Which interfaces you want to configure
- Which routing protocols you wish to enable
- Whether the router is to perform bridging
- Network addresses for the protocols being configured
- Password strategy for your environment

When you enter the **setup** EXEC command after first-time startup, an interactive dialog called the *System Configuration Dialog* appears on the system console screen. The System Configuration Dialog guides you through the configuration process. It prompts you first for global parameters and then for interface parameters. The values shown in brackets next to each prompt reflect either the default settings or the last configured setting.

The prompts and the order in which they appear on the screen vary depending on the platform and the interfaces installed in the device.

You must progress through the System Configuration Dialog until you come to the item that you intend to change. To accept default settings for items that you do not want to change, press the **Return** or **Enter** key. The default choice is indicated by square brackets (for example, [yes]) before the prompt colon (:).

To exit Setup mode and return to privileged EXEC mode without making changes and without progressing through the entire System Configuration Dialog, press **Ctrl-C**.

The facility also provides help text for each prompt. To access help text, press the question mark (**?**) key at a prompt.

When you complete your changes, the system will automatically display the configuration file that was created during the Setup session. It also asks you if you want to use this configuration. If you answer Yes, the configuration is saved to NVRAM as the startup configuration file. If you answer No, the configuration is not saved and the process begins again. There is no default for this prompt; you must answer either Yes or No.

Examples

The following example displays the **setup** command facility to configure serial interface 0 and to add ARAP and IP/IPX PPP support on the asynchronous interfaces:

```
Router# setup

         --- System Configuration Dialog ---

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Continue with configuration dialog? [yes]:

First, would you like to see the current interface summary? [yes]:

Interface          IP-Address      OK?  Method    Status                 Protocol
Ethernet0          172.16.72.2     YES  manual    up                     up
Serial0            unassigned      YES  not set   administratively down  down
Serial1            172.16.72.2     YES  not set   up                     up

Configuring global parameters:

  Enter host name [Router]:

The enable secret is a one-way cryptographic secret used
instead of the enable password when it exists.

  Enter enable secret [<Use current secret>]:


The enable password is used when there is no enable secret
and when using older software and some boot images.


  Enter enable password [ww]:
  Enter virtual terminal password [ww]:
  Configure SNMP Network Management? [yes]:
    Community string [public]:
  Configure DECnet? [no]:
  Configure AppleTalk? [yes]:
    Multizone networks? [no]: yes
  Configure IPX? [yes]:
  Configure IP? [yes]:
```

```
    Configure IGRP routing? [yes]:
      Your IGRP autonomous system number [15]:
  Configure Async lines? [yes]:
    Async line speed [9600]: 57600
    Configure for HW flow control? [yes]:
    Configure for modems? [yes/no]: yes
      Configure for default chat script? [yes]: no
    Configure for Dial-in IP SLIP/PPP access? [no]: yes
      Configure for Dynamic IP addresses? [yes]: no
      Configure Default IP addresses? [no]: yes
      Configure for TCP Header Compression? [yes]: no
      Configure for routing updates on async links? [no]:
    Configure for Async IPX? [yes]:
    Configure for Appletalk Remote Access? [yes]:
      AppleTalk Network for ARAP clients [1]: 20
      Zone name for ARAP clients [ARA Dialins]:

Configuring interface parameters:

Configuring interface Ethernet0:
  Is this interface in use? [yes]:
  Configure IP on this interface? [yes]:
    IP address for this interface [172.16.72.2]:
    Number of bits in subnet field [8]:
    Class B network is 172.16.0.0, 8 subnet bits; mask is /24
  Configure AppleTalk on this interface? [yes]:
    Extended AppleTalk network? [yes]:
    AppleTalk starting cable range [1]:
    AppleTalk ending cable range [1]:
    AppleTalk zone name [Sales]:
    AppleTalk additional zone name:
  Configure IPX on this interface? [yes]:
    IPX network number [1]:

Configuring interface Serial0:
  Is this interface in use? [no]: yes
  Configure IP on this interface? [no]: yes
  Configure IP unnumbered on this interface? [no]: yes
    Assign to which interface [Ethernet0]:
  Configure AppleTalk on this interface? [no]: yes
    Extended AppleTalk network? [yes]:
    AppleTalk starting cable range [2]: 3
    AppleTalk ending cable range [3]: 3
    AppleTalk zone name [myzone]: ZZ Serial
    AppleTalk additional zone name:
  Configure IPX on this interface? [no]: yes
    IPX network number [2]: 3

Configuring interface Serial1:
  Is this interface in use? [yes]:
  Configure IP on this interface? [yes]:
  Configure IP unnumbered on this interface? [yes]:
    Assign to which interface [Ethernet0]:
  Configure AppleTalk on this interface? [yes]:
    Extended AppleTalk network? [yes]:
    AppleTalk starting cable range [2]:
    AppleTalk ending cable range [2]:
    AppleTalk zone name [ZZ Serial]:
    AppleTalk additional zone name:
  Configure IPX on this interface? [yes]:
    IPX network number [2]:
Configuring interface Async1:
    IPX network number [4]:
    Default client IP address for this interface [none]: 172.16.72.4
```

```
Configuring interface Async2:
    IPX network number [5]:
    Default client IP address for this interface [172.16.72.5]:
Configuring interface Async3:
    IPX network number [6]:
    Default client IP address for this interface [172.16.72.6]:
Configuring interface Async4:
    IPX network number [7]:
    Default client IP address for this interface [172.16.72.7]:
Configuring interface Async5:
    IPX network number [8]:
    Default client IP address for this interface [172.16.72.8]:
Configuring interface Async6:
    IPX network number [9]:
    Default client IP address for this interface [172.16.72.9]:
Configuring interface Async7:
    IPX network number [A]:
    Default client IP address for this interface [172.16.72.10]:
Configuring interface Async8:
    IPX network number [B]:
    Default client IP address for this interface [172.16.72.11]:
Configuring interface Async9:
    IPX network number [C]:
    Default client IP address for this interface [172.16.72.12]:
Configuring interface Async10:
    IPX network number [D]:
    Default client IP address for this interface [172.16.72.13]:
Configuring interface Async11:
    IPX network number [E]:
    Default client IP address for this interface [172.16.72.14]:
Configuring interface Async12:
    IPX network number [F]:
    Default client IP address for this interface [172.16.72.15]:
Configuring interface Async13:
    IPX network number [10]:
    Default client IP address for this interface [172.16.72.16]:
Configuring interface Async14:
    IPX network number [11]:
    Default client IP address for this interface [172.16.72.17]:
Configuring interface Async15:
    IPX network number [12]:
    Default client IP address for this interface [172.16.72.18]:
Configuring interface Async16:
    IPX network number [13]:
    Default client IP address for this interface [172.16.72.19]:

The following configuration command script was created:

hostname Router
enable secret 5 $1$krIg$emfYm/1OwHVspDuS8Gy0K1
enable password ww
line vty 0 4
password ww
snmp-server community public
!
no decnet routing
appletalk routing
ipx routing
ip routing
!
line 1 16
speed 57600
flowcontrol hardware
modem inout
```

```
!
arap network 20 ARA Dialins
line 1 16
arap enable
autoselect
!
! Turn off IPX to prevent network conflicts.
interface Ethernet0
no ipx network
interface Serial0
no ipx network
interface Serial1
no ipx network
!
interface Ethernet0
ip address 172.16.72.2 255.255.255.0
appletalk cable-range 1-1 1.204
appletalk zone Sales
ipx network 1
no mop enabled
!
interface Serial0
no shutdown
no ip address
ip unnumbered Ethernet0
appletalk cable-range 3-3
appletalk zone ZZ Serial
ipx network 3
no mop enabled
!
interface Serial1
no ip address
ip unnumbered Ethernet0
appletalk cable-range 2-2 2.2
appletalk zone ZZ Serial
ipx network 2
no mop enabled
!
Interface Async1
ipx network 4
ip unnumbered Ethernet0
peer default ip address 172.16.72.4
async mode interactive
!
Interface Async2
ipx network 5
ip unnumbered Ethernet0
peer default ip address 172.16.72.5
async mode interactive
!
Interface Async3
ipx network 6
ip unnumbered Ethernet0
peer default ip address 172.16.72.6
async mode interactive
!
Interface Async4
ipx network 7
ip unnumbered Ethernet0
peer default ip address 172.16.72.7
async mode interactive
async dynamic address
!
Interface Async5
```

```
ipx network 8
ip unnumbered Ethernet0
peer default ip address 172.16.72.8
async mode interactive
!
Interface Async6
ipx network 9
ip unnumbered Ethernet0
peer default ip address 172.16.72.9
async mode interactive
!
Interface Async7
ipx network A
ip unnumbered Ethernet0
peer default ip address 172.16.72.10
async mode interactive
!
Interface Async8
ipx network B
ip unnumbered Ethernet0
peer default ip address 172.16.72.11
async mode interactive
!
Interface Async9
ipx network C
ip unnumbered Ethernet0
peer default ip address 172.16.72.12
async mode interactive
!
Interface Async10
ipx network D
ip unnumbered Ethernet0
peer default ip address 172.16.72.13
async mode interactive
!
Interface Async11
ipx network E
ip unnumbered Ethernet0
peer default ip address 172.16.72.14
async mode interactive
!
Interface Async12
ipx network F
ip unnumbered Ethernet0
peer default ip address 172.16.72.15
async mode interactive
!
Interface Async13
ipx network 10
ip unnumbered Ethernet0
peer default ip address 172.16.72.16
async mode interactive
!
Interface Async14
ipx network 11
ip unnumbered Ethernet0
peer default ip address 172.16.72.17
async mode interactive
!
Interface Async15
ipx network 12
ip unnumbered Ethernet0
peer default ip address 172.16.72.18
async mode interactive
```

```
!
Interface Async16
ipx network 13
ip unnumbered Ethernet0
peer default ip address 172.16.72.19
async mode interactive
!
router igrp 15
network 172.16.0.0
!
end

Use this configuration? [yes/no]: yes

Building configuration...

Use the enabled mode 'configure' command to modify this configuration.

Router#
```

Related Commands

Command	Description
erase nvram:	Erases a file system.
show running-config	Displays the running configuration file. Command alias for the **more system:running-config** command.
show startup-config	Displays the startup configuration file. Command alias for the **more system:startup-config** command.
show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

show

To verify the Multiple Spanning Tree (MST) configuration, use the **show** command. in MST configuration submode.

show [**current** | **pending**]

Syntax Description

current	(Optional) Displays the current configuration that is used to run MST.
pending	(Optional) Displays the edited configuration that will replace the current configuration.

Defaults

This command has no default settings.

Command Modes

MST configuration submode

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The display output from the **show pending** command is the edited configuration that will replace the current configuration if you enter the **exit** command to exit MST configuration mode.

Entering the **show** command with no arguments displays the pending configurations.

Examples

This example shows how to display the edited configuration:

```
Router(config-mst)# show pending

Pending MST configuration
Name      [zorglub]
Version   31415
Instance  Vlans Mapped
-------- ---------------------------------------------------------------------
0        4001-4096
2        1010, 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090, 1100, 1110
         1120
3        1-1009, 1011-1019, 1021-1029, 1031-1039, 1041-1049, 1051-1059
         1061-1069, 1071-1079, 1081-1089, 1091-1099, 1101-1109, 1111-1119
         1121-4000
-------------------------------------------------------------------------------
Router(config-mst)#
```

This example shows how to display the current configuration:

```
Router(config-mst)# show current
```

```
Current MST configuration
Name []
Revision 0
Instance Vlans mapped
-------- ---------------------------------------------------------------------
0 1-4094
---------------------------------------------------------------------------
```

Related Commands

Command	Description
instance	Maps a VLAN or a set of VLANs to an MST instance.
name (MST configuration submode)	Sets the name of an MST region.
revision	Sets the revision number for the MST configuration.
show spanning-tree mst	Displays the information about the MST protocol.
spanning-tree mst configuration	Enters MST-configuration submode.

show <command> append

To redirect and add the output of any **show** command to an existing file, use the **show** *command* **| append** command in privileged EXEC mode.

show *command* **| append** *url*

Syntax Description

command	Any Cisco IOS **show** command.
| append *url*	The addition of this syntax redirects the command output to the file location specified in the Universal Resource Locator (URL). The pipe (|) is required. The Cisco IOS File System (IFS) uses URLs to specify the location of a file system, directory, and file. Typical URL elements include: *prefix***:**[*directory*/]*filename* Prefixes can be local file locations, such as **flash:** or **disk0:**. Alternatively, you can specify network locations using the following syntax: **ftp:**[[//[*username*[**:***password*]**@**]*location*]/*directory*]/*filename* **tftp:**[[//*location*]/*directory*]/*filename* The **rcp:** prefix is not supported.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(21)S	This command was introduced.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

Usage Guidelines

To display all URL prefixes that are supported for this command, use the **show** *command* **| append ?** command.

This command adds the **show** command output to the end of the specified file.

Examples

In the following example, output from the **show tech-support** command is redirected to an existing file on Disk 1 with the file-name of "showoutput.txt." This output is added at the end of any existing data in the file.

```
Router# show tech-support | append disk1:showoutput.txt
```

Related Commands

Command	Description
show <command> redirect	Redirects the output of any **show** command to a specified file.
show <command> tee	Copies the **show** command output to a file while displaying it on the terminal.

show <command> begin

To begin the output of any **show** command from a specified string, use the **show** *command* | **begin** command in EXEC mode.

show *command* **| begin** *regular-expression*

Syntax Description

command	Any supported **show** command.
|	A vertical bar (the "pipe" symbol) indicates that an output processing specification follows.
regular-expression	Any regular expression found in **show** command output. The show output will begin from the first instance of this string (output prior to this string will not be printed to the screen). The string is case-sensitive. Use parenthesis to indicate a literal use of spaces.
/	Specifies a search at a --More-- prompt that begins unfiltered output with the first line that contains the regular expression.
-	Specifies a filter at a --More-- prompt that only displays output lines that do not contain the regular expression.
+	Specifies a filter at a --More-- prompt that only displays output lines that contain the regular expression.

Command Modes

EXEC

Command History

Release	Modification
8.3	The **show** command was introduced.
12.0(1)T	This extension of the **show** command was introduced..
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The *regular-expression* argument is case sensitive and allows for complex matching requirements. Use parenthesis to indicate a literal use of spaces. For example, **| begin u** indicates that the show output should begin with any line that contains a u; **| begin (u)** indicates that the show output should begin with any line that contains a space and a u together (line has a word that begins with a lowercase u).

To search the remaining output of the **show** command, use the following command at the --More-- prompt:

/regular-expression

You can specify a filtered search at any --More-- prompt. To filter the remaining output of the **show** command, use one of the following commands at the --More-- prompt:

-regular-expression

+regular-expression

When output volume is large, the search can produce long lists of output. To interrupt the output, press **Ctrl**-^ (Ctrl-Shift-6) or **Ctrl**-**z**.

Note Once you specify a filter for a **show** command, you cannot specify another filter at the next --More-- prompt. The first specified filter remains until the **more** command output finishes or until you interrupt the output. The use of the keyword **begin** does not constitute a filter.

Because prior output is not saved, you cannot search or filter backward through prior output.

Note A few **show** commands that have long output requirements do not require user input at the --More-- prompt to jump to the next table of output; these types of output require you to enter the same number of Ctrl-^ or Ctrl-Z combinations as there are --More-- prompts to completely abort output.

Examples

The following is partial sample output of the **show interface | begin** command that begins unfiltered output with the first line that contains the regular expression "Ethernet." At the --More-- prompt, the user specifies a filter to show only the lines in the remaining output that contain the regular expression "Serial."

```
Router# show interface | begin Ethernet
Ethernet0 is up, line protocol is up
Hardware is Lance, address is 0060.837c.6399 (bia 0060.837c.6399)
  Description: ip address is 172.1.2.14 255.255.255.0
  Internet address is 172.1.2.14/24
.
.
.
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
--More--
+Serial
filtering...
Serial1 is up, line protocol is up
Serial2 is up, line protocol is up
Serial3 is up, line protocol is down
Serial4 is down, line protocol is down
Serial5 is up, line protocol is up
Serial6 is up, line protocol is up
Serial7 is up, line protocol is up
```

Related Commands

Command	Description
more <url> begin	Begins unfiltered output of the **more** command with the first line that contains the regular expression you specify.
more <url> exclude	Filters **more** command output so that it excludes lines that contain a particular regular expression.
more <url> include	Filters **more** command output so that it displays only lines that contain a particular regular expression.
show <command> exclude	Filters **show** command output so that it excludes lines that contain a particular regular expression.
show <command> include	Filters **show** command output so that it displays only lines that contain a particular regular expression.

show <command> exclude

To filter **show** command output so that it excludes lines that contain a particular regular expression, use the **show** *command* **| exclude** command in EXEC mode.

show *command* **| exclude** *regular-expression*

Syntax Description

command	Any supported **show** command.
|	A vertical bar (the "pipe" symbol) indicates that an output processing specification follows.
regular-expression	Any regular expression found in **show** command output.
/	Specifies a search at a --More-- prompt that begins unfiltered output with the first line that contains the regular expression.

Command Modes

EXEC

Command History

Release	Modification
12.0(1)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The *regular-expression* argument is case sensitive and allows for complex matching requirements.

You can specify a new search at every --More-- prompt. To search the remaining output of the **show** command, use the following syntax at the --More-- prompt:

/regular-expression

When output volume is large, the search can produce long lists of output. To interrupt the output, press **Ctrl**-^ (Ctrl-Shift-6) or **Ctrl**-**Z**.

Because prior output is not saved, you cannot search or filter backward through prior output.

Note A few **show** commands that have long output requirements do not require user input at the --More-- prompt to jump to the next table of output; these types of output require you to enter the same number of Ctrl-^ or Ctrl-Z combinations as there are --More-- prompts to completely abort output.

Examples

The following is partial sample output of the **show | exclude** command used with the **show buffers** command. It excludes lines that contain the regular expression "0 misses." At the --More-- prompt, the user searches for the regular expression "Serial0," which continues the filtered output with the first line that contains "Serial0."

```
Router# show buffers | exclude 0 misses

Buffer elements:
     398 in free list (500 max allowed)
Public buffer pools:
```

```
Small buffers, 104 bytes (total 50, permanent 50):
     50 in free list (20 min, 150 max allowed)
     551 hits, 3 misses, 0 trims, 0 created
Big buffers, 1524 bytes (total 50, permanent 50):
     49 in free list (5 min, 150 max allowed)
Very Big buffers, 4520 bytes (total 10, permanent 10):
.
.
.
Huge buffers, 18024 bytes (total 0 permanent 0):
     0 in free list (0 min, 4 max allowed)
--More--
/Serial0
filtering...
Serial0 buffers, 1543 bytes (total 64, permanent 64):
     16 in free list (0 min, 64 max allowed)
     48 hits, 0 fallbacks
```

Related Commands

Command	Description
more <url> begin	Begins unfiltered output of the **more** command with the first line that contains the regular expression you specify.
more <url> exclude	Filters **more** command output so that it excludes lines that contain a particular regular expression.
more <url> include	Filters **more** command output so that it displays only lines that contain a particular regular expression.
show <command> begin	Searches the output of any **show** command and displays the output from the first instance of a specified string.
show <command> include	Filters **show** command output so that it displays only lines that contain a particular regular expression.

show <command> include

To filter **show** command output so that it only displays lines that contain a particular regular expression, use the **show** *command* **| include** command in EXEC mode.

show *command* **| include** *regular-expression*

Syntax Description

command	Any supported **show** command.
|	A vertical bar (the "pipe" symbol) indicates that an output processing specification follows.
regular-expression	Any regular expression found in **show** command output. Use parenthesis to include spaces in the expression.
/	Specifies a search at a --More-- prompt that begins unfiltered output with the first line that contains the regular expression.

Command Modes

EXEC

Command History

Release	Modification
12.0(1)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The *regular-expression* argument is case sensitive and allows for complex matching requirements.

You can specify a new search at every --More-- prompt. To search the remaining output of the **show** command, use the following syntax at the --More-- prompt:

/regular-expression

When output volume is large, the search can produce long lists of output. To interrupt the output, press **Ctrl**-^ (Ctrl-Shift-6) or **Ctrl**-**Z**.

Because prior output is not saved, you cannot search or filter backward through prior output.

Note A few **show** commands that have long output requirements do not require user input at the --More-- prompt to jump to the next table of output; these types of output require you to enter the same number of Ctrl-^ or Ctrl-Z combinations as there are --More-- prompts to completely abort output.

Examples

The following is partial sample output of the **show interface | include** command. It displays only lines that contain the regular expression "(is)." The parentheses force the inclusion of the spaces before and after "is." Use of the parenthesis ensures that only lines containing "is" with a space both before and after it will be included in the output. Lines with words like "disconnect" will be excluded because there are not spaces around the instance of the string "is".

```
Router# show interface | include ( is )
```

```
ATM0 is administratively down, line protocol is down
  Hardware is ATMizer BX-50
Dialer1 is up (spoofing), line protocol is up (spoofing)
  Hardware is Unknown
  DTR is pulsed for 1 seconds on reset
Ethernet0 is up, line protocol is up
  Hardware is Lance, address is 0060.837c.6399 (bia 0060.837c.6399)
  Internet address is 172.21.53.199/24
Ethernet1 is up, line protocol is up
  Hardware is Lance, address is 0060.837c.639c (bia 0060.837c.639c)
  Internet address is 5.5.5.99/24
Serial0:0 is down, line protocol is down
  Hardware is DSX1
.
.
.
 --More--
```

At the --More-- prompt, the user searches for the regular expression “Serial0:13”, which continues filtered output with the first line that contains “Serial0:13.”

```
/Serial0:13
filtering...
Serial0:13 is down, line protocol is down
  Hardware is DSX1
  Internet address is 11.0.0.2/8
     0 output errors, 0 collisions, 2 interface resets
  Timeslot(s) Used:14, Transmitter delay is 0 flags
```

Related Commands

Command	Description
more <url> begin	Begins unfiltered output of the **more** command with the first line that contains the regular expression you specify.
more <url> exclude	Filters **more** command output so that it excludes lines that contain a particular regular expression.
more <url> include	Filters **more** command output so that it displays only lines that contain a particular regular expression.
show <command> begin	Searches the output of any **show** command and displays the output from the first instance of a specified string.
show <command> exclude	Filters **show** command output so that it excludes lines that contain a particular regular expression.

show <command> redirect

To redirect the output of any **show** command to a file, use the **show** *command* **| redirect** command in privileged EXEC mode.

show *command* **| redirect** *url*

Syntax Description

command	Any Cisco IOS **show** command.
| redirect *url*	The addition of this syntax redirects the command output to the file location specified in the Universal Resource Locator (URL). The pipe (|) is required. The Cisco IOS File System (IFS) uses URLs to specify the location of a file system, directory, and file. Typical URL elements include: *prefix***:**[*directory*/]*filename* Prefixes can be local file locations, such as **flash:** or **disk0:**. Alternatively, you can specify network locations using the following syntax: **ftp:**[[//[*username*[**:***password*]**@**]*location*]/*directory*]/*filename* **tftp:**[[//*location*]/*directory*]/*filename* The **rcp:** prefix is not supported.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(21)S	This command was introduced.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

Usage Guidelines

To display all URL prefixes that are supported for this command, use the **show** *command* **| redirect ?** command.

This command creates a new file at the specified location, or overwrites an existing file.

Examples

In the following example, output from the **show tech-support** command is write to the file "showtech.txt" on the host at 172.16.101.101 in the directory "//tftpboot/docs/" using FTP:

```
Router# show tech | redirect
ftp://USER:MYPASSWORD@172.16.101.101//tftpboot/docs/showtech.txt
```

Related Commands

Command	Description
show <command> append	Redirects and appends **show** command output to the end of an existing file.
show <command> tee	Copies the **show** command output to a file while displaying it on the terminal.

show <command> section

To filter the output of a **show** command to match a given expression as well as any lines associated with that expression, use the **show** *command* **section** command in privileged EXEC mode.

show *command* | **section** [**include** | **exclude**] *regular-expression*

Syntax Description

command	Any Cisco IOS **show** command.
include	(Optional) Includes only the lines that contain a particular regular expression. This is the default keyword when none is specified.
exclude	(Optional) Excludes any lines that contain a particular regular expression.
regular-expression	Any regular expression or plain text string found in show command output. The syntax of the regular expression conforms to that of Bell V8 regexp(3).

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(2)T	This command was introduced.
12.2(33)SRE	This command was integrated into Cisco IOS release 12.(33)SRE.

Usage Guidelines

In many cases, it is useful to filter the output of a **show** command to match a specific expression. Filtering provides some control over the type and amount of information displayed by the system. The **show section** command provides enhanced filtering capabilities by matching lines in the **show** command output containing specific expressions as well as matching any entries associated with those expressions. Filtering is especially useful, for example, when displaying large configuration files using the **show running-configuration** command or the **show interfaces** command.

If the **include** or **exclude** keyword is not specified, **include** is the default.

If there are no associated entries for an expression, then only the line matching the expression is displayed.

Examples

The following examples compare the filtering characteristics of the **show running-config | include** command with the **show running-config | section** command. The first example gathers just the lines from the configuration file with “interface” in them.

```
Router# show running-config | include interface

interface Ethernet0/0
interface Ethernet1/0
interface Serial2/0
interface Serial3/0
```

The next example uses the **show** *command* **section** command to gather the lines in the configuration file with “interface” in them as well as any lines associated with those entries. In this example, interface configuration information is captured.

```
Router# show running-config | section include interface

interface Ethernet0/0
 shutdown
 no cdp enable
interface Ethernet1/0
 shutdown
 no cdp enable
interface Serial2/0
 shutdown
 no cdp enable
interface Serial3/0
 shutdown
 no cdp enable
```

Related Commands

Command	Description
show <command> append	Redirects the output of any **show** command and adds it to the end of an existing file.
show <command> exclude	Filters **show** command output so that it excludes lines that contain a particular regular expression.
show <command> include	Filters **show** command output so that it displays only lines that contain a particular regular expression.
show <command> redirect	Redirects the output of any **show** command to a specified file.

show <command> tee

To copy the output of any **show** command to a file while displaying it on the terminal, use the **show** *command* **| tee** command in privileged EXEC mode.

show *command* **| tee** [/**append**] *url*

Syntax Description

command	Any Cisco IOS **show** command.
| tee *url*	The addition of this syntax copies the command output to the file location specified in the Universal Resource Locator (URL). The pipe (|) is required. The Cisco IOS File System (IFS) uses URLs to specify the location of a file system, directory, and file. Typical URL elements include: *prefix***:**[*directory*/]*filename* Prefixes can be local file locations, such as **flash:** or **disk0:**. Alternatively, you can specify network locations using the following syntax: **ftp:**[[//[*username*[**:***password*]**@**]*location*]/*directory*]/*filename* **tftp:**[[//*location*]/*directory*]/*filename* The **rcp:** prefix is not supported.
/**append**	(Optional) Adds the **show** command output to the end of an existing file.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(21)S	This command was introduced.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

Usage Guidelines

To display all URL prefixes that are supported for this command, use the **show** *command* **| tee ?** command.

The **tee** keyword was chosen to reflect that output is redirected to two locations; the terminal and a file (as a tee plumbing junction redirects water to two different pipes).

Examples

In the following example, output from the **show tech-support** command is displayed on-screen while it is written to the file "showoutput.txt" at the host 172.16.101.101 using TFTP:

```
Router# show tech-support | tee tftp://172.16.101.101/docs/showoutput.txt
```

The following example performs the same function as above, but in this case the output is added at the end of any existing data in the file "showoutput.txt":

```
Router# show tech-support | tee /append tftp://172.16.101.101/docs/showoutput.txt
```

Related Commands

Command	Description
show <command> append	Redirects the output of any **show** command and adds it to the end of existing file.
show <command> redirect	Redirects the output of any **show** command to a specified file.

show (Flash file system)

To display the layout and contents of a Flash memory file system, use the **show** *flash-filesystem* command in EXEC mode.

Class A Flash File Systems

show *flash-filesystem***:** [**all** | **chips** | **filesys**]

Class B Flash File Systems

show *flash-filesystem***:**[*partition-number*:] [**all** | **chips** | **detailed** | **err** | **summary**]

Class C Flash File Systems

show *flash-filesystem***:**

Syntax Description

*flash-filesystem***:**	Flash memory file system, followed by a colon. The availablity of Flash file system keywords will vary by platform. Valid flash file system keywords inlude: • **bootflash** • **flash** • **slot0** • **slot1** • **slavebootflash** • **slaveslot0** • **slaveslot1**
all	(Optional) On Class B Flash file systems, **all** keyword displays complete information about Flash memory, including information about the individual ROM devices in Flash memory and the names and sizes of all system image files stored in Flash memory, including those that are invalid. On Class A Flash file systems, the **all** keyword displays the following information: • The information displayed when no keywords are used. • The information displayed by the **filesys** keyword. • The information displayed by the **chips** keyword.
chips	(Optional) Displays information per partition and per chip, including which bank the chip is in, plus its code, size, and name.
filesys	(Optional) Displays the Device Info Block, the Status Info, and the Usage Info.
partition-number	(Optional) Displays output for the specified partition number. If you do not specify a partition in the command, the router displays output for all partitions. You can use this keyword only when Flash memory has multiple partitions.

detailed	(Optional) Displays detailed file directory information per partition, including file length, address, name, Flash memory checksum, computer checksum, bytes used, bytes available, total bytes, and bytes of system Flash memory.
err	(Optional) Displays write or erase failures in the form of number of retries.
summary	(Optional) Displays summary information per partition, including the partition size, bank size, state, and method by which files can be copied into a particular partition. You can use this keyword only when Flash memory has multiple partitions.

Command Modes

EXEC

Command History

Release	Modification
11.3 AA	This command was introduced.
12.3	A timestamp that shows the offset from Coordinated Universal Time (UTC) was added to the **show** command display.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If Flash memory is partitioned, the command displays the requested output for each partition, unless you use the **partition** keyword.

The command also specifies the location of the current image.

To display the contents of boot Flash memory on Class A or B file systems, use the **show bootflash:** command as follows:

Class A Flash file systems

show bootflash: [**all** | **chips** | **filesys**]

Class B Flash file systems

show bootflash:[*partition-number*] [**all** | **chips** | **detailed** | **err**]

To display the contents of internal Flash memory on Class A or B file systems, use the **show flash:** command as follows:

Class A Flash file systems

show flash: [**all** | **chips** | **filesys**]

Class B Flash file systems

show flash:[*partition-number*][**all** | **chips** | **detailed** | **err** | **summary**]

The **show** (Flash file system) command replaces the **show flash devices** command.

Examples

The output of the **show** command depends on the type of Flash file system you select. Types include **flash:**, **bootflash:**, **slot0:**, **slot1:**, **slavebootflash:**, **slaveslot0:**, and **slaveslot1:**.

Examples of output from the **show flash** command are provided in the following sections:

- Class A Flash File System
- Class B Flash File Systems

Although the examples use **flash:** as the Flash file system, you may also use the other Flash file systems listed.

Class A Flash File System

The following three examples show sample output for Class A Flash file systems. Table 49 describes the significant fields shown in the display.

The following is sample output from the **show flash:** command.

```
Router# show flash:

-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. unknown  317FBA1B  4A0694   24  4720148 Dec 15 2003 17:49:36 -08:00
hampton/nitro/c7200-j-mz
2   .. unknown  9237F3FF  92C574   11  4767328 Jan 02 2004 18:42:53 -08:00 c7200-js-mz
3   .D unknown  71AB01F1 10C94E0   10  7982828 Jan 02 2004 18:48:14 -08:00 rsp-jsv-mz
4   .D unknown  96DACD45 10C97E0    8      639 Jan 03 2004 12:09:17 -08:00 the_time
5   .. unknown  96DACD45 10C9AE0    3      639 Jan 03 2004 12:09:32 -08:00 the_time
6   .D unknown  96DACD45 10C9DE0    8      639 Jan 03 2004 12:37:01 -08:00 the_time
7   .. unknown  96DACD45 10CA0E0    8      639 Jan 03 2004 12:37:13 -08:00 the_time

3104544 bytes available (17473760 bytes used)
```

Table 49 show (Class A Flash File System) Field Descriptions

Field	Description
#	Index number for the file.
ED	Whether the file contains an error (*E*) or is deleted (*D*).
type	File type (1 = configuration file, 2 = image file). The software displays these values only when the file type is certain. When the file type is unknown, the system displays “unknown” in this field.
crc	Cyclic redundant check for the file.
seek	Offset into the file system of the next file.
nlen	Name length—Length of the filename.
length	Length of the file itself.
date/time	Date and time the file was created. In the example, -08:00 indicates that the given date and time is 8 hours behind Coordinated Universal Time (UTC).
name	Name of the file.

The following is sample output from the **show flash: chips** command:

```
RouterA# show flash: chips

******** Intel Series 2+ Status/Register Dump ********

ATTRIBUTE MEMORY REGISTERS:
  Config Option Reg (4000): 2
```

```
  Config Status Reg (4002): 0
  Card Status   Reg (4100): 1
  Write Protect Reg (4104): 4
  Voltage Cntrl Reg (410C): 0
  Rdy/Busy Mode Reg (4140): 2

COMMON MEMORY REGISTERS: Bank 0
  Intelligent ID Code  : 8989A0A0
  Compatible Status Reg: 8080
  Global     Status Reg: B0B0
  Block Status Regs:
    0  :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    8  :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    16 :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    24 :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0

COMMON MEMORY REGISTERS: Bank 1
  Intelligent ID Code  : 8989A0A0
  Compatible Status Reg: 8080
  Global     Status Reg: B0B0
  Block Status Regs:
    0  :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    8  :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    16 :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    24 :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0

COMMON MEMORY REGISTERS: Bank 2
  Intelligent ID Code  : 8989A0A0
  Compatible Status Reg: 8080
  Global     Status Reg: B0B0
  Block Status Regs:
    0  :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    8  :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    16 :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    24 :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0

COMMON MEMORY REGISTERS: Bank 3
  Intelligent ID Code  : 8989A0A0
  Compatible Status Reg: 8080
  Global     Status Reg: B0B0
  Block Status Regs:
    0  :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    8  :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    16 :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    24 :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0

COMMON MEMORY REGISTERS: Bank 4
  Intelligent ID Code  : 8989A0A0
  Compatible Status Reg: 8080
  Global     Status Reg: B0B0
  Block Status Regs:
    0  :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    8  :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    16 :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
    24 :  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0  B0B0
```

The following is sample output from the **show flash: filesys** command:

```
RouterA# show flash: filesys

-------- F I L E   S Y S T E M   S T A T U S --------
  Device Number = 0
DEVICE INFO BLOCK:
  Magic Number          = 6887635   File System Vers = 10000    (1.0)
```

```
  Length                = 1400000   Sector Size      = 20000
  Programming Algorithm = 4         Erased State     = FFFFFFFF
  File System Offset    = 20000     Length = 13A0000
  MONLIB Offset         = 100       Length = C730
  Bad Sector Map Offset = 1FFEC     Length = 14
  Squeeze Log Offset    = 13C0000   Length = 20000
  Squeeze Buffer Offset = 13E0000   Length = 20000
  Num Spare Sectors     = 0
    Spares:
STATUS INFO:
  Writable
  NO File Open for Write
  Complete Stats
  No Unrecovered Errors
  No Squeeze in progress
USAGE INFO:
  Bytes Used     = 10AA0E0  Bytes Available = 2F5F20
  Bad Sectors    = 0        Spared Sectors  = 0
  OK Files       = 4        Bytes = 90C974
  Deleted Files  = 3        Bytes = 79D3EC
  Files w/Errors = 0        Bytes = 0
```

The following is sample output from the **show flash:** command:

```
RouterB> show flash:

System flash directory:
File  Length   Name/status
  1   4137888  c3640-c2is-mz.Feb24
[4137952 bytes used, 12639264 available, 16777216 total]
16384K bytes of processor board System flash (Read/Write)\
```

The following example shows detailed information about the second partition in internal Flash memory:

```
RouterB# show flash:2

System flash directory, partition 2:
File  Length   Name/status
  1   1711088  dirt/images/c3600-i-mz
[1711152 bytes used, 15066064 available, 16777216 total]
16384K bytes of processor board System flash (Read/Write)
```

Class B Flash File Systems

Table 50 describes the significant fields shown in the displays.

Table 50 show (Class B Flash File System) all Fields

Field	Description
addr	Address of the file in Flash memory.
available	Total number of bytes available in Flash memory.
Bank	Bank number.
Bank-Size	Size of bank in bytes.
bytes used	Total number of bytes used in Flash memory.
ccksum	Computed checksum.
Chip	Chip number.
Code	Code number.

Table 50 show (Class B Flash File System) all Fields (continued)

Field	Description
Copy-Mode	Method by which the partition can be copied to: • RXBOOT-MANUAL indicates a user can copy manually by reloading to the boot ROM image. • RXBOOT-FLH indicates user can copy via Flash load helper. • Direct indicates user can copy directly into Flash memory. • None indicates that it is not possible to copy into that partition.
fcksum	Checksum recorded in Flash memory.
File	Number of the system image file. If no filename is specified in the **boot system flash** command, the router boots the system image file with the lowest file number.
Free	Number of bytes free in partition.
Length	Size of the system image file (in bytes).
Name	Name of chip manufacturer and chip type.
Name/status	Filename and status of a system image file. The status [invalidated] appears when a file has been rewritten (recopied) into Flash memory. The first (now invalidated) copy of the file is still present within Flash memory, but it is rendered unusable in favor of the newest version. The [invalidated] status can also indicate an incomplete file that results from the user abnormally terminating the copy process, a network timeout, or a Flash memory overflow.
Partition	Partition number in Flash memory.
Size	Size of partition (in bytes) or size of chip.
State	State of the partition. It can be one of the following values: • Read-Only indicates the partition that is being executed from. • Read/Write is a partition that can be copied to.
System flash directory	Flash directory and its contents.
total	Total size of Flash memory (in bytes).
Used	Number of bytes used in partition.

The following is sample output from the **show flash: all** command:

```
RouterB> show flash: all
Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1        16384K   4040K    12343K     4096K      Read/Write     Direct

System flash directory:
File  Length   Name/status
        addr      fcksum  ccksum
  1   4137888  c3640-c2is-mz.Feb24
        0x40      0xED65  0xED65
```

```
[4137952 bytes used, 12639264 available, 16777216 total]
16384K bytes of processor board System flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       01D5      1024KB    AMD   29F080
    2      1       01D5      1024KB    AMD   29F080
    3      1       01D5      1024KB    AMD   29F080
    4      1       01D5      1024KB    AMD   29F080
    1      2       01D5      1024KB    AMD   29F080
    2      2       01D5      1024KB    AMD   29F080
    3      2       01D5      1024KB    AMD   29F080
    4      2       01D5      1024KB    AMD   29F080
    1      3       01D5      1024KB    AMD   29F080
    2      3       01D5      1024KB    AMD   29F080
    3      3       01D5      1024KB    AMD   29F080
    4      3       01D5      1024KB    AMD   29F080
    1      4       01D5      1024KB    AMD   29F080
    2      4       01D5      1024KB    AMD   29F080
    3      4       01D5      1024KB    AMD   29F080
    4      4       01D5      1024KB    AMD   29F080
```

The following is sample output from the **show flash: all** command on a router with Flash memory partitioned:

```
Router# show flash: all

System flash partition information:
Partition   Size    Used       Free     Bank-Size     State         Copy-Mode
    1       4096K    3459K     637K     4096K         Read Only     RXBOOT-FLH
    2       4096K    3224K     872K     4096K         Read/Write    Direct

System flash directory, partition 1:
File     Length     Name/status
        addr     fcksum     ccksum
  1     3459720     master/igs-bfpx.100-4.3
        0x40     0x3DE1     0x3DE1
[3459784 bytes used, 734520 available, 4194304 total]
4096K bytes of processor board System flash (Read ONLY)

   Chip    Bank     Code      Size      Name
    1      1        89A2      1024KB    INTEL 28F008SA
    2      1        89A2      1024KB    INTEL 28F008SA
    3      1        89A2      1024KB    INTEL 28F008SA
    4      1        89A2      1024KB    INTEL 28F008SA
Executing current image from System flash [partition 1]

 System flash directory, partition2:
File     Length     Name/status
        addr     fcksum     ccksum
  1     3224008     igs-kf.100
        0x40     0xEE91     0xEE91
[3224072 bytes used, 970232 available, 4194304 total]
4096K bytes of processor board System flash (Read/Write)

   Chip    Bank     Code      Size      Name
    1      2        89A2      1024KB    INTEL 28F008SA
    2      2        89A2      1024KB    INTEL 28F008SA
    3      2        89A2      1024KB    INTEL 28F008SA
    4      2        89A2      1024KB    INTEL 28F008SA
```

The following is sample output from the **show flash: chips** command:

```
RouterB> show flash: chips

16384K bytes of processor board System flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1       1       01D5      1024KB    AMD   29F080
    2       1       01D5      1024KB    AMD   29F080
    3       1       01D5      1024KB    AMD   29F080
    4       1       01D5      1024KB    AMD   29F080
    1       2       01D5      1024KB    AMD   29F080
    2       2       01D5      1024KB    AMD   29F080
    3       2       01D5      1024KB    AMD   29F080
    4       2       01D5      1024KB    AMD   29F080
    1       3       01D5      1024KB    AMD   29F080
    2       3       01D5      1024KB    AMD   29F080
    3       3       01D5      1024KB    AMD   29F080
    4       3       01D5      1024KB    AMD   29F080
    1       4       01D5      1024KB    AMD   29F080
    2       4       01D5      1024KB    AMD   29F080
    3       4       01D5      1024KB    AMD   29F080
    4       4       01D5      1024KB    AMD   29F080
```

The following is sample output from the **show flash: detailed** command:

```
RouterB> show flash: detailed

System flash directory:
File  Length   Name/status
        addr      fcksum  ccksum
  1   4137888  c3640-c2is-mz.Feb24
        0x40      0xED65  0xED65
[4137952 bytes used, 12639264 available, 16777216 total]
16384K bytes of processor board System flash (Read/Write)
```

The following is sample output from the **show flash: err** command:

```
RouterB> show flash: err

System flash directory:
File  Length   Name/status
  1   4137888  c3640-c2is-mz.Feb24
[4137952 bytes used, 12639264 available, 16777216 total]
16384K bytes of processor board System flash (Read/Write)

   Chip    Bank    Code      Size      Name                erase  write
    1       1       01D5      1024KB    AMD   29F080      0      0
    2       1       01D5      1024KB    AMD   29F080      0      0
    3       1       01D5      1024KB    AMD   29F080      0      0
    4       1       01D5      1024KB    AMD   29F080      0      0
    1       2       01D5      1024KB    AMD   29F080      0      0
    2       2       01D5      1024KB    AMD   29F080      0      0
    3       2       01D5      1024KB    AMD   29F080      0      0
    4       2       01D5      1024KB    AMD   29F080      0      0
    1       3       01D5      1024KB    AMD   29F080      0      0
    2       3       01D5      1024KB    AMD   29F080      0      0
    3       3       01D5      1024KB    AMD   29F080      0      0
    4       3       01D5      1024KB    AMD   29F080      0      0
    1       4       01D5      1024KB    AMD   29F080      0      0
    2       4       01D5      1024KB    AMD   29F080      0      0
    3       4       01D5      1024KB    AMD   29F080      0      0
    4       4       01D5      1024KB    AMD   29F080      0      0
```

See Table 50 for a description of the fields. The **show flash: err** command also displays two extra fields: erase and write. The erase field indications the number of erase errors. The write field indicates the number of write errors.

The following is sample output from the **show flash summary** command on a router with Flash memory partitioned. The partition in the Read Only state is the partition from which the Cisco IOS image is being executed.

```
Router# show flash summary

System flash partition information:
Partition   Size     Used      Free    Bank-Size   State       Copy-Mode
    1       4096K    2048K     2048K   2048K       Read Only   RXBOOT-FLH
    2       4096K    2048K     2048K   2048K       Read/Write  Direct
```

Related Commands

Command	Description
more	Displays the contents of any file in the Cisco IOS File System.

show aliases

To display all alias commands, or the alias commands in a specified mode, use the **show aliases** command in EXEC mode.

show aliases [*mode*]

Syntax Description

mode	(Optional) Name of a specific command or configuration mode. Specifies that only aliases configured for this mode should be displayed.

Command Modes

EXEC

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

When used without the *mode* argument, this command will display all aliases currently configured on the system. Use the *mode* argument to display only the aliases configured for the specified command mode.

To display a list of the command mode keywords available for your system, use the **show aliases ?** command.

The following is sample output from the **show aliases exec** commands. The aliases configured for commands in EXEC mode are displayed.

```
Router> show aliases exec

Exec mode aliases:
  h                    help
  lo                   logout
  p                    ping
  r                    resume
  s                    show
  w                    where
```

Related Commands

Command	Description
alias	Creates a command alias.

show alignment

To display alignment errors and spurious memory access errors, use the **show alignment** command in privileged EXEC mode.

show alignment

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(22)S	This command was integrated into Cisco IOS Release 12.2(22)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Alignment Errors

Alignment errors are caused by misaligned reads and writes. For example, a two-byte read where the memory address is not an even multiple of two bytes is an alignment error. Alignment errors are caused by a software defect.

Alignment errors are reported in the system log and recorded by the router. Output from the **show alignment** command provides a record of these errors along with potentially useful traceback information. The traceback information for alignment errors can generally be decoded to reveal the function causing the alignment problems.

Spurious Memory Access Errors

Spurious memory access errors occur when a software process attempts to access memory in a restricted location. A read operation to this region of memory is usually caused when a nonexisting value is returned to a function in the software, or in other words, when a null pointer is passed to a function.

Spurious memory access errors are counted and recorded, if possible, by the software. This information is displayed with the **show alignment** command.

Examples

The following is sample output from the **show alignment** command when alignment detection is disabled. To enable alignment detection, use the **enable** command to enter privileged EXEC mode

```
Router# show alignment
Unaligned handler is disabled
Router#
```

The following is sample output from the **show alignment** command when there are no alignment or spurious memory errors:

```
Router# show alignment
```

```
No alignment data has been recorded.
No spurious memory references have been recorded.
Router#
```

The following is sample output from the **show alignment** command when there are only alignment errors. The traceback information is necessary to determine the cause and the fix of the alignment errors.

```
Router# show alignment

Total Corrections 134, Recorded 1, Reads 134, Writes 0
Initial    Initial
Address  Count  Access  Type   Traceback
1A014C5   134   32bit read  0x6012F538 0x601338F8 0x601344D8 0x6022D528

No spurious memory references have been recorded.

Router#
```

Table 51 describes the significant fields shown in the display.

Table 51 show alignment Field Descriptions

Field	Description
Total Corrections	Total number of alignment corrections made.
Recorded	Number of alignment entries.
Reads	Number of misaligned reads.
Writes	Number of misaligned writes.
Initial Address	Address of where the alignment error occurred.
Count	Number of times the alignment occurred at this address.
Initial Access	Address of where the alignment error occurred.
Type	Type of alignment error: read or write.
Traceback	The traceback address information necessary to determine the cause of the misalignment.

The following is sample output from the **show alignment** command when there are only spurious memory access errors:

```
Router# show alignment

No alignment data has been recorded.

Total Spurious Accesses 50, Recorded 3

Address  Count  Traceback

E        10     0x605351A0 0x603CA084 0x606C4060 0x606D6368  0x60743284 0x60743270
E        20     0x605351A0 0x6036EE7C 0x606C4060 0x606D6368  0x60743284 0x60743270
E        20     0x605351A0 0x603C998C 0x606D53EC 0x606C4060 0x606D6368 0x60743284
Router#
```

Table 52 describes the significant fields shown in the display.

Table 52 show alignment Field Descriptions for Spurious Memory Access Errors

Field	Description
Total Spurious Accesses	Total number of spurious memory accesses made.
Recorded	Number of recorded spurious memory access entries.
Address	Address at which the spurious memory access error occurred.
Count	Number of times the spurious memory access occurred at each address. The sum equals the Total Spurious Accesses.
Traceback	The traceback address information necessary to determine the cause of the misalignment.

The following is sample output from the **show alignment** command when there are alignment errors and spurious memory access errors:

```
Router# show alignment

Total Corrections 134, Recorded 1, Reads 134, Writes 0
Initial        Initial
Address  Count Access  Type   Traceback
1A014C5   134   32bit    read 0x6012F538 0x601338F8 0x601344D8 0x6022D528

Total Spurious Accesses 50, Recorded 3

Address  Count  Traceback
E        10     0x605351A0 0x603CA084 0x606C4060 0x606D6368  0x60743284 0x60743270
E        20     0x605351A0 0x6036EE7C 0x606C4060 0x606D6368  0x60743284 0x60743270
E        20     0x605351A0 0x603C998C 0x606D53EC 0x606C4060 0x606D6368 0x60743284 x60743270
```

Related Commands

Command	Description
enable	To enter privileged EXEC mode, or any other security level set by a system administrator, use the **enable** command in user EXEC or privileged EXEC mode.

show archive

To display information about the files saved in the Cisco IOS configuration archive, use the **show archive** command in privileged EXEC mode.

show archive

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was implemented on the Cisco 10000 series.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Examples

The following is sample output from the **show archive** command:

```
Router# show archive

There are currently 1 archive configurations saved.
The next archive file will be named disk0:myconfig-2
 Archive #  Name
   0
   1       disk0:myconfig-1 <- Most Recent
   2
   3
   4
   5
   6
   7
   8
   9
   10
   11
   12
   13
   14
```

The following is sample output from the **show archive** command after several archive files of the running configuration have been saved. In this example, the maximum number of archive files to be saved is set to three.

```
Router# show archive

There are currently 3 archive configurations saved.
```

```
The next archive file will be named disk0:myconfig-8
 Archive #  Name
   0
   1        :Deleted
   2        :Deleted
   3        :Deleted
   4        :Deleted
   5        disk0:myconfig-5
   6        disk0:myconfig-6
   7        disk0:myconfig-7 <- Most Recent
   8
   9
   10
   11
   12
   13
   14
```

Table 53 describes the significant fields shown in the displays.

Table 53 show archive Field Descriptions

Field	Description
Archive #	Indicates the number of the running configuration file saved to the Cisco IOS configuration archive. You can set the maximum number of archive files of the running configuration to be saved in the configuration archive. The most recent archive file is the last one shown in the display.
Name	Indicates the name of the running configuration file saved to the Cisco IOS configuration archive.

Related Commands

Command	Description
archive config	Saves a copy of the current running configuration to the Cisco IOS configuration archive.
configure confirm	Confirms replacement of the current running configuration with a saved Cisco IOS configuration file.
configure replace	Replaces the current running configuration with a saved Cisco IOS configuration file.
maximum	Sets the maximum number of archive files of the running configuration to be saved in the Cisco IOS configuration archive.
path	Specifies the location and filename prefix for the files in the Cisco IOS configuration archive.
time-period	Sets the time increment for automatically saving an archive file of the current running configuration in the Cisco IOS configuration archive.

show archive config differences

To perform a line-by-line comparison of any two configuration files (accessible through the Cisco IOS File System [IFS]) and generate a list of the differences between them, use the **show archive config differences** command in user EXEC or privileged EXEC mode.

show archive config differences [*filename1(path)*[*filename2(path)*][**ignorecase**]]

Syntax Description

filename1(path)	(Optional) The filename (path) of the first configuration file. Can be files in the following locations: bootflash:, cns:, fpd:, ftp:, harddisk:, http:, https:, null:, nvram:, obfl:, pram:, rcp:, revrcsf:, scp:, stby-bootflash:, stby-harddisk:, stby-nvram:, stby-obfl:, stby-rcsf:, stby-usb0:, stby-usb1:, system:, tar:, tftp:, tmpsys:, usb0:
filename2(path)	(Optional) The filename of the second configuration file. Can be files in the following locations: bootflash:, cns:, fpd:, ftp:, harddisk:, http:, https:, null:, nvram:, obfl:, pram:, rcp:, revrcsf:, scp:, stby-bootflash:, stby-harddisk:, stby-nvram:, stby-obfl:, stby-rcsf:, stby-usb0:, stby-usb1:, system:, tar:, tftp:, tmpsys:, usb0:
ignorecase	(Optional) Indicates that the case of the filenames should be ignored.

Command Default

If the *filename1(path)* and *filename2(path)* arguments are not specified, the first configuration file is assumed to be the running configuration file and the second to be the startup configuration file.

If only the *filename1(path)* argument is specified, the second configuration file is assumed to be the running configuration file.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Usage Guidelines

Interpreting the output of the **show archive config differences** command is dependent on the order in which the two files are configured. Each entry in the generated output list is prefixed with a unique text symbol to indicate the type of difference found. The text symbols and their meanings are as follows:

- A minus symbol (-) indicates that the configuration line exists in *filename1(path)* but not in *filename2(path)*.

- A plus symbol (+) indicates that the configuration line exists in *filename2(path)* but not in *filename1(path)*.
- An exclamation point (!) with descriptive comments is used to identify order-sensitive configuration lines whose location is different in *filename1(path)* than in *filename2(path)*.

Examples

In this example, a diff operation is performed on the running and startup configuration files. Table 54 shows the configuration files used for this example.

Table 54 Configuration Files Used for the Diff Operation Example

Running Configuration File	Startup Configuration File
no ip subnet-zero ip cef interface Ethernet1/0 ip address 10.7.7.7 255.0.0.0 no ip route-cache no ip mroute-cache duplex half no ip classless snmp-server community public RO	ip subnet-zero ip cef ip name-server 10.4.4.4 voice dnis-map 1 dnis 111 interface Ethernet1/0 no ip address no ip route-cache no ip mroute-cache shutdown duplex half ip default-gateway 10.5.5.5 ip classless access-list 110 deny ip any host 10.1.1.1 access-list 110 deny ip any host 10.1.1.2 access-list 110 deny ip any host 10.1.1.3 snmp-server community private RW

The following is sample output from the **show archive config differences** command. This sample output displays the results of the diff operation performed on the configuration files in Table 54.

```
Router# show archive config differences running-config startup-config

+ip subnet-zero
+ip name-server 10.4.4.4
+voice dnis-map 1
 +dnis 111
interface Ethernet1/0
 +no ip address
 +shutdown
+ip default-gateway 10.5.5.5
+ip classless
+access-list 110 deny   ip any host 10.1.1.1
+access-list 110 deny   ip any host 10.1.1.2
+access-list 110 deny   ip any host 10.1.1.3
+snmp-server community private RW
-no ip subnet-zero
interface Ethernet1/0
 -ip address 10.7.7.7 255.0.0.0
-no ip classless
-snmp-server community public RO
```

Related Commands

Command	Description
more nvram:startup-config	Displays the startup configuration file contained in NVRAM or specified by the CONFIG_FILE environment variable.
more system:running-config	Displays the contents of the currently running configuration file.
show archive config incremental-diffs	Performs a line-by-line comparison of a specified configuration file to the running configuration file and generates a list of the configuration lines that do not appear in the running configuration file.

show archive config incremental-diffs

To perform a line-by-line comparison of a specified configuration file to the running configuration file and generate a list of the configuration lines that do not appear in the running configuration file, use the **show archive config incremental-diffs** command in user EXEC or privileged EXEC mode.

show archive config incremental-diffs *file*

Syntax Description

file	The filename of the configuration file to be compared to the running configuration file.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Usage Guidelines

When an incremental diff operation is performed, a list of the configuration lines that do not appear in the running configuration file (in other words, configuration lines that only appear in the specified file that is being compared to the running configuration file) is generated as output. An exclamation point (!) with descriptive comments is used to identify order-sensitive configuration lines whose location is different in the specified configuration file than in the running configuration file.

Examples

In this example, an incremental diff operation is performed on the startup and running configuration files. Table 55 shows the configuration files used for this example.

Table 55 Configuration Files Used for the Incremental Diff Operation Example

Startup Configuration File	Running Configuration File

ip subnet-zero
ip cef
ip name-server 10.4.4.4
voice dnis-map 1
  dnis 111
interface Ethernet1/0
  no ip address
  no ip route-cache
  no ip mroute-cache
  shutdown
  duplex half
ip default-gateway 10.5.5.5
ip classless
access-list 110 deny ip any host 10.1.1.1
access-list 110 deny ip any host 10.1.1.2
access-list 110 deny ip any host 10.1.1.3
snmp-server community private RW
	no ip subnet-zero
	ip cef
	interface Ethernet1/0
	  ip address 10.7.7.7 255.0.0.0
	  no ip route-cache
	  no ip mroute-cache
	  duplex half
	no ip classless
	snmp-server community public RO

The following is sample output from the **show archive config incremental-diffs** command. This sample output displays the results of the incremental diff operation performed on the configuration files in Table 55.

```
Router# show archive config incremental-diffs nvram:startup-config

ip subnet-zero
ip name-server 10.4.4.4
voice dnis-map 1
 dnis 111
interface Ethernet1/0
 no ip address
 shutdown
ip default-gateway 10.5.5.5
ip classless
 access-list 110 deny   ip any host 10.1.1.1
 access-list 110 deny   ip any host 10.1.1.2
 access-list 110 deny   ip any host 10.1.1.3
snmp-server community private RW
```

Related Commands

Command	Description
more nvram:startup-config	Displays the startup configuration file contained in NVRAM or specified by the CONFIG_FILE environment variable.
more system:running-config	Displays the contents of the currently running configuration file.
show archive config differences	Performs a line-by-line comparison of any two configuration files (accessible through the IFS) and generates a list of the differences between them.

show archive config rollback timer

To display settings of the timed rollback, use the **show archive config rollback timer** command in privileged EXEC mode.

show archive config rollback timer

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(15)T	This command was introduced in Cisco IOS Release12.4(15)T.
12.2(33)SRC	This command was integrated into a release earlier than Cisco IOS Release 12.2(33)SRC.
12.2(33)SXI	This command was integrated into a release earlier than Cisco IOS Release 12.2(33)SXI.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

Use the **show archive config rollback timer** command to display the timed rollback settings, such as the timer type (idle timer or absolute timer) and timer value, after a timed rollback is configured on a router.

Examples

The following is sample output from the **show archive config rollback timer** command:

```
Router# show archive config rollback timer

Time configured(or reconfigured): 22:50:48 UTC Sat Feb 21 2009
Timer type: absolute timer
Timer value: 2 min
User: console
```

Table 56 describes the significant fields shown in the display.

Table 56 show archive config rollback timer Field Descriptions

Field	Description
Time configured (or reconfigured)	The time at which the timer refreshes every time the Enter key is pressed.
Timer type	The type of the timer: Idle or absolute.
Timer value	Displays the time, in minutes, for which to wait for confirmation.
User	Displays the username.

Related Commands

Command	Description
configure revert	Cancels the timed rollback and trigger the rollback immediately or resets parameters for the timed rollback.
configure terminal revert timer	Enter global configuration mode and sets the parameters for reverting the configuration if confirmation of the new configuration is not received.

show archive log config

To display entries from the configuration log, use the **show archive log config** command in privileged EXEC mode.

show archive log config {**all** | *record-number* [*end-number*] | **user** *username* [**session** session-*number*] *record-number* [*end-number*] | **statistics**} [**provisioning**] [**contenttype** {**plaintext** | **xml**}] [**persistent**]

Syntax Description

all	Displays all configuration log entries.
record-number [*end-number*]	Displays the log entry by record number. If you specify a record number for the optional *end-number* argument, all log entries with record numbers between the values entered for the *record-number* and *end-number* arguments are displayed. Valid values for the *record-number* and *end-number* arguments range from 1 to 2147483647.
user *username*	Displays log entries attributed to a particular user.
session *session-number*	(Optional) Displays log entries attributed to a particular session. Valid values for the *session-number* argument range from 1 to 1000.
statistics	Displays memory usage information for the configuration log.
provisioning	(Optional) Displays configuration log file information as it would appear in a configuration file, rather than in tabular format.
contenttype	(Optional) Specifies the format for the display of configuration change results.
plaintext	Specifies that the configuration change results will be formatted as plain text. This keyword appears only if the **contenttype** keyword has been entered.
xml	Specifies that the configuration change results will be in eXtensible Markup Language (XML) format. This keyword appears only if the **contenttype** keyword has been entered.
persistent	(Optional) Displays the persistent configuration changes in a configlet format.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	The **contenttype**, **plaintext**, **xml**, and **persistent** keywords were added.
12.4(11)T	This command was integrated into Cisco IOS Release 12.4(11)T.

Release	Modification
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command with syntax updated in 12.2(33)SRA was integrated into Cisco IOS Release 12.2(33)SB. This command was implemented on the Cisco 10000 series.

Usage Guidelines

If you do not specify the **all** keyword, you must specify a record number with the *record-number* argument. You can optionally specify an end record number with the *end-number* argument to display a range of records. If you use the *end-number* argument to specify a record number that does not exist, all records after the starting record number with a record number lower than that specified with the *end-number* argument are displayed.

Specifying the **provisioning** keyword results in the display appearing as it would in a configuration file, rather than in tabular format. This output includes commands used to change configuration modes and logged configuration commands. This output can be used to set up another router if desired.

Examples

The following is sample output from the **show archive log config** command, which displays configuration log entry numbers 1 and 2:

```
Router# show archive log config 1 2

idx   sess   user@line        Logged command
 1     1     user1@console    logging enable
 2     1     user1@console    logging size 200
```

Table 57 describes the significant fields shown in the display.

Table 57 show archive log config Field Descriptions

Field	Description
idx	The record number of the configuration log entry.
sess	The session number associated with the configuration log entry.
user@line	The username of the user who executed the command that generated the configuration log entry.
Logged command	The command that was executed.

The following example results in the display of all configuration log files as they would appear in a configuration file rather than in tabular format. In addition to displaying logged commands, the example shows the commands used to change configuration modes that are required to correctly apply the logged commands.

```
Router# show archive log config all provisioning

archive
 log config
 logging enable
 logging size 200
```

The following example results in the display of memory usage statistics for the configuration log:

```
Router# show archive log config statistics
```

```
Config Log Session Info:
 Number of sessions being tracked: 1
 Memory being held: 3910 bytes
 Total memory allocated for session tracking: 3910 bytes
 Total memory freed from session tracking: 0 bytes

Config Log log-queue Info:
 Number of entries in the log-queue: 3
 Memory being held in the log-queue: 671 bytes
 Total memory allocated for log entries: 671 bytes
 Total memory freed from log entries:: 0 bytes
```

The output is self-explanatory.

The following example shows the contents of the archive log in XML format:

```
Router# show archive log config all contenttype xml

<?xml version="1.0" encoding="UTF-8"?>
<configLoggerMsg version="1.0">
    <configChanged>
        <changeInfo>
            <user>jdoe</user>
            <async>
                <port>con_0</port>
            </async>
            <when>
                <absoluteTime>2003-04-23T20:25:19.847Z</absoluteTime>
            </when>
        </changeInfo>
        <logComment>begin test test1</logComment>
    </configChanged>
    <configChanged>
        <changeInfo>
            <user>jdoe</user>
            <async>
                <port>con_0</port>
            </async>
            <when>
                <absoluteTime>2003-04-23T20:27:19.847Z</absoluteTime>
            </when>
        </changeInfo>
        <changeItem>
            <context/>
            <enteredCommand>
                <cli>interface e0</cli>
            </enteredCommand>
            <prcResultType>
                <prcSuccess>
                    <change>PRC_CHANGE</change>
                </prcSuccess>
            </prcResultType>
            <oldConfigState>
                <cli></cli>
            </oldConfigState>
            <newConfigState>
                <cli>interface e0</cli>
            </newConfigState>
        </changeItem>
        </configChanged>
        <configChanged>
            <changeInfo>
                <user>jdoe</user>
                <async>
```

```
                    <port>con_0</port>
                </async>
                <when>
                        <absoluteTime>2003-04-23T20:28:19.847Z</absoluteTime>
                    </when>
                </changeInfo>
                <changeItem>
                    <context><cli>interface e0</cli></context>
                    <enteredCommand>
                        <cli>ip address 10.1.1.1 255.255.255.0</cli>
                    </enteredCommand>
                    <prcResultType>
                        <prcSuccess>
                            <change>PRC_CHANGE</change>
                        </prcSuccess>
                        </prcResultType>
                        <oldConfigState/>
                        <newConfigState>
                            <cli>ip address 10.1.1.1 255.255.255.0</cli>
                        </newConfigState>
                    </changeItem>
    </configChanged>
    <configChanged>
        <changeInfo>
            <user>jdoe</user>
            <async>
                <port>con_0</port>
            </async>
            <when>
                <absoluteTime>2003-04-23T20:29:19.847Z</absoluteTime>
            </when>
        </changeInfo>
        <logComment>end test test1</logComment>
    </configChanged>
</configLoggerMsg>
```

show async bootp

To display the extended BOOTP request parameters that have been configured for asynchronous interfaces, use the **show async bootp** command in privileged EXEC mode.

show async bootp

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

The following is sample output from the **show async bootp** command:

```
Router# show async bootp

The following extended data will be sent in BOOTP responses:

bootfile (for address 192.168.1.1) "pcboot"
bootfile (for address 172.16.1.111) "dirtboot"
subnet-mask 255.255.0.0
time-offset -3600
time-server 192.168.1.1
```

Table 58 describes the significant fields shown in the display.

Table 58 show async bootp Field Descriptions

Field	Description
bootfile... "pcboot"	Boot file for address 192.168.1.1 is named pcboot.
subnet-mask 255.255.0.0	Subnet mask.
time-offset -3600	Local time is one hour (3600 seconds) earlier than UTC time.
time-server 192.168.1.1	Address of the time server for the network.

Related Commands

Command	Description
async-bootp	Configures extended BOOTP requests for asynchronous interfaces as defined in RFC 1084.

show autoupgrade configuration unknown

To display all of the unknown start-up configuration lines that the auto-upgraded Cisco IOS software image does not understand, use the **show autoupgrade configuration unknown** command in privileged EXEC mode.

show autoupgrade configuration unknown

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(15)T	This command was introduced.

Usage Guidelines

Use the **show autoupgrade configuration unknown** command to view any invalid start-up configuration. This command prints invalid start-up configuration data only when run from an an image which was upgraded using the Auto-Upgrade Manager. This command output is useful when you are upgrading to an image with a different feature set.

Examples

The following example shows how to view the invalid start-up configuration lines that the Cisco IOS software image, upgraded on the router using AUM, does not understand:

```
Router# show autoupgrade configuration unknown
! Config Lines not understood by the current image:
voice-card 0
 no dspfarm
crypto pki trustpoint aum_cisco_ca
 enrollment terminal
 revocation-check none
crypto pki certificate chain aum_cisco_ca
 certificate ca 40DCB71E54EE24CBE5326F8006BBA4F6 nvram:SecureServer#A4F6CA.cer
no ip http secure-server
 transport output lat pad telnet rlogin lapb-ta mop udptn v120 ssh

Total 9 Invalid Config Lines

Router#
```

Related Commands

Command	Description
upgrade automatic abortversion	Cancels a scheduled reloading of the device with a new Cisco IOS software image.

Command	Description
upgrade automatic getversion	Downloads a Cisco IOS software image directly from www.cisco.com or from a non-Cisco server.
upgrade automatic runversion	Reloads the device with a new Cisco IOS software image.

show bootflash:

To display information about the bootflash: file system, use the **show bootflash:** command in user EXEC or privileged EXEC mode.

show bootflash: [**all** | **chips** | **filesys**]

Syntax Description

all	(Optional) Displays all possible Flash information.
chips	(Optional) Displays information about the Flash chip.
filesys	(Optional) Displays information about the file system.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to display information about the file system status:

```
Router> show bootflash: filesys

-------- F I L E   S Y S T E M   S T A T U S --------
  Device Number = 0
DEVICE INFO BLOCK: bootflash
  Magic Number          = 6887635   File System Vers = 10000    (1.0)
  Length                = 1000000   Sector Size      = 40000
  Programming Algorithm = 39        Erased State     = FFFFFFFF
  File System Offset    = 40000     Length = F40000
  MONLIB Offset         = 100       Length = C628
  Bad Sector Map Offset = 3FFF8     Length = 8
  Squeeze Log Offset    = F80000    Length = 40000
  Squeeze Buffer Offset = FC0000    Length = 40000
  Num Spare Sectors     = 0
    Spares:
STATUS INFO:
  Writable
  NO File Open for Write
  Complete Stats
  No Unrecovered Errors
  No Squeeze in progress
USAGE INFO:
  Bytes Used     = 917CE8  Bytes Available = 628318
  Bad Sectors    = 0       Spared Sectors  = 0
```

```
  OK Files       = 2       Bytes = 917BE8
  Deleted Files  = 0       Bytes = 0
  Files w/Errors = 0       Bytes = 0
Router>
```

This example shows how to display image information:

```
Router> show bootflash:

-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. image    8C5A393A  237E3C   14  2063804 Aug 23 1999 16:18:45 c6msfc-boot-mz
2   .. image    D86EE0AD  957CE8    9  7470636 Sep 20 1999 13:48:49 rp.halley
Router>
```

This example shows how to display all bootflash information:

```
Router> show bootflash: all

-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. image    8C5A393A  237E3C   14  2063804 Aug 23 1999 16:18:45 c6msfc-boot-
mz
2   .. image    D86EE0AD  957CE8    9  7470636 Sep 20 1999 13:48:49 rp.halley

6456088 bytes available (9534696 bytes used)

-------- F I L E   S Y S T E M   S T A T U S --------
  Device Number = 0
DEVICE INFO BLOCK: bootflash
  Magic Number          = 6887635   File System Vers = 10000    (1.0)
  Length                = 1000000   Sector Size      = 40000
  Programming Algorithm = 39        Erased State     = FFFFFFFF
  File System Offset    = 40000     Length = F40000
  MONLIB Offset         = 100       Length = C628
  Bad Sector Map Offset = 3FFF8     Length = 8
  Squeeze Log Offset    = F80000    Length = 40000
  Squeeze Buffer Offset = FC0000    Length = 40000
  Num Spare Sectors     = 0
    Spares:
STATUS INFO:
  Writable
  NO File Open for Write
  Complete Stats
  No Unrecovered Errors
  No Squeeze in progress
USAGE INFO:
  Bytes Used     = 917CE8  Bytes Available = 628318
  Bad Sectors    = 0       Spared Sectors  = 0
  OK Files       = 2       Bytes = 917BE8
  Deleted Files  = 0       Bytes = 0
  Files w/Errors = 0       Bytes = 0
Router>
```

Related Commands

Command	Description
delete	Marks files on bootflash for deletion.
squeeze	Removes files from bootflash that have been marked for deletion.

show bootvar

To display the contents of the BOOT variable, the name of the configuration file pointed to by the CONFIG_FILE variable, the contents of the BOOTLDR variable, and the configuration register setting, use the **show bootvar** command in user EXEC or privileged EXEC mode.

show bootvar

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.3 AA	This command was introduced.
12.2(14)SX	Support for this command was implemented on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was integrated into Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Supported Platforms Other than the Cisco 7600 Series Router

The **show bootvar** command replaces the **show boot** command.

The **show bootvar** command allows you to view the current settings for the following variables:

- BOOT
- CONFIG_FILE
- BOOTLDR

The BOOT variable specifies a list of bootable images on various devices. The CONFIG_FILE variable specifies the configuration file used during system initialization. The BOOTLDR variable specifies the flash device and filename containing the rxboot image that ROM uses for booting. You set these variables with the **boot system**, **boot config**, and **boot bootldr** global configuration commands, respectively.

When you use this command on a device with multiple Route Switch Processor (RSP) cards (Dual RSPs), this command also shows you the variable settings for both the master and slave RSP card.

Cisco 7600 Series Router

The **show bootvar** command displays information about the BOOT environmental variable.

The command output depends on how you configure the boot statement as follows:

- If you enter the **boot system flash bootflash:***sup720_image* command in the boot configuration, then the **show bootvar** command output displays the bootflash information.

- If you enter the **boot system flash sup-bootflash:***sup720_image* command in the boot configuration, then the **show bootvar** command output displays the sup-bootflash information. This action is the correct way of configuring the boot statement.

The **show bootvar** command is available from the switch processor command-line interface (CLI) and the route processor CLI. From the switch processor CLI, the display is always bootflash. With either the bootflash or the sup-bootflash boot statement, the switch boots correctly. You should use sup-bootflash in the boot configuration statement because the image is stored in the switch processor bootflash; the route processor sees the image as sup-bootflash.

The number displayed after the image name (for example, c6sup12-js-mz.121-13.E,12) indicates the number of times that the Cisco 7600 series router tries to reboot the file before giving up.

Examples

Supported Platforms Other than the Cisco 7600 Series Router

The following is sample output from the **show bootvar** command:

```
Router# show bootvar

BOOT variable =
CONFIG_FILE variable = nvram:
Current CONFIG_FILE variable = slot0:router-config
BOOTLDR variable not exist

Configuration register is 0x0
```

In this example, the BOOT variable contains a null string; that is no bootable images are specified.

The CONFIG_FILE variable points to the configuration file in NVRAM as the startup (initialization) configuration. The run-time value for the CONFIG_FILE variable points to the router-configuration file on the flash memory card inserted in the first slot of the RSP card. That is, during the run-time configuration, you have modified the CONFIG_FILE variable using the **boot config** command, but you have not saved the run-time configuration to the startup configuration. To save your run-time configuration to the startup configuration, use the **copy system:running-config nvram:startup-config** command. If you do not save the run-time configuration to the startup configuration, then the system reverts to the saved CONFIG_FILE variable setting for initialization information upon reload. In this sample, the system reverts to NVRAM for the startup configuration file.

The BOOTLDR variable does not yet exist. That is, you have not created the BOOTLDR variable using the **boot bootldr** global configuration command.

The following example is output from the **show bootvar** command for a Cisco 7513 router configured for high system availability (HSA):

```
Router# show bootvar

BOOT variable =
CONFIG_FILE variable =
Current CONFIG_FILE variable =
BOOTLDR variable does not exist

Configuration register is 0x0

current slave is in slot 7
BOOT variable =
CONFIG_FILE variable =
BOOTLDR variable does not exist

Configuration register is 0x0
```

Table 59 describes the significant fields shown in the displays.

Table 59 show bootvar Field Descriptions

Field	Description
BOOT variable	Displays a list of specified bootable images.
CONFIG_FILE variable	Indicates where to locate the startup (initialization) configuration file.
Current CONFIG_FILE variable	Identifies the run-time configuration file.
BOOTLDR variable	Identifies the location of the boot image that ROM uses for booting, if it is specified.
Configuration register	Specifies router behavior, such as how the router boots, options while booting, and console speed (baud rate for a terminal emulation session).
current slave is in slot 7	Indicates the slot where the redundant system is located in HSA configurations.

Cisco 7600 Series Router

This example shows how to display information about the BOOT environment variable:

```
Router# show bootvar

BOOT variable = sup-bootflash:c6sup12-js-mz.121-13.E,12
CONFIG_FILE variable =
BOOTLDR variable = bootflash:c6msfc2-boot-mz.121-13.E.bin
Configuration register is 0x2102

Standby is up
Standby has 112640K/18432K bytes of memory.

Standby BOOT variable = bootflash:c6sup12-js-mz.121-13.E,12
Standby CONFIG_FILE variable =
Standby BOOTLDR variable = bootflash:c6msfc2-boot-mz.121-13.E.bin
Standby Configuration register is 0x2102
```

The number displayed after the image name (for example, c6sup12-js-mz.121-13.E,12) indicates the number of times that the Cisco 7600 series router tries to reboot the file before giving up.

Related Commands

Command	Description
boot bootldr	Specifies the location of the boot image that ROM uses for booting.
boot bootstrap	Configures the filename that is used to boot a secondary bootstrap image.
boot config	Specifies the device and filename of the configuration file from which the router configures itself during initialization (startup).
boot system	Specifies the system image that the router loads at startup.
copy	Copies a file from source to a destination.
show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

show buffers

To display statistics for the buffer pools on the network server when Cisco IOS or Cisco IOS Software Modularity images are running, use the **show buffers** command in user EXEC or privileged EXEC mode.

show buffers [{**address** *hex-address* | **failures** | **pool** *pool-name* | **processes** | {**all** | **assigned** [*process-id*] | **free** | **old** | **input-interface** *interface-type interface-number*} [**pool** *pool-name*]} [**dump** | **header** | **packet**]]

Syntax Description

address	(Optional) Displays buffers at a specified address.
hex-address	(Optional) Address in hexadecimal notation.
failures	(Optional) Displays buffer allocation failures.
pool	(Optional) Displays buffers in a specified buffer pool.
pool-name	(Optional) Name of buffer pool.
processes	(Optional) For Cisco IOS Software Modularity images only. Displays buffers connected to Packet Manager.
all	(Optional) Displays all buffers.
assigned	(Optional) Displays the buffers in use.
process-id	(Optional) For Cisco IOS Software Modularity images only. POSIX process identifier.
free	(Optional) Displays the buffers available for use.
old	(Optional) Displays buffers older than one minute.
input-interface	(Optional) Displays interface pool information. If an interface type is specified and this interface has its own buffer pool, information for that pool is displayed.
interface-type	(Optional) Interface type.
interface-number	(Optional) Interface number.
dump	(Optional) Displays the buffer header and all data.
header	(Optional) Displays the buffer header only.
packet	(Optional) Displays the buffer header and packet data.

Command Default

If no options are specified, all buffer pool information is displayed.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
12.3	The option to filter display output based on specific buffer pools was expanded.

Release	Modification
12.2(18)SXF4	Two additional fields were added to the output to support Cisco IOS Software Modularity.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

Example output varies between Cisco IOS software images and Cisco IOS Software Modularity software images. To view the appropriate output, choose one of the following sections:

- Cisco IOS Software
- Cisco IOS Software Modularity

Cisco IOS Software

The following is sample output from the **show buffers** command with no arguments, showing all buffer pool information:

```
Router# show buffers

Buffer elements:
     398 in free list (500 max allowed)
     1266 hits, 0 misses, 0 created

Public buffer pools:
Small buffers, 104 bytes (total 50, permanent 50):
     50 in free list (20 min, 150 max allowed)
     551 hits, 0 misses, 0 trims, 0 created
Middle buffers, 600 bytes (total 25, permanent 25):
     25 in free list (10 min, 150 max allowed)
     39 hits, 0 misses, 0 trims, 0 created
Big buffers, 1524 bytes (total 50, permanent 50):
     49 in free list (5 min, 150 max allowed)
     27 hits, 0 misses, 0 trims, 0 created
VeryBig buffers, 4520 bytes (total 10, permanent 10):
     10 in free list (0 min, 100 max allowed)
     0 hits, 0 misses, 0 trims, 0 created
Large buffers, 5024 bytes (total 0, permanent 0):
     0 in free list (0 min, 10 max allowed)
     0 hits, 0 misses, 0 trims, 0 created
Huge buffers, 18024 bytes (total 0, permanent 0):
     0 in free list (0 min, 4 max allowed)
     0 hits, 0 misses, 0 trims, 0 created

Interface buffer pools:
Ethernet0 buffers, 1524 bytes (total 64, permanent 64):
     16 in free list (0 min, 64 max allowed)
     48 hits, 0 fallbacks
     16 max cache size, 16 in cache
Ethernet1 buffers, 1524 bytes (total 64, permanent 64):
     16 in free list (0 min, 64 max allowed)
     48 hits, 0 fallbacks
     16 max cache size, 16 in cache
Serial0 buffers, 1524 bytes (total 64, permanent 64):
     16 in free list (0 min, 64 max allowed)
     48 hits, 0 fallbacks
     16 max cache size, 16 in cache
Serial1 buffers, 1524 bytes (total 64, permanent 64):
     16 in free list (0 min, 64 max allowed)
     48 hits, 0 fallbacks
     16 max cache size, 16 in cache
```

```
TokenRing0 buffers, 4516 bytes (total 48, permanent 48):
     0 in free list (0 min, 48 max allowed)
     48 hits, 0 fallbacks
     16 max cache size, 16 in cache
TokenRing1 buffers, 4516 bytes (total 32, permanent 32):
     32 in free list (0 min, 48 max allowed)
     16 hits, 0 fallbacks
     0 failures (0 no memory)
```

The following is sample output from the **show buffers** command with no arguments, showing onlybuffer pool information for Huge buffers. This output shows a highest total of five Huge buffers created five days and 18 hours before the command was issued.

```
Router# show buffers

Huge buffers, 18024 bytes (total 5, permanent 0, peak 5 @ 5d18h):
     4 in free list (3 min, 104 max allowed)
     0 hits, 1 misses, 101 trims, 106 created
     0 failures (0 no memory)
```

The following is sample output from the **show buffers** command with no arguments, showing only buffer pool information for Huge buffers. This output shows a highest total of 184 Huge buffers created one hour, one minute, and 15 seconds before the command was issued.

```
Router# show buffers

Huge buffers, 65280 bytes (total 4, permanent 2, peak 184 @ 01:01:15):
     4 in free list (0 min, 4 max allowed)
     32521 hits, 143636 misses, 14668 trims, 14670 created
     143554 failures (0 no memory)
```

The following is sample output from the **show buffers** command with an interface type and interface number:

```
Router# show buffers Ethernet 0

Ethernet0 buffers, 1524 bytes (total 64, permanent 64):
     16 in free list (0 min, 64 max allowed)
     48 hits, 0 fallbacks
   16 max cache size, 16 in cache
```

Table 60 describes the significant fields shown in the display.

Table 60 show buffers (Cisco IOS Software) Field Descriptions

Field	Description
Buffer elements	Small structures used as placeholders for buffers in internal operating system queues. Used when a buffer may need to be on more than one queue.
free list	Total number of the currently unallocated buffer elements.
max allowed	Maximum number of buffers that are available for allocation.
hits	Count of successful attempts to allocate a buffer when needed.
misses	Count of buffer allocation attempts that resulted in growing the buffer pool to allocate a buffer.
created	Count of new buffers created to satisfy buffer allocation attempts when the available buffers in the pool have already been allocated.

Table 60 show buffers (Cisco IOS Software) Field Descriptions (continued)

Field	Description
Public Buffer Pools	
Small buffers	Buffers that are 104 bytes long.
Middle buffers	Buffers that are 600 bytes long.
Big buffers	Buffers that are 1524 bytes long.
VeryBig buffers	Buffers that are 4520 bytes long.
Large buffers	Buffers that are 5024 bytes long.
Huge buffers	Buffers that are 18,024 bytes long.
total	Total number of this type of buffer.
permanent	Number of these buffers that are permanent.
peak	Maximum number of buffers created (highest total) and the time when that peak occurred. Formats include weeks, days, hours, minutes, and seconds. Not all systems report a peak value, which means this field may not display in output.
free list	Number of available or unallocated buffers in that pool.
min	Minimum number of free or unallocated buffers in the buffer pool.
max allowed	Maximum number of free or unallocated buffers in the buffer pool.
hits	Count of successful attempts to allocate a buffer when needed.
misses	Count of buffer allocation attempts that resulted in growing the buffer pool in order to allocate a buffer.
trims	Count of buffers released to the system because they were not being used. This field is displayed only for dynamic buffer pools, not interface buffer pools, which are static.
created	Count of new buffers created in response to misses. This field is displayed only for dynamic buffer pools, not interface buffer pools, which are static.
Interface Buffer Pools	
total	Total number of this type of buffer.
permanent	Number of these buffers that are permanent.
free list	Number of available or unallocated buffers in that pool.
min	Minimum number of free or unallocated buffers in the buffer pool.
max allowed	Maximum number of free or unallocated buffers in the buffer pool.
hits	Count of successful attempts to allocate a buffer when needed.
fallbacks	Count of buffer allocation attempts that resulted in falling back to the public buffer pool that is the smallest pool at least as big as the interface buffer pool.
max cache size	Maximum number of buffers from the pool of that interface that can be in the buffer pool cache of that interface. Each interface buffer pool has its own cache. These are not additional to the permanent buffers; they come from the buffer pools of the interface. Some interfaces place all of their buffers from the interface pool into the cache. In this case, it is normal for the *free list* to display 0.

Table 60 show buffers (Cisco IOS Software) Field Descriptions (continued)

Field	Description
failures	Total number of times a buffer creation failed. The failure may have occurred because of a number of different reasons, such as low processor memory, low IOMEM, or no buffers in the pool when called from interrupt context.
no memory	Number of times there has been low memory during buffer creation. Low or no memory during buffer creation may not necessarily mean that buffer creation failed; memory can be obtained from an alternate resource such as a fallback pool.

Cisco IOS Software Modularity

The following is sample output from the **show buffers** command using a Cisco IOS Modularity image from Cisco IOS Release 12.2(18)SXF4 and later releases. Two new output fields were introduced—Public buffer heads and Temporary buffer heads—and are shown within comments in the following sample output.

```
Router# show buffers

Buffer elements:
    500 in free list (500 max allowed)
    106586 hits, 0 misses, 0 created

Public buffer pools:
Small buffers, 104 bytes (total 50, permanent 50, peak 54 @ 1d13h):
    49 in free list (20 min, 150 max allowed)
    54486 hits, 0 misses, 4 trims, 4 created
    0 failures (0 no memory)
Middle buffers, 600 bytes (total 25, permanent 25, peak 27 @ 1d13h):
    25 in free list (10 min, 150 max allowed)
    20 hits, 0 misses, 2 trims, 2 created
    0 failures (0 no memory)
Big buffers, 1536 bytes (total 50, permanent 50):
    50 in free list (40 min, 150 max allowed)
    6 hits, 0 misses, 0 trims, 0 created
    0 failures (0 no memory)
VeryBig buffers, 4520 bytes (total 10, permanent 10):
    10 in free list (0 min, 100 max allowed)
    0 hits, 0 misses, 0 trims, 0 created
    0 failures (0 no memory)
Large buffers, 5024 bytes (total 0, permanent 0):
    0 in free list (0 min, 10 max allowed)
    0 hits, 0 misses, 0 trims, 0 created
    0 failures (0 no memory)
Huge buffers, 18024 bytes (total 1, permanent 0, peak 1 @ 1d13h):
    0 in free list (0 min, 4 max allowed)
    1 hits, 0 misses, 0 trims, 0 created
    0 failures (0 no memory)

! Start of Cisco IOS Software Modularity fields
Public buffer headers:
Header buffers, 880 bytes (total 1000, peak 142 @ 1d13h):
    864 in permanent free list
    142 hits, 0 misses

Temporary buffer headers:
Header buffers, 896 bytes (total 0):
    0 in free list
    0 hits, 0 misses, 0 trims, 0 created
```

```
    0 failures
! End of Cisco IOS Software Modularity fields

Interface buffer pools:
Logger Pool buffers, 600 bytes (total 150, permanent 150):
    150 in free list (150 min, 150 max allowed)
    22 hits, 0 misses
```

Table 61 describes the significant fields shown in the display that are different from the fields in Table 60.

Table 61 show buffers (Cisco IOS Software Modularity) Field Descriptions

Field	Description
Public Buffer Headers	
Header buffers	Buffers that are 880 bytes long.
total	Total number of this type of buffer.
permanent free list	Number of available or unallocated permanent header buffers.
hits	Count of successful attempts to allocate a header buffer when needed.
misses	Count of buffer allocation attempts that resulted in growing the buffer pool in order to allocate a buffer.
Temporary Buffer Headers	
Header buffers	Buffers that are 896 bytes long.
total	Total number of this type of buffer.
free list	Number of available or unallocated header buffers in that pool.
hits	Count of successful attempts to allocate a buffer when needed.
misses	Count of buffer allocation attempts that resulted in growing the buffer pool in order to allocate a buffer.
trims	Count of buffers released to the system because they were not being used. This field is displayed only for dynamic buffer pools, not interface buffer pools, which are static.
created	Count of new buffers created in response to misses. This field is displayed only for dynamic buffer pools, not interface buffer pools, which are static.
failures	Total number of allocation requests that have failed because no buffer was available for allocation; the datagram was lost. Such failures normally occur at interrupt level.

show buffers summary

To display the buffers usage summary for all caller and for all buffer pools, use the **show buffers summary** command in privileged EXEC mode.

show buffers summary

Syntax Description

This command has no arguments or keywords.

Command Default

All buffer usage summary information is displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SXI	This command was introduced.

Examples

The following is sample output from the **show buffers summary** command:

```
Router# show buffers summary

Pool: Small
Non-aligned packet(s): 25
 Caller Summary
    pc = 0x40612F74 count = 37
    pc = 0x418D77FC count = 24
    pc = 0x418571E0 count = 1
    pc = 0x41860488 count = 1

Pool: Medium
Non-aligned packet(s): 39
 Caller Summary
    pc = 0x418D77FC count = 38
    pc = 0x41860488 count = 1
    pc = 0x40612F74 count = 23

Pool: Middle
Non-aligned packet(s): 333
 Caller Summary
    pc = 0x418D77FC count = 333
    pc = 0x40612F74 count = 2
    pc = 0x4049FFD8 count = 3

Pool: Big
Non-aligned packet(s): 32078
 Caller Summary
    pc = 0x418D77FC count = 32006
    pc = 0x4065FD40 count = 7
    pc = 0x409E915C count = 1
    pc = 0x40652A58 count = 65

Pool: VeryBig
```

```
Non-aligned packet(s): 10
 Caller Summary
    pc = 0x418D77FC count = 10

Pool: Large
Non-aligned packet(s): 8
 Caller Summary
    pc = 0x418D77FC count = 8

Pool: Huge
Non-aligned packet(s): 2
 Caller Summary
    pc = 0x418D77FC count = 2
```

Table 60 describes the significant fields shown in the display.

Table 62 show buffers summary Field Descriptions

Field	Description
Non-alligned	Indicates the number of packets not alligned to 32 bits
PC	Specifies who allocated buffer from this pool, for example, small buffer pool, middle buffer pool and so on.
Public Buffer Pools	
Small buffers	Buffers that are 104 bytes long.
Middle buffers	Buffers that are 600 bytes long.
Big buffers	Buffers that are 1524 bytes long.
VeryBig buffers	Buffers that are 4520 bytes long.
Large buffers	Buffers that are 5024 bytes long.
Huge buffers	Buffers that are 18,024 bytes long.

Related Commands

Command	Description
show buffers	Displays statistics for the buffer pools on the network server.

show c2600

To display information for troubleshooting the Cisco 2600 series router, use the **show c2600** command in EXEC mode.

show c2600

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.3 XA	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **show c2600** command provides complex troubleshooting information that pertains to the platform's shared references rather than to a specific interface.

Examples

The following is sample output from the **show c2600** command:

```
Router# show c2600

C2600 Platform Information:
Interrupts:

 Assigned Handlers...
  Vect  Handler   # of Ints   Name
    00  801F224C   00000000   Xilinx bridge error interrupt
    01  801DE768   0D3EE155   MPC860 TIMER INTERRUPT
    02  801E94E0   0000119E   16552 Con/Aux Interrupt
    04  801F0D94   00000000   PA Network Management Int Handler
    05  801E6C34   00000000   Timebase Reference Interrupt
    06  801F0DE4   00002C1A   PA Network IO Int Handler
    07  801F0EA0   0000015D   MPC860 CPM INTERRUPT
    14  801F224C   00000000   Xilinx bridge error interrupt

 IOS Priority Masks...
  Level 00 = [ EF020000 ]
  Level 01 = [ EC020000 ]
  Level 02 = [ E8020000 ]
  Level 03 = [ E0020000 ]
  Level 04 = [ E0020000 ]
  Level 05 = [ E0020000 ]
  Level 06 = [ C0020000 ]
  Level 07 = [ 00000000 ]

 SIU_IRQ_MASK  = FFFFFFFF  SIEN   = EF02xxxx   Current Level = 00
 Spurious IRQs = 00000000  SIPEND = 0000xxxx
 Interrupt Throttling:
  Throttle Count = 00000000   Timer Count      = 00000000
```

```
  Netint usec     = 00000000   Netint Mask usec = 000003E8
  Active          =          0   Configured       =          0
  Longest IRQ     = 00000000

IDMA Status:
 Requests = 00000349      Drops                = 00000000
 Complete = 00000349      Post Coalesce Frames = 00000349
 Giant    = 00000000
 Available Blocks = 256/256

ISP Status:
 Version string burned in chip: "A986122997"
 New version after next program operation: "B018020998"
 ISP family type: "2096"
 ISP chip ID: 0x0013
 Device is  programmable
```

Table 63 describes the significant fields shown in the display.

Table 63 show c2600 Field Descriptions

Field	Description
Interrupts	Denotes that the next section describes the status of the interrupt services.
Assigned Handlers	Denotes a subsection of the Interrupt section that displays data about the interrupt handlers.
Vect	The processor vector number.
Handler	The execution address of the handler assigned to this vector.
# of Ints	The number of times this handler has been called.
Name	The name of the handler assigned to this vector.
IOS Priority Masks	Denotes the subsection of the Interrupt section that displays internal Cisco IOS priorities. Each item in this subsection indicates a Cisco IOS interrupt level and the bit mask used to mask out interrupt sources when that Cisco IOS level is being processed. Used exclusively for debugging.
SIU_IRQ_MASK	For engineering level debug only.
Spurious IRQs	For engineering level debug only.
Interrupt Throttling:	This subsection describes the behavior of the Interrupt Throttling mechanism on the platform.
Throttle Count	Number of times throttle has become active.
Timer Count	Number of times throttle has deactivated because the maximum masked out time for network interrupt level has been reached.
Netint usec	Maximum time network level is allowed to run (in microseconds).
Netint Mask usec	Maximum time network level interrupt is masked out to allow process level code to run (in microseconds).
Active	Indicates that the network level interrupt is masked or that the router is in interrupt throttle state.
Configured	Indicates that throttling is enabled or configured when set to 1.

Table 63 show c2600 Field Descriptions (continued)

Field	Description
Longest IRQ	Duration of longest network level interrupt (in microseconds).
IDMA Status	Monitors the activity of the Internal Direct Memory Access (IDMA) hardware and software. Used to coalesce packets (turn particularized packets into non particularized packets) for transfer to the process level switching mechanism.
Requests	Number of times the IDMA engine is asked to coalesce a packet.
Drops	Number of times the coalescing operation was aborted.
Complete	Number of times the operation was successful.
Post Coalesce Frames	Number of Frames completed post coalesce processing.
Giant	Number of packets too large to coalesce.
Available Blocks	Indicates the status of the request queue, in the format N/M where N is the number of empty slots in queue and M is the total number of slots; for example, 2/256 indicates that the queue has 256 entries and can accept two more requests before it is full.
ISP Status	Provides status of In-System-Programmable (ISP) hardware.
Version string burned in chip	Current version of ISP hardware.
New version after next program operation	Version of ISP hardware after next ISP programming operation.
ISP family type	Device family number of ISP hardware.
ISP chip ID	Internal ID of ISP hardware as designated by the chip manufacturer.
Device is programmable	“Yes” or “No.” Indicates if an ISP operation is possible on this board.

Related Commands

Command	Description
show context	Displays information stored in NVRAM when the router crashes.

show c7200

To display information about the CPU and midplane for Cisco 7200 series routers, use the **show c7200** command in EXEC mode.

show c7200

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can use the output of this command to determine whether the hardware version level and upgrade is current. The information is generally useful for diagnostic tasks performed by technical support only.

Examples

The following is sample output from the **show c7200** command:

```
Router# show c7200

C7200 Network IO Interrupt Throttling:
 throttle count=0, timer count=0
 active=0, configured=0
 netint usec=3999, netint mask usec=200

C7200 Midplane EEPROM:
        Hardware revision 1.2           Board revision A0
        Serial number     2863311530    Part number    170-43690-170
        Test history      0xAA          RMA number     170-170-170
        MAC=0060.3e28.ee00, MAC Size=1024
        EEPROM format version 1, Model=0x6
        EEPROM contents (hex):
          0x20: 01 06 01 02 AA AA AA AA AA AA AA AA 00 60 3E 28
          0x30: EE 00 04 00 AA AA AA AA AA AA AA AA 50 AA AA AA AA

C7200 CPU EEPROM:
        Hardware revision 2.0           Board revision A0
        Serial number     3509953       Part number     73-1536-02
        Test history      0x0           RMA number      00-00-00
        EEPROM format version 1
        EEPROM contents (hex):
          0x20: 01 15 02 00 00 35 8E C1 49 06 00 02 00 00 00 00
          0x30: 50 00 00 00 FF FF FF FF FF FF FF FF FF FF FF FF
```

show catalyst6000

To display the information about the Cisco 7600 series router, use the **show catalyst6000** command in user EXEC or privileged EXEC mode.

show catalyst6000 {**all** | **chassis-mac-address** | **switching-clock** | **traffic-meter**}

Syntax Description

all	Displays the MAC-address ranges and the current and peak traffic-meter reading.
chassis-mac-address	Displays the MAC-address range.
switching-clock	Displays the failure recovery mode of the switching clock.
traffic-meter	Displays the percentage of the backplane (shared bus) utilization.

Defaults

all

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If you enter the **switching-clock** keywords, the Cisco 7600 series router displays whether switching of the redundant clock sources on the backplane is allowed if the active clock source fails.

The Cisco 7600 series router has either 64 or 1024 MAC addresses that are available to support the software features. You can enter the **show catalyst6000 chassis-mac-address** command to display the MAC-address range on your chassis.

Examples

This example shows how to display the MAC-address ranges and the current and peak traffic-meter readings:

```
Router> show catalyst6000 all

chassis MAC addresses: 64 addresses from 0001.6441.60c0 to 0001.6441.60ff
  traffic meter =   0%  Never cleared
           peak =   0%  reached at 08:14:38 UTC Wed Mar 19 2003
  switching-clock: clock switchover and system reset is allowed
Router>
```

This example shows how to display the MAC-address ranges:

```
Router# show catalyst6000 chassis-mac-address
```

```
chassis MAC addresses: 1024 addresses from 00d0.004c.1800 to 00d0.004c.1c00
Router#
```

This example shows how to display the current and peak traffic-meter readings:

```
Router> show catalyst6000 traffic-meter

traffic meter = 0%   peak = 0%  at  09:57:58 UTC Mon Nov 6 2000
Router#
```

This example shows how to display the failure recovery mode of the switching clock:

```
Router> show catalyst6000 switching-clock

switching-clock: clock switchover and system reset is allowed
Router>
```

Related Commands

Command	Description
show environment alarm	Displays the information about the environmental alarm.
show fm summary	Displays a summary of FM Information.
show environment status	Displays the information about the operational FRU status.

show cls

To display the current status of all Cisco link services (CLS) sessions on the router, use the **show cls** command in EXEC mode.

show cls [**brief**]

Syntax Description

brief	(Optional) Displays a brief version of the output.

Defaults

Without the **brief** keyword, displays complete output.

Command Modes

EXEC

Command History

Release	Modification
11.0	This command was introduced in a release prior to Cisco IOS Release 11.0.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The Cisco link service (CLS) is used as the interface between data link users (DLUs), such as DLSw, LAN Network Manager (LNM), downstream physical unit (DSPU), and SNASw, and their corresponding data link circuits (DLCs) such as Logic Link Control (LLC), VDLC, and Qualified Logic Link Control (QLLC). Each DLU registers a particular service access point (SAP) with CLS, and establishes circuits through CLS over the DLC.

The **show cls** command displays the SAP values associated with the DLU and the circuits established through CLS.

For further information about CLS, use the Release 12.2 *Cisco IOS Bridging and IBM Networking Configuration Guide*.

Examples

The following is sample output from the **show cls** command:

```
IBD-4500B# show cls

DLU user:SNASW
   SSap:0x04  VDLC VDLC650
    DTE:1234.4000.0001 1234.4000.0002 04 04
    T1 timer:0   T2 timer:0  Inact timer:0
    max out:0    max in:0    retry count:10
    XID retry:10 XID timer:5000  I-Frame:0
    flow:0       DataIndQ:0   DataReqQ:0
DLU user:DLSWDLUPEER
DLU user:DLSWDLU
   Bridging  VDLC VDLC1000
   Bridging  VDLC VDLC650
```

The following is sample output from the **show cls brief** command:

```
IBD-4500B# show cls brief

DLU user:SNASW
   SSap:0x04  VDLC VDLC650
    DTE:1234.4000.0001 1234.4000.0002 04 04
DLU user:DLSWDLUPEER
DLU user:DLSWDLU
   Bridging  VDLC VDLC1000
   Bridging  VDLC VDLC650
```

The examples show two DLUs—SNASw and DLSw—active in the router. SNASw uses a SAP value of 0x04, and the associated DLC port is VDLC650. SNASw has a circuit established between MAC addresses 1234.4000.0001 and 1234.4000.0002 using source and destination SAPs 04 and 04. DLSw is a bridging protocol and uses VDLC1000 and VDLC650 ports. There are no circuits in place at this time.

In the output from the **show cls** command (without the **brief** argument), the values of timers and counters applicable to this circuit are displayed.

Related Commands

Command	Description
stun peer-name	Enables STUN for an IP address and uses Cisco Link Services (CLS) to access the Frame Relay network.

show config id

The configuration change tracking identifier (CTID) assigns a version number to each saved version of the running-config file. To display output about the versions, use the **show config id** command in privileged EXEC mode.

show config id [**detail**]

Syntax Description

detail	(Optional) Expands the output of the command to include the ID of the last user to make a configuration change and the process in which the changes were made.

Command Default

This command is disabled by default. If this command is not entered, the management system has to query the device for the current running-config file and then compare the results to the last known configuration to determine if a change has been made.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRC	This command was introduced.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Usage Guidelines

This configuration infrastructure command assigns a version number that is updated every time the running-config file is changed. This version number is called the configuration change tracking identifier or CTID. The CTID can be used to compare configuration files to track configuration changes and take appropriate actions (for example, a configuration rollback). Config Logger can also use the CTID to determine if there have been any changes to the running-config file.

CTID makes the management system more efficient by presenting information that indicates a change has been made to the running-config file. Without CTID, the management system has to query the device for the current running-config file and then compare the results to the last known configuration to determine if a change has been made.

Examples

The following example shows that the current running-config file is version 4 and that this file was saved on June 15, 2006 at 7.572 seconds after 3:02 p.m.:

```
Router# show config id

version:4 time:2006-06-15T15:02:07.572Z
```

The following example shows that the current running-config file is version 9 and that this file was last saved on June 18, 2006 at 34.431 seconds after 6:34 p.m. The file was saved by the system and changed from Init:

```
Router# show config id detail

Configuration version : 9
Last change time : 2006-06-18T18:34:34.431Z
Changed by user : system
Changed from process : Init
```

Field descriptions are self-explanatory.

Related Commands

Command	Description
copy running-config startup-config	Copies the current running-config file (source) to the startup-config file (destination).
show running-config	Displays the contents of the currently running configuration file or the configuration for a specific class map, interface, map class, policy map, or virtual-circuit class.

show configuration lock

To display information about the lock status of the running configuration file during a configuration replace operation, use the **show configuration lock** command in privileged EXEC mode.

show configuration lock

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(25)S	This command was introduced.
12.3(14)T	This command was integrated into Cisco IOS Release 12.3(14)T. The output of this command was updated to display the configuration locking class.
12.0(31)S	The command output was enhanced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was implemented on the Cisco 10000 series.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Examples

The following is sample output from the **show configuration lock** command when the running configuration file is locked by another user.

Cisco IOS Release 12.2(25)S, Release 12.2(28)SB, Release 12.3(14)T, and Later Releases

```
Router# configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)# configuration mode exclusive ?

auto     Lock configuration mode automatically
manual   Lock configuration mode on-demand

Router(config)# configuration mode exclusive auto
Router(config)# end

Router# show running-config | include configuration

configuration mode exclusive auto

Router# configure terminal                !<----------- Acquires the lock

Enter configuration commands, one per line. End with CNTL/Z.
```

```
Router(config)# show configuration lock

Parser Configure Lock
---------------------
Owner PID : 3
User : unknown
TTY : 0
Type : EXCLUSIVE
State : LOCKED
Class : EXPOSED
Count : 1
Pending Requests : 0
User debug info : configure terminal
Router(config)#
Router(config)# end              ! <------------ Releases the lock
```

The following is sample output from the **show configuration lock** command when the running configuration file is not locked by another user.

```
Router# show configuration lock

Parser Configure Lock
---------------------
Owner PID : -1
User : unknown
TTY : -1
Type : NO LOCK
State : FREE
Class : unknown
Count : 0
Pending Requests : 0
User debug info :
```

Cisco IOS Release 12.0(31)S, 12.2(33)SRA, and Later Releases

```
Router# show configuration lock

Parser Configure Lock
-----------------------------------------------------
Owner PID                          : 3
User                               : unknown
TTY                                : 0
Type                               : EXCLUSIVE
State                              : LOCKED
Class                              : EXPOSED
Count                              : 1
Pending Requests                   : 0
User debug info                    : configure terminal
Session idle state                 : TRUE
No of exec cmds getting executed   : 0
No of exec cmds blocked            : 0
Config wait for show completion    : FALSE
Remote ip address                  : Unknown
Lock active time (in Sec)          : 6
Lock Expiration timer (in Sec)     : 593
```

Table 64 describes the significant fields shown in the displays.

Table 64 show configuration lock Field Descriptions

Field	Description
Owner PID	Process identifier (PID) of the process that owns the lock.
User	Owner's username.
TTY	Owner's terminal number.
Type	Lock type (EXCLUSIVE/COUNTER/NO LOCK).
State	State of the lock (FREE/LOCKED).
Class	Classification of users of the lock (EXPOSED/ROLLBACK). Processes other than ROLLBACK belong to the EXPOSED class.
Count	In the case of a counter lock, total number of processes holding the lock.
Pending Requests	Total number of processes blocked by the lock.
User debug info	Any string given by the process (used for debugging only).
Session idle state	Indicates whether the user in an access session locking session is idle. Displays TRUE or FALSE.
No of exec cmds getting executed	Total number of EXEC commands (**show** and **clear**) being executed simultaneously from different sessions.
No of exec cmds blocked	Total number of EXEC commands (**show** and **clear**) waiting for the configuration command (running from the access session locking session) to complete its execution.
Config wait for show completion	Indicates whether a configuration command executed in an access session locking session is waiting for the completion of the **show** command being executed simultaneously from a different session. Displays TRUE or FALSE.
Remote ip address	IP address of the terminal from which the user telneted to the router.
Lock active time (in Sec)	Amount of time, in seconds, that elapsed since the lock was acquired.
Lock Expiration timer (in Sec)	The amount of time, in seconds, that expires before the lock is automatically released.

The following example shows how to configure the configuration file for single user auto configuration mode (using the **configuration mode exclusive auto** command). Use the **configure terminal** command to enter global configuration mode and lock the configuration mode exclusively. Once the Cisco IOS configuration mode is locked exclusively, you can verify the lock using the **show configuration lock** command.

```
Router# configure terminal
Router(config)# configuration mode exclusive auto
Router(config)# end

Router# configure terminal

Router(config)# show configuration lock

Parser Configure Lock
```

```
Owner PID        :  10
User             :  User1
TTY              :  3
Type             :  EXCLUSIVE
State            :  LOCKED
Class            :  Exposed
Count            :  0
Pending Requests :  0
User debug info  :  0
```

Related Commands

Command	Description
configuration mode exclusive	Enables single-user (exclusive) access functionality for the Cisco IOS CLI.
configure replace	Replaces the current running configuration with a saved Cisco IOS configuration file.
debug configuration lock	Enables debugging of the Cisco IOS configuration lock.

show context

To display information stored in NVRAM when an unexpected system reload (system exception) occurs, use the **show context** command in user EXEC or priviledged EXEC mode.

show context [**summary** | **all** | **slot** *slot-number* [*crash-index*] [**all**] [**debug**]]

Syntax Description

summary	Displays a summary of all the crashes recorded.
all	Displays all crashes for all the slots. When optionally used with the **slot** keyword, displays crash information for the specified slot.
slot *slot-number* [*crash-index*]	Displays information for a particular line card. Slot numbers range from 0 to 11 for the Cisco 12012 router and from 0 to 7 for the Cisco 12008. The index number allows you to look at previous crash contexts. Contexts from the last 24 line card crashes are saved on the GRP card. If the GRP reloads, the last 24 line card crash contexts are lost. For example, **show context slot 3 2** shows the second most recent crash for line card in slot 3. Index numbers are displayed by the **show context summary** command.
debug	(Optional) Displays crash information as a hex record dump in addition to one of the options listed.

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
10.3	This command was introduced.
11.2 GS	The **slot** *slot-number* [*crash-index*] [**all**] [**debug**] syntax was added for Cisco 12000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The display from the **show context** command includes the following information:

- Reason for the system reboot
- Stack trace
- Software version
- The signal number, code, and router uptime information
- All the register contents at the time of the crash

Note This command is primarily for use by Cisco technical support representatives for analyzing unexpected system reloads.

Output for this command will vary by platform. Context information is specific to processors and architectures. For example, context information for the Cisco 2600 series router differs from that for other router types because the Cisco 2600 runs with an M860 processor.

Examples

The following is sample output from the **show context** command following a system failure:

```
Router> show context

System was restarted by error - a Software forced crash, PC 0x60189354
GS Software (RSP-PV-M), Experimental Version 11.1(2033) [ganesh 111]
Compiled Mon 31-Mar-97 13:21 by ganesh
Image text-base: 0x60010900, data-base: 0x6073E000
Stack trace from system failure:
FP: 0x60AEA798, RA: 0x60189354
FP: 0x60AEA798, RA: 0x601853CC
FP: 0x60AEA7C0, RA: 0x6015E98C
FP: 0x60AEA7F8, RA: 0x6011AB3C
FP: 0x60AEA828, RA: 0x601706CC
FP: 0x60AEA878, RA: 0x60116340
FP: 0x60AEA890, RA: 0x6011632C
Fault History Buffer:
GS Software (RSP-PV-M), Experimental Version 11.1(2033) [ganesh 111]
Compiled Mon 31-Mar-97 13:21 by ganesh
Signal = 23, Code = 0x24, Uptime 00:04:19
$0 : 00000000, AT : 60930120, v0 : 00000032, v1 : 00000120
a0 : 60170110, a1 : 6097F22C, a2 : 00000000, a3 : 00000000
t0 : 60AE02A0, t1 : 8000FD80, t2 : 34008F00, t3 : FFFF00FF
t4 : 00000083, t5 : 3E840024, t6 : 00000000, t7 : 11010132
s0 : 00000006, s1 : 607A25F8, s2 : 00000001, s3 : 00000000
s4 : 00000000, s5 : 00000000, s6 : 00000000, s7 : 6097F755
t8 : 600FABBC, t9 : 00000000, k0 : 30408401, k1 : 30410000
gp : 608B9860, sp : 60AEA798, s8 : 00000000, ra : 601853CC
EPC : 60189354, SREG : 3400EF03, Cause : 00000024
Router>
```

The following is sample output from the **show context summary** command on a Cisco 12012 router. The **show context summary** command displays a summary of all the crashes recorded for each slot (line card).

```
Router# show context summary

CRASH INFO SUMMARY
  Slot 0 : 0 crashes
  Slot 1 : 0 crashes
  Slot 2 : 0 crashes
  Slot 3 : 0 crashes
  Slot 4 : 0 crashes
  Slot 5 : 0 crashes
  Slot 6 : 0 crashes
  Slot 7 : 2 crashes
    1 - crash at 18:06:41 UTC Tue Nov 5 1996
    2 - crash at 12:14:55 UTC Mon Nov 4 1996
  Slot 8 : 0 crashes
  Slot 9 : 0 crashes
  Slot 10: 0 crashes
  Slot 11: 0 crashes
Router#
```

The following is sample output from the **show context** command following an unexpected system reload on a Cisco 2600 series router.

```
router# show context

S/W Version: Cisco IOS Software
Cisco IOS (tm) c2600 Software (c2600-JS-M), Released Version 11.3(19980115:184921]
Copyright (c) 1986-2003 by Cisco Systems, Inc.
Compiled Thu 15-Jan-98 13:49 by mmagno
Exception occurred at: 00:02:26 UTC Mon Mar 1 1993
Exception type: Data TLB Miss (0x1200)
CPU Register Context:
PC  = 0x80109964  MSR = 0x00009030  CR  = 0x55FFFD35  LR    = 0x80109958
CTR = 0x800154E4  XER = 0xC000BB6F  DAR = 0x00000088  DSISR = 0x00000249
DEC = 0x7FFFDFCA  TBU = 0x00000000  TBL = 0x15433FCF  IMMR  = 0x68010020
R0  = 0x80000000  R1  = 0x80E80BD0  R2  = 0x80000000  R3    = 0x00000000
R4  = 0x80E80BC0  R5  = 0x40800000  R6  = 0x00000001  R7    = 0x68010000
R8  = 0x00000000  R9  = 0x00000060  R10 = 0x00001030  R11   = 0xFFFFFFFF
R12 = 0x00007CE6  R13 = 0xFFF379E8  R14 = 0x80D50000  R15   = 0x00000000
R16 = 0x00000000  R17 = 0x00000000  R18 = 0x00000000  R19   = 0x00000000
R20 = 0x00000000  R21 = 0x00000001  R22 = 0x00000010  R23   = 0x00000000
R24 = 0x00000000  R25 = 0x80E91348  R26 = 0x01936010  R27   = 0x80E92A80
R28 = 0x00000001  R29 = 0x019BA920  R30 = 0x00000000  R31   = 0x00000018
Stack trace:
Frame 00: SP = 0x80E80BD0    PC = 0x80109958
Frame 01: SP = 0x80E80C28    PC = 0x8010A720
Frame 02: SP = 0x80E80C40    PC = 0x80271010
Frame 03: SP = 0x80E80C50    PC = 0x8025EE64
Frame 04: SP = 0x80DEE548    PC = 0x8026702C
Frame 05: SP = 0x80DEE558    PC = 0x8026702C
```

Table 65 describes the significant fields shown in the display.

Table 65 show context Field Descriptions

Field	Description
S/W Version	Standard Cisco IOS version string as displayed.
Exception occurred at	Router real time when exception occurred. The router must have the clock time properly configured for this to be accurate.
Exception type	Technical reason for exception. For engineering analysis.
CPU Register Context	Technical processor state information. For engineering analysis.
Stack trace	Technical processor state information. For engineering analysis.

Related Commands

Command	Description
show processes	Displays information about the active processes.
show stacks	Monitors the stack usage of processes and interrupt routines.

show controllers (GRP image)

To display information that is specific to the hardware, use the **show controllers** command in privileged EXEC mode.

show controllers [**atm** *slot-number* | **clock** | **csar** [**register**] | **csc-fpga** | **dp83800** | **fab-clk** | **fia** [**register**] | **pos** [*slot-number*] [**details**] | **queues** [*slot-number*] | **sca** | **xbar**]

Syntax Description

atm *slot-number*	(Optional) Displays the ATM controllers. Number is slot-number/port-number (for example, 4/0). Slot numbers range from 0 to 11 for the Cisco 12012 router and from 0 to 7 for the Cisco 12008 router.
clock	(Optional) Displays the clock card configuration.
csar [**register**]	(Optional) Displays the Cisco Cell Segmentation and Reassembly (CSAR) information. CSAR is the name of the chip on the card that handles traffic between the GRP and the switch fabric interface ASICs.
csc-fpga	(Optional) Displays the clock and scheduler card register information in the field programmable gate array (FPGA).
dp83800	(Optional) Displays the Ethernet information on the GRP card.
fab-clk	(Optional) Display the switch fabric clock register information. The switch fabric clock FPGA is a chip that monitors the incoming fabric clock generated by the switch fabric. This clock is needed by each card connecting to the switch fabric to properly communicate with it. Two switch fabric clocks arrive at each card; only one can be used. The FPGA monitors both clocks and selects which one to use if only one of them is running.
fia [**register**]	(Optional) Displays the fabric interface ASIC information and optionally displays the register information.
pos [slot-*number*] [**details**]	(Optional) Displays the POS framer state and optionally displays all the details for the interface. Number is slot-number/port-number (for example, 4/0). Slot numbers range from 0 to 11 for the Cisco 12012 router and from 0 to 7 for the Cisco 12008 router.
queues [*slot-number*]	(Optional) Displays the SDRAM buffer carve information and optionally displays the information for a specific line card. The SDRAM buffer carve information displayed is suggested carve information from the GRP card to the line card. Line cards might change the shown percentages based on SDRAM available. Slot numbers range from 0 to 11 for the Cisco 12012 router and from 0 to 7 for the Cisco 12008.
sca	(Optional) Displays the SCA register information. The SCA is an ASIC that arbitrates among the line cards requests to use the switch fabric.
xbar	(Optional) Displays the crossbar register information. The XBAR is an ASIC that switches the data as it passes through the switch fabric.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was introduced to support the Cisco 12000 series routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This information provided by this command is intended for use only by technical support representatives in analyzing system failures in the field.

Examples

The following is sample output from the **show controllers pos** command for a Cisco 12012:

```
Router# show controllers pos 7/0

POS7/0
SECTION
  LOF = 2          LOS = 0                          BIP(B1) = 5889
  Active Alarms: None
LINE
  AIS = 2          RDI = 2          FEBE = 146      BIP(B2) = 2106453
  Active Alarms: None
PATH
  AIS = 2          RDI = 4          FEBE = 63       BIP(B3) = 3216
  LOP = 0          PSE = 8          NSE = 3         NEWPTR = 2
  Active Alarms: None
APS
  COAPS = 3          PSBF = 2
  State: PSBF_state = False
  Rx(K1/K2): F0/15  Tx(K1/K2): 00/00
  S1S0 = 00, C2 = 64
PATH TRACE BUFFER : STABLE
  Remote hostname : GSR-C
  Remote interface: POS10/0
  Remote IP addr  : 10.201.101.2
  Remote Rx(K1/K2): F0/15  Tx(K1/K2): 00/00
Router#
```

Related Commands

Command	Description
clear controllers	Resets the T1 or E1 controller.
show controllers (line card image)	Displays information that is specific to the hardware on a line card.

show controllers (line card image)

To display information that is specific to the hardware on a line card, use the **attach** command in privileged EXEC mode to connect to the line card and then use the **show controllers** command in privileged EXEC mode or the **execute-on** command in privileged EXEC mode.

show controllers atm [[*port-number*] [**all** | **sar** | **summary**]]

show controllers fia [**register**]

show controllers {**frfab** | **tofab**} {**bma** {**microcode** | **ms-inst** | **register**} | **qelem** *start-queue-element* [*end-queue-element*] | **qnum** *start-queue-number* [*end-queue-number*] | **queues** | **statistics**}

show controllers io

show controllers l3

show controllers pos {**framers** | **queues** | **registers** | **rxsram** *port-number queue-start-address* [*queue-length*] | **txsram** *port-number queue-start-address* [*queue-length*]}

show controllers events [**clear** | **punt-sniff** [**none** | **word1** | **word2**] | **punt-verbose** [**all**]]

Syntax Description

atm	Displays the ATM controller information.
port-number	(Optional) Displays request for the physical interface on the ATM card. The range of choices is from 0 to 3.
all	(Optional) Lists all details.
sar	(Optional) Lists SAR interactive command.
summary	(Optional) Lists SAR status summary.
fia	Displays the fabric interface ASIC information.
register	(Optional) Displays the register information.
frfab	(Optional) Displays the "from" (transmit) fabric information.
tofab	(Optional) Displays the "to" (receive) fabric information.
bma	For the **frfab** or **tofab** keywords, displays microcode, micro sequencer, or register information for the silicon queuing engine (SQE), also known as the buffer management ASIC (BMA).
microcode	Displays SQE information for the microcode bundled in the line card and currently running version.
mis-inst	Displays SQE information for the micro sequencer instruction.
register	Displays silicon queuing engine (SQE) information for the register.
qelem	For the **frfab** or **tofab** keywords, displays the SDRAM buffer pool queue element summary information.
start-queue-element	Specifies the start queue element number from 0 to 65535.
end-queue-element	(Optional) Specifies the end queue element number from 0 to 65535).

qnum	For the **frfab** or **tofab** keywords, displays the SDRAM buffer pool queue detail information.
start-queue-number	Specifies the start free queue number (from 0 to 127).
end-queue-number	(Optional) Specifies the end free queue number (from 0 to 127).
queues	For the **frfab** or **tofab** keywords, displays the SDRAM buffer pool information.
statistics	For the **frfab** or **tofab** keywords, displays the BMA counters.
io	Displays input/output registers.
l3	Displays Layer 3 ASIC information.
pos	Displays packet-over-sonic (POS) information for framer registers, framer queues, and ASIC registers.
framers	Displays the POS framer registers.
queues	Displays the POS framer queue information.
registers	Displays the ASIC registers.
rxsram	Displays the receive queue SRAM.
port-number	Specifies a port number (valid range is from 0 to 3).
queue-start-address	Specifies the queue SRAM logical starting address.
queue-length	(Optional) Specifies the queue SRAM length.
txsram	Displays the transmit queue SRAM.
events	Displays the line card counter information of events generated from line card.
clear	(Optional) Clears all the line card event counter output details that are displayed using the commands: **show controllers events**, **show controllers events punt-verbose**, and **show controllers events punt-sniff**.
punt-sniff	(Optional) Sniffs the packets sent to route processor from line card by specifying the word and location. **Note** Punt sniff is enabled only if one of the word is configured.
none	(Optional) Clears the attributes and packets to be sniffed from route processor and resets the counters to zero.
word1	(Optional) Sniffs packets sent to the route processor for the specified hexa decimal value of word1. Location of the word is optional.
word2	(Optional) Sniffs packets sent to the route processor matching the specified hexa decimal value of word2. Location of the word is optional.
punt-verbose	(Optional) Displays application-wise packets punt to route processor (RP) from line card (LC). Displays non-zero punt counters if the command is executed without the **all** keyword.
all	(Optional) Displays zero and non-zero punt counters of packets punt to RP from LC. The all keyword is used along with the command **show controllers events punt-verbose all**.

Command Modes Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was added to support the Cisco 12000 series Gigabit Switch Routers.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB	This command was integrated in Cisco IOS Release 12.2(31)SB.
12.2(33)SB	This command' behavior was modified on the Cisco 10000 series router for the PRE3 and PRE4.
12.0(33)S	The keywords **punt-sniff** and **punt-verbose** were added in the command **show controllers events** for the Cisco 12000 Series Routers.

Usage Guidelines This information displayed by this command is of use only to technical support representatives in analyzing unexpected system failures in the field. It is documented here in case you need to provide the displayed statistics to an technical support engineer.

Cisco 10000 Series Router Usage Guidelines

In releases prior to Cisco IOS Release 12.2(33)SB, when you configure the **t1 loopback remote** command on the local router, the command also displays in the running-config file of the far-end router. This is due to the route processor (RP) updating an incorrect parameter when it receives the loopback event message from the line card for loopback requests from the far end.

In Cisco IOS Release 12.2(33)SB, the RP updates the correct parameter and the **show controllers** command correctly displays the loopback CLI commands applied on the local end and displays the loopback events and status received from the line card in response to loopback requests from the far end.

This change in behavior affects the following line cards and is documented in the CSCsm84447 caveat:

- 4-port channelized STM1
- 1-port channelized OC-12
- 6-port channelized T3
- 4-port half-height channelized T3

In Cisco IOS Release 12.2(33)SB, the output from the **show controller** command includes line code information for the 6-port channelized T3 line card and the 8-port E3/DS3 line card. However, because SONET line cards do not have a direct physical link at the T3 or E3 level, the output from the **show controller t3** command does not include line code information.

In Cisco IOS Release 12.2(31)SB, the output from the **show controller** command displays line code information. The output of the **show controller t3** command for SONET-based T3 also includes line code information.

Cisco 12000 Series Router Usage Guidelines

The packets processed by a line card are either sent to a route processor or a line card in the form of Cisco cells. To track the packets sent to a route processor from a line card is essential for troubleshooting. The keywords **punt-sniff** and **punt-verbose** have been added for the command show controllers events to identify the packets sent to RP from LC.

By default, the feature is enabled and packets punt to route processor are displayed using the command **show controllers events punt-verbose**. To view all the zero and non-zero punt counters use the command **show controllers events punt-verbose all**.

To clear all the line card events and counters including resetting the packets to be sniffed to zero, executing the command **show controllers events clear**.

Packets sent to route processor from line card can be sniffed by specifying the hexa-decimal value of the word. Packets can only be sniffed if the word along with the hexa-decimal value is specified. Specifying the location of the word, sniffs packets from the particular location. To reset the counters of packets to be sniffed to zero, execute the command **show controllers events punt-sniff none**.

For example, use the command **show controllers events punt-sniff word1** *0x60000000* to sniff packets punt to RP with the hexa-decimal value 0x60000000. As the location is not specified, it searches the entire buffer for the value 0x60000000. Packets punt to RP can also be sniffed by specifying a particular location using the command **show controllers events punt-sniff word1** *0x60000000 34*.

Examples

Because you are executing this command on the line card, you must use the **execute-on** command to use the **show** command, or you must connect to the card using the **attach** command. All examples in this section use the **execute-on** command

The following is partial sample output from the **show controllers atm** command:

```
Router# execute-on slot 4 show controllers atm 0

TX SAR (Beta 1.0.0) is Operational;
RX SAR (Beta 1.0.0) is Operational;

Interface Configuration Mode:
        STS-12c

Active Maker Channels: total # 6
VCID  ChnnlID  Type  OutputInfo    InPkts   InOAMs  MacString
   1   0888    UBR    0C010010          0         0  08882000AAAA030000000800
   2   0988    VBR    04010020          0         0  09882000
   3   8BC8    UBR    0C010030          0         0  8BC82000AAAA030000000800
   4   0E08    UBR    0C010040          0         0  0E082000AAAA030000000800
  10   1288    VBR    040100A0          0         0  12882000
  11   8BE8    VBR    0C0100B0          0         0  8BE82000AAAA030000000800

SAR Total Counters:
total_tx_idle_cells 215267  total_tx_paks 0  total_tx_abort_paks 0
total_rx_paks 0  total_rx_drop_paks 0  total_rx_discard_cells 15

Switching Code Counters:
total_rx_crc_err_paks 0  total_rx_giant_paks 0
total_rx_abort_paks 0  total_rx_crc10_cells 0
total_rx_tmout_paks 0  total_rx_unknown_paks 0
total_rx_out_buf_paks 0  total_rx_unknown_vc_paks 0
BATMAN Asic Register Values:
hi_addr_reg 0x8000, lo_addr_reg 0x000C, boot_msk_addr 0x0780,
rmcell_msk_addr 0x0724, rmcnt__msk_addr 0x07C2, txbuf_msk_addr 0x070C,
.
.
.
CM622 SAR Boot Configuration:
txind_q_addr 0x14000 txcmd_q_addr 0x20000
.
.
.
SUNI-622 Framer Register Values:
```

```
Master Rst and Ident/Load Meters Reg (#0x0): 0x10
Master Configuration Reg (#0x1): 0x1F
Master Interrupt Status Reg (#0x2): 0x00
PISO Interrupt Reg (#0x3): 0x04
Master Auto Alarm Reg (#0x4): 0x03
Master Auto Alarm Reg (#0x5): 0x07
Parallel Output Port Reg (#0x6): 0x02
.
.
.
BERM Line BIP Threshold LSB Reg (#0x74): 0x00
BERM Line BIP Threshold MSB Reg (#0x75): 0x00
Router#
```

The following is partial sample output from the **show controllers** command:

```
Router# execute-on slot 6 show controllers

Interface POS0
Hardware is BFLC POS
lcpos_instance struct   60311B40
RX POS ASIC addr space  12000000
TX POS ASIC addr space  12000100
SUNI framer addr space  12000400
SUNI rsop intr status   00
CRC32 enabled, HDLC enc, int clock
no loop

Interface POS1
Hardware is BFLC POS
lcpos_instance struct   603142E0
RX POS ASIC addr space  12000000
TX POS ASIC addr space  12000100
SUNI framer addr space  12000600
SUNI rsop intr status   00
CRC32 enabled, HDLC enc, int clock
no loop
.
.
.
Router#
```

The following is partial sample output from the **show controllers pos framers** command:

```
Router# execute-on slot 6 show controllers pos framers

Framer 0, addr=0x12000400:
master reset            C0
master config           1F        rrate sts3c trate sts3c fixptr
master control          00
clock rcv cntrl         D0
RACP control            84
RACP gfc control        0F
TACP control status     04        hcsadd
RACP intr enable        04
RSOP cntrl intr enable  00
RSOP intr status        00
TPOP path sig lbl (c2)  13
SPTB control            04        tnull
SPTB status             00

Framer 1, addr=0x12000600:
master reset            C0
master config           1F        rrate sts3c trate sts3c fixptr
```

```
master control          00
clock rcv cntrl         D0
RACP control            84
RACP gfc control        0F
TACP control status     04        hcsadd
RACP intr enable        04
RSOP cntrl intr enable  00
RSOP intr status        00
TPOP path sig lbl (c2)  13
SPTB control            04        tnull
SPTB status             00

Framer 2, addr=0x12000800:
master reset            C0
master config           1F        rrate sts3c trate sts3c fixptr
master control          00
clock rcv cntrl         D0
RACP control            84
RACP gfc control        0F
TACP control status     04        hcsadd
RACP intr enable        04
RSOP cntrl intr enable  00
RSOP intr status        00
TPOP path sig lbl (c2)  13
SPTB control            04        tnull
SPTB status             00
.
.
.
Router#
```

The following is partial sample output from the **show controllers fia** command:

```
Router# execute-on slot 7 show controllers fia

========= Line Card (Slot 7) =======

Fabric configuration: Full bandwidth redundant
Master Scheduler: Slot 17

From Fabric FIA Errors
----------------------
redund fifo parity 0          redund overflow 0          cell drops 0
crc32 lkup parity  0          cell parity     0          crc32      0
          0          1          2          3          4
       --------   --------   --------   --------   --------
los    0          0          0          0          0
crc16  0          0          0          0          0

To Fabric FIA Errors
----------------------
sca not pres 0          req error     0          uni fifo overflow 0
grant parity 0          multi req     0          uni fifo undrflow 0
cntrl parity 0          uni req       0          crc32 lkup parity 0
multi fifo   0          empty dst req 0          handshake error   0
```

The following is a sample output from the **show controllers events** command:

```
Router# execute-on slot 7 show controllers events

Switching Stats
  Packets punt to RP: 935
  HW engine punt: 62
  HW engine reject: 38113520
```

```
RX HW Engine Reject Counters
  Unrecognized Protocol ID: 19182546
  IP TTL Expired: 14706652
  Unrecognized L2 Frame: 4224320
  IPv6 Control pkts: 2
```

The following is a sample output from the **show controllers events punt-verbose** command:

```
Router# execute-on slot 7 show controllers events punt-verbose

RP Punted L2 Statistics in Verbose
-----------------------------------
  HDLC Encap                :  927

 RP Punted L3 Statistics in Verbose
-----------------------------------
  ICMP                      :  40
  UDP                       :  441
  OSPF                      :  211
  IPV6                      :  40

 RP Punted L3 Application Statistics in Verbose
-----------------------------------------------
  LDP                       :  441
  DF Bit not Set            :  692
```

The following is a partial sample output from the **show controllers events punt-verbose** all command which displays the zero and non-zero value of packets punt to RP from LC:

```
Router# execute-on slot 7 show controllers events punt-verbose all

RP Punted L2 Statistics in Verbose
-----------------------------------
  L2 Protocol - 0           :  0
  ARPA Encap                :  0
  L2 Protocol - 2           :  0
  L2 Protocol - 3           :  0
  L2 Protocol - 4           :  0
  HDLC Encap                :  941
  L2 Protocol - 6           :  0
  L2 Protocol - 7           :  0
  L2 Protocol - 8           :  0
  L2 Protocol - 9           :  0
  L2 Protocol - 10          :  0
  L2 Protocol - 11          :  0
  L2 Protocol - 12          :  0
  L2 Protocol - 13          :  0
  L2 Protocol - 14          :  0
  L2 Protocol - 15          :  0
  PPP Encap                 :  0
  L2 Protocol - 17          :  0
  L2 Protocol - 18          :  0
  L2 Protocol - 19          :  0
  Frame Relay Encap         :  0
  L2 Protocol - 21          :  0
  L2 Protocol - 22          :  0
  L2 Protocol - 23          :  0
  L2 Protocol - 24          :  0
  L2 Protocol - 25          :  0
  L2 Protocol - 26          :  0
  L2 Protocol - 27          :  0
  L2 Protocol - 28          :  0
  L2 Protocol - 29          :  0
```

```
  L2 Protocol - 30           :  0
  L2 Protocol - 31           :  0
  L2 Protocol - 32           :  0
  ATM Encap                  :  0
  L2 Protocol - 34           :  0
  L2 Protocol - 35           :  0

 RP Punted L3 Statistics in Verbose
-------------------------------------
  HOPOPT                     :  0
  ICMP                       :  40
  IGMP                       :  0
  L3 Protocol - 3            :  0
  IPINIP                     :  0
  L3 Protocol - 5            :  0

 RP Punted L3 Application Statistics in Verbose
-----------------------------------------------
  MPLS OAM                   :  0
  FTP                        :  0
  FTPD                       :  0
  TFTP                       :  0
.....
```

The following is a sample output from the **show controllers events clear** command:

```
Router# execute-on slot 7 show controllers events clear
Drop, switching and reject counters cleared
```

The following is a sample output from the **show controllers events punt-sniff** command:

```
Router# execute-on slot 7 show controllers events punt-sniff
Punt Sniff Statistics
 --------------------------------
 Word         Location   Occurance
 0x60000000   34         0
 0xB6010102   37         5
Note: Location offset taken from the begining of BufferHeader(32 bytes).
```

The following is a sample output from the **show controllers events punt-sniff word1** *0x60000000* command. This command is used to sniff a packet with a hexa-decimal value *0x60000000* from the start of the buffer header of the packet being punt to RP:

```
Router# execute-on slot 7 show controllers events punt-sniff word1 0x60000000
```

The following is a sample output from the **show controllers events punt-sniff word1** *0x60000000 34* command. This command is used to sniff a packet with a hexa-decimal value *0x60000000* 0 at the location 34 from the start of the buffer header of the packet being punt to RP:

```
Router# execute-on slot 7 show controllers events punt-sniff word1 0x60000000 34
```

The following is a sample output from the **show controllers events punt-sniff none** command. This command is used to clear the counter of packets to be sniffed:

```
Router# execute-on slot 7 show controllers events punt-sniff none
```

Related Commands

Command	Description
clear controllers	Resets the T1 or E1 controller.

show controllers logging

To display logging information about a Versatile Interface Processor (VIP) card, use the **show controllers logging** command in privileged EXEC mode.

show controllers vip *slot-number* **logging**

Syntax Description

vip *slot-number*	VIP slot number.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command displays the state of syslog error and event logging, including host addresses, and whether console logging is enabled.

When enabled, “trap logging” allows messages to be sent to a remote host (a syslog server).

Examples

The following is sample output from the **show controllers logging** command:

```
Router# show controllers vip 1 logging

show logging from Slot 1:

Syslog logging:enabled (0 messages dropped, 1 messages rate-limited, 0 flushes, 0
overruns)
     Console logging: disabled
     Monitor logging: level debugging, 0 messages logged
     Buffer logging: level debugging, 24 messages logged
     Trap logging:  level informational, 266 messages logged.
       Logging to 209.165.202.129

     Exception Logging size: 4096 bytes
     Count and timestamp logging messages:disabled

Log Buffer (8192 bytes):
smallest_local_pool_entries = 256, global particles = 5149
highest_local_visible_bandwidth = 155000

00:00:05:%SYS-5-RESTART:System restarted --
 .
 .
 .
```

Table 66 describes the significant fields shown in the display.

Table 66 show controllers logging Field Descriptions

Field	Description
Syslog logging	Shows general state of system logging (enabled or disabled), and status of logged messages (number of messages dropped, rate-limited, or flushed).
Console logging	Logging to the console port. Shows "disabled" or, if enabled, the severity level limit and number of messages logged. Enabled using the **logging console** command.
Monitor logging	Logging to the monitor (all TTY lines). Shows "disabled" or, if enabled, the severity level limit and number of messages logged. Enabled using the **logging monitor** command.
Buffer logging	Logging to the standard syslog buffer. Shows "disabled" or, if enabled, the severity level limit and number of messages logged. Enabled using the **logging buffered** command.
Trap logging	Logging to a remote host (syslog host). Shows "disabled" or, if enabled, the severity level limit and number of messages logged. (The word "trap" means a trigger in the system software for sending error messages to a remote host.) Enabled using the **logging host** command. The severity level limit is set using the **logging trap** command.

Related Commands

Command	Description
show logging	Displays the state of logging (syslog).

show controllers tech-support

To display general information about a Versatile Interface Processor (VIP) card when reporting a problem, use the **show controllers tech-support** command in privileged EXEC mode.

show controllers vip *slot-number* **tech-support**

Syntax Description

vip *slot-number*	VIP slot number.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to help collect general information about a VIP card when you are reporting a problem. This command displays the equivalent of the following **show** commands for the VIP card:

- **more system:running-config**
- **show buffers**
- **show controllers**
- **show interfaces**
- **show processes cpu**
- **show processes memory**
- **show stacks**
- **show version**

For a sample display of the **show controllers tech-support** command output, refer to these **show** commands.

Related Commands

Command	Description
more system:running-config	Displays the running configuration.
show buffers	Displays statistics for the buffer pools on the network server.
show controllers	Displays information that is specific to the hardware.
show interfaces	Uses the **show interfaces** EXEC command to display ALC information.
show processes	Displays information about the active processes.
show processes memory	Displays memory used.
show stacks	Monitors the stack usage of processes and interrupt routines.

Command	Description
show tech-support	Displays general information about the router when reporting a problem.
show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

show coverage history

To display the system history table, use the **show coverage history** command in privileged EXEC mode.

show coverage history [**all** | **first** *number-of-entries* | **last** *number-of-entries* | **status**]

Syntax Description

all	(Optional) Displays the entire history table.
first	(Optional) Displays the oldest entries in the history table.
number-of-entries	(Optional) Number of entries to be displayed. The range is from 1 to 100000.
last	(Optional) Displays the latest entries in the history table.
status	(Optional) Displays the status of the history system.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(24)T	This command was introduced in a release earlier than Cisco IOS Release 12.4(24)T.

Examples

The following is sample output from the **show coverage history** command. The output is self-explanatory.

```
Router# show coverage history status

History table size is 23 entries. 0 entries have been used.
Low-level count handler has been called 0 times.
There were 0 entries not traced due to recursion detection.
There were 0 entries not traced due to internal pauses.
```

Related Commands

Command	Description
coverage history	Enables the system to record the history of the events.

show data-corruption

To display data inconsistency errors of the present software version, use the **show data-corruption** command in user EXEC or privileged EXEC mode.

show data-corruption

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.2(22)SE	This command was introduced.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.
Cisco IOS 2.3 XE	This command was integrated into Cisco IOS XE Release 2.3.

Usage Guidelines

Use this command to display all data inconsistency errors or the corrupt data. If there are no data errors, the “No data inconsistency errors have been recorded” message is displayed.

Examples

The following is sample output from **show data-corruption** command. The fields are self-explanatory.

```
Router# show data-corruption

Data inconsistency records for:
3800 Software (C3845-ADVIPSERVICESK9-M), Version 12.4(24)T, RELEASE
SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Compiled Thu 17-Dec-09 09:02 by xyz

Count           Traceback
   1842        60523C58, 616E85FC 60523C58 62A9F648
              1: Jun 12 18:24:33.960
              2: Jun 12 18:24:33.960
              3: Jun 12 18:24:33.960
           1842: Jun 19 00:30:51.350
```

show debugging

To display information about the types of debugging that are enabled for your router, use the **show debugging** command in privileged EXEC mode.

show debugging

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
11.1	This command was introduced.
12.3(7)T	The output of this command was enhanced to show TCP Explicit Congestion Notification (ECN) configuration.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.4(20)T	The output of this command was enhanced to show the user-group debugging configuration.

Examples

The following is sample output from the **show debugging** command. In this example, the remote host is not configured or connected.

```
Router# show debugging
!
TCP:
  TCP Packet debugging is on
  TCP ECN debugging is on
!
Router# telnet 10.1.25.234
!
Trying 10.1.25.234 ...
!
00:02:48: 10.1.25.31:11001 <---> 10.1.25.234:23 out ECN-setup SYN
00:02:48: tcp0: O CLOSED 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 ECE CWR SYN  WIN 4128
00:02:50: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:02:50: cwnd from 1460 to 1460, ssthresh from 65535 to 2920
00:02:50: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 ECE CWR SYN  WIN 4128
00:02:54: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:02:54: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
00:02:54: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 ECE CWR SYN  WIN 4128
00:03:02: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:03:02: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
```

```
00:03:02: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 ECE CWR SYN  WIN 4128
00:03:18: 10.1.25.31:11001 <---> 10.1.25.234:23 SYN with ECN disabled
00:03:18: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:03:18: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
00:03:18: tcp0: O SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 SYN  WIN 4128
00:03:20: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:03:20: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
00:03:20: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 SYN  WIN 4128
00:03:24: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:03:24: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
00:03:24: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 SYN  WIN 4128
00:03:32: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:03:32: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
00:03:32: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 SYN  WIN 4128
!Connection timed out; remote host not responding
```

The following is sample output from the **show debugging** command when user-group debugging is configured:

```
Router# show debugging
!
usergroup:
 Usergroup Deletions debugging is on
 Usergroup Additions debugging is on
 Usergroup Database debugging is on
 Usergroup API debugging is on
!
```

Table 67 describes the significant fields in the output.

Table 67 show debugging Field Descriptions

Field	Description
OPTS 4	Bytes of TCP expressed as a number. In this case, the bytes are 4.
ECE	Echo congestion experience.
CWR	Congestion window reduced.
SYN	Synchronize connections—Request to synchronize sequence numbers, used when a TCP connection is being opened.
WIN 4128	Advertised window size, in bytes. In this case, the bytes are 4128.
cwnd	Congestion window (cwnd)—Indicates that the window size has changed.
ssthresh	Slow-start threshold (ssthresh)—Variable used by TCP to determine whether or not to use slow-start or congestion avoidance.
usergroup	Statically defined usergroup to which source IP addresses are associated.

show declassify

To display the state of the declassify function (enabled, in progress, and so forth) and the sequence of declassification steps that will be performed, use the **show declassify** command in global configuration mode.

show declassify

Syntax Description

This command has no arguments or keywords.

Note The **show declassify** command is supported on the Cisco 3200 series routers only.

Command Modes

Global configuration

Command History

Release	Modification
12.3(8)YD	This command was introduced.
12.4(2)T	This command was integrated into Cisco IOS Release 12.4(2)T.

Examples

The following example is sample output for the **show declassify** command:

```
Router# show declassify

Declassify facility: Enabled=Yes  In Progress=No
    Erase flash=Yes  Erase nvram=Yes
    Obtain memory size
    Shutdown Interfaces
    Declassify Console and Aux Ports
    Erase flash
    Declassify NVRAM
    Declassify Communications Processor Module
    Declassify RAM, D-Cache, and I-Cache
```

Table 68 describes the significant fields shown in the display.

Table 68 show declassify Field Descriptions

Field	Description
Enabled	A “Yes” value indicates that zeroization is enabled. A “No” value indicates that zeroization is disabled.
In Progress	A “Yes” value indicates that zeroization is currently in progress. A “No” value indicates that zeroization is currently not in progress.

Table 68 show declassify Field Descriptions (continued)

Field	Description
Erase flash	A “Yes” value indicates that erasure of Flash memory is enabled. A “No” value indicates that the erasure of Flash memory is disabled.
Erase nvram	A “Yes” value indicates that the erasure of NVRAM is enabled. A “No” value indicates that the erasure of NVRAM is disabled.
Obtain memory size	Obtain the main memory size in order to understand how much of the memory is to be scrubbed.
Shutdown Interfaces	Shut down any and all network interfaces.
Declassify Console and AUX Ports	Remove potentially sensitive information from console and AUX port FIFOs.
Erase flash	Erase Flash memory.
Declassify NVRAM	Erase NVRAM.
Declassify Communications Processor Module	Erase the memory in the Communications Processor Module (CPM).
Declassify RAM, D-Cache, and I-Cache	Scrub the main memory, erase the Data Cache (D-Cache), and erase the Instruction Cache (I-Cache).

Related Commands

Command	Description
service declassify	Invokes declassification.

show derived-config

To display the composite results of all the configuration commands that apply to an interface, including commands that come from sources such as static templates, dynamic templates, dialer interfaces, and authentication, authorization, and accounting (AAA) per-user attributes, use the **show derived-config** command in privileged EXEC mode.

show derived-config [interface *type number*]

Syntax Description

interface *type number*	(Optional) Displays the derived configuration for a specific interface. If you use the **interface** keyword, you must specify the interface type and the interface number (for example, interface ethernet 0).

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Configuration commands can be applied to an interface from sources such as static templates, dynamic templates bound by resource pooling, dialer interfaces, AAA per-user attributes and the configuration of the physical interface. The **show derived-config** command displays all the commands that apply to an interface.

The output for the **show derived-config** command is nearly identical to that of the **show running-config** command. It differs when the configuration for an interface is derived from a template, a dialer interface, or some per-user configuration. In those cases, the commands derived from the template, dialer interface, and so on, will be displayed for the affected interface.

If the same command is configured differently in two different sources that apply to the same interface, the command coming from the source that has the highest precedence will appear in the display.

Examples

The following examples show sample output for the **show running-config** and **show derived-config** commands for serial interface 0:23 and dialer interface 0. The output of the **show running-config** and **show derived-config** commands is the same for dialer interface 0 because none of the commands that apply to that interface are derived from any sources other than the configuration of the dialer interface. The output for the **show running-config** and **show derived-config** commands for serial interface 0:23 differs because some of the commands that apply to serial interface 0:23 come from dialer interface 0.

```
Router# show running-config interface Serial0:23

Building configuration...

Current configuration :296 bytes
!
interface Serial0:23
 description PRI to ADTRAN (#4444150)
```

```
 ip unnumbered Loopback0
 encapsulation ppp
 dialer rotary-group 0
 isdn switch-type primary-dms100
 isdn incoming-voice modem
 isdn calling-number 4444150
 peer default ip address pool old_pool
end

Router# show running-config interface Dialer0

Building configuration...

Current configuration :257 bytes
!
interface Dialer0
 description Dialin Users
 ip unnumbered Loopback0
 no ip proxy-arp
 encapsulation ppp
 dialer in-band
 dialer idle-timeout 30
 dialer-group 1
 peer default ip address pool new_pool
 ppp authentication pap chap callin
end

Router# show derived-config interface Serial0:23

Building configuration...

Derived configuration :332 bytes
!
interface Serial0:23
 description PRI to ADTRAN (#4444150)
 ip unnumbered Loopback0
 encapsulation ppp
 dialer rotary-group 0
 isdn switch-type primary-dms100
 isdn incoming-voice modem
 isdn calling-number 4444150
 peer default ip address pool new_pool
 ppp authentication pap chap callin
end

Router# show derived-config interface Dialer0

Building configuration...

Derived configuration :257 bytes
!
interface Dialer0
 description Dialin Users
 ip unnumbered Loopback0
 no ip proxy-arp
 encapsulation ppp
 dialer in-band
 dialer idle-timeout 30
 dialer-group 1
 peer default ip address pool new_pool
 ppp authentication pap chap callin
end
```

Related Commands

Command	Description
show running-config	Displays the contents of the currently running configuration file or the configuration for a specific interface.

show diagnostic cns

To display the information about the CNS subject, use the **show diagnostic cns** command in user EXEC or privileged EXEC mode.

show diagnostic cns {**publish** | **subscribe**}

Syntax Description

publish	Displays the subject with which the diagnostic results is published.
subscribe	Displays the subscribed subjects.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

The CNS subsystem communicates with remote network applications through the CNS-event agent and follows the publish and subscribe model. An application sets itself up to receive events by subscribing to the approprate event subject name.

Examples

This example shows how to display the subject with which the diagnostic results is published:

```
Router# show diagnostic cns publish
Subject: cisco.cns.device.diag_results
```

This example shows how to display the subscribed subject:

```
Router# show diagnostic cns subscribe
Subject: cisco.cns.device.diag_get_results
```

Related Commands

Command	Description
diagnostic cns	Configures the CNS diagnostics.

show diagnostic sanity

To display sanity check results, use the **show diagnostic sanity** command in privileged EXEC mode.

show diagnostic sanity

Syntax Description

This command has no arguments or keywords.

Defaults

Displays information for all the Gigabit Ethernet WAN interfaces in the Cisco 7600 series router.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(18)SXE	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The sanity check runs a set of predetermined checks on the configuration with a possible combination of certain system states to compile a list of warning conditions. The checks are designed to look for anything that seems out of place and are intended to serve as an aid to maintaining the system sanity.

The following is a list of the checks that are run and the action taken when the condition is found:

- Checks whether the default gateways are reachable. If so, the system stops pinging.
- If a port auto-negotiates to half duplex, the system flags it.

Trunking Checks

- If a trunk port has the mode set to “on,” the system flags it.
- If a port is trunking and mode is auto, the system flags it.
- If a trunk port is not trunking and the mode is desirable, the system flags it.
- If a trunk port negotiates to half duplex, the system flags it.

Channeling Checks

- If a port has channeling mode set to on, the system flags it.
- If a port is not channeling and the mode is set to desirable, the system flags it.
- If a VLAN has a Spanning-Tree root of 32K (root is not set), the system flags it.

Spanning-Tree VLAN Checks

- If a VLAN has a max age on the Spanning-Tree root that is different than the default, the system flags it.
- If a VLAN has a fwd delay on the Spanning-Tree root that is different than the default, the system flags it.
- If a VLAN has a fwd delay on the bridge that is different than the default, the system flags it.

- If a VLAN has a fwd delay on the bridge that is different than the default, the system flags it.
- If a VLAN has a hello time on the bridge that is different than the default, the system flags it.

Spanning-Tree Port Checks

- If a port has a port cost that is different than the default, the system flags it.
- If a port has a port priority that is different than the default, the system flags it.

UDLD Checks

- If a port has UDLD disabled, the system flags it.
- If a port had UDLD shut down, the system flags it.
- If a port had a UDLD undetermined state, the system flags it.

Assorted Port Checks

- If a port had receive flow control disabled, the system flags it.
- If a trunk port had PortFast enabled, the system flags it.
- If a inline power port has any of the following states:
  - denied
  - faulty
  - other
  - off

  The system flags it.
- If a port has a native VLAN mismatch, the system flags it.
- If a port has a duplex mismatch, the system flags it.

Bootstring and Config Register Checks

- The config register on the primary supervisor engine (and on the secondary supervisor engine if present) must be one of the following values: 0x2 , 0x102, or 0x2102.
- The system verifies the bootstring on the primary supervisor engine (and on the secondary supervisor engine if present). The system displays a message if the bootstring is empty.
- The system verifies that every file is specified in the bootstring. The system displays a message if the file is absent or shows up with a wrong checksum.

  If only *device***:** is specified as a filename, then the system verifies that the first file is on the device.

Assorted Checks

- The system displays a message if IGMP snooping is disabled.
- The system displays a message if any of the values of the snmp community access strings {RO,RW,RW-ALL} is the same as the default.
- The system displays a message if any of the modules are in states other than “Ok.”
- The system displays a message that lists all the tests that failed (displayed as an “F”) in the **show test all** command.
- The system displays a message if *fast is not configured on the switch anywhere.
- The system displays a message if there is enough room for the crashinfo file on the bootflash:.
- The system displays a message if multicast routing is enabled globally but is not applied to all interfaces.

- The system displays a message if IGMP snooping is disabled and RGMP is enabled.

Examples

This example displays samples of the messages that could be displayed with the **show diagnostic sanity** command:

```
Router# show diagnostic sanity

Pinging default gateway 10.6.141.1 ....
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.6.141.1, timeout is 2 seconds:
..!!.
Success rate is 0 percent (0/5)

IGMP snooping disabled please enable it for optimum config.

IGMP snooping disabled but RGMP enabled on the following interfaces,
please enable IGMP for proper config :
Vlan1, Vlan2, GigabitEthernet1/1

Multicast routing is enabled globally but not enabled on the following
interfaces:
GigabitEthernet1/1, GigabitEthernet1/2

A programming algorithm mismatch was found on the device bootflash:
Formatting the device is recommended.

The bootflash: does not have enough free space to accomodate the crashinfo file.

Please check your confreg value : 0x0.

Please check your confreg value on standby: 0x0.

The boot string is empty. Please enter a valid boot string .
Could not verify boot image "disk0:" specified in the boot string on the
slave.

Invalid boot image "bootflash:asdasd" specified in the boot string on the
slave.

Please check your boot string on the slave.

UDLD has been disabled globally - port-level UDLD sanity checks are
being bypassed.
OR
[
The following ports have UDLD disabled. Please enable UDLD for optimum
config:
Fa9/45

The following ports have an unknown UDLD link state. Please enable UDLD
on both sides of the link:
Fa9/45
]

The following ports have portfast enabled:
Fa9/35, Fa9/45

The following ports have trunk mode set to on:
Fa4/1, Fa4/13

The following trunks have mode set to auto:
Fa4/2, Fa4/3
```

```
The following ports with mode set to desirable are not trunking:
Fa4/3, Fa4/4

The following trunk ports have negotiated to half-duplex:
Fa4/3, Fa4/4

The following ports are configured for channel mode on:
Fa4/1, Fa4/2, Fa4/3, Fa4/4

The following ports, not channeling are configured for channel mode
desirable:
Fa4/14

The following vlan(s) have a spanning tree root of 32768:
1

The following vlan(s) have max age on the spanning tree root different from
the default:
1-2

The following vlan(s) have forward delay on the spanning tree root different
from the default:
1-2

The following vlan(s) have hello time on the spanning tree root different
from the default:
1-2

The following vlan(s) have max age on the bridge different from the
default:
1-2

The following vlan(s) have fwd delay on the bridge different from the
default:
1-2

The following vlan(s) have hello time on the bridge different from the
default:
1-2

The following vlan(s) have a different port priority than the default
on the port FastEthernet4/1
1-2

The following ports have recieve flow control disabled:
Fa9/35, Fa9/45

The following inline power ports have power-deny/faulty status:
Gi7/1, Gi7/2

The following ports have negotiated to half-duplex:
Fa9/45

The following vlans have a duplex mismatch:
Fas 9/45

The following interafaces have a native vlan mismatch:
interface (native vlan - neighbor vlan)
 Fas 9/45 (1 - 64)

The value for Community-Access on read-only operations for SNMP is the same
as default. Please verify that this is the best value from a security point
of view.
```

```
The value for Community-Access on write-only operations for SNMP is the same
as default. Please verify that this is the best value from a security point
of view.

The value for Community-Access on read-write operations for SNMP is the same
as default. Please verify that this is the best value from a security point
of view.

Please check the status of the following modules:
8,9

Module 2 had a MINOR_ERROR.

The Module 2 failed the following tests:
TestIngressSpan

The following ports from Module2 failed test1:
1,2,4,48
```

show disk

To display flash or file system information for a disk, use the **show disk** command in user or privileged EXEC mode.

show {**disk0** | **disk1**} [**all** | **filesys**]

Syntax Description

disk0	Selects disk 0 as the disk to display information about.
disk1	Selects disk 1 as the disk to display information about.
all	(Optional) Specifies that all flash information will be displayed for the selected disk.
filesys	(Optional) Specifies that file system information will be displayed for the selected disk.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2	This command was introduced in a release prior to Cisco IOS Release 12.2.
12.3(7)T	This command was enhanced to display information about the ATA ROM monitor library (monlib) file.
12.2(25)S	This command was integrated into the Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **show disk** command is supported only on platforms that have a disk file system.

Note The name of the ATA monlib file may contain a platform name that does not match the platform that you are using. Different platforms may have a similar or the same name for their ATA monlib file.

Examples

The following example displays information about disk 0. The output is self-explanatory.

```
Router# show disk0 all

-#- --length-- -----date/time------ path
1     19539160 Jan 27 2004 23:08:40 c7200-is-mz.123-5.7.PI3a

1011679232 bytes available (19546112 bytes used)

******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
   Number of Heads:      16
   Number of Cylinders    1999
   Sectors per Track      63
```

```
   Sector Size            512
   Total Sectors          2014992
ATA CARD FORMAT
   Number of FAT Sectors  246
   Sectors Per Cluster    32
   Number of Clusters     62941
   Number of Data Sectors 2014789
   Base Root Sector       632
   Base FAT Sector        140
   Base Data Sector       664

ATA MONLIB INFO
   Image Monlib size = 67256
   Disk monlib size = 71680
   Name = c7200-atafslib-m
   Monlib Start sector = 2
   Monlib End sector = 133
   Monlib updated by = C7200-IS-M12.3(5.7)PI3a
   Monlib version = 1
```

show disk0:

To display flash or file system information for a disk located in slot 0, use the **show disk** command in user EXEC or privileged EXEC mode.

show disk0: [**all** | **filesys**]

Syntax Description

all	(Optional) The **all** keyword displays complete information about flash memory, including information about the individual devices in flash memory and the names and sizes of all system image files stored in flash memory, including those that are invalid.
filesys	(Optional) Displays the device information block, the status information, and the usage information.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.3AA	This command was introduced.
12.2	This command was incorporated into Cisco IOS Release 12.2.
12.3(7)T	This command was enhanced to display information about the ATA ROM monitor library (monlib) file.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **show disk0:** command is supported only on platforms that have a disk file system located in slot 0. Use the **show disk0:** command to display details about the files in a particular ATA PCMCIA flash disk memory card.

For more information regarding file systems and flash cards, access the *PCMCIA Filesystem Compatibility Matrix and Filesystem Information* document at the following URL:

http://www.cisco.com/en/US/partner/products/hw/routers/ps341/products_tech_note09186a00800a7515.shtml

Note The name of the ATA monlib file may contain a platform name that does not match the platform that you are using. Different platforms may have a similar name or the same name for their ATA monlib file.

Examples

The following examples show displays of information about the flash disks or file system information for a disk. The output is self-explanatory.

```
c7200# show disk0:

-#- --length-- -----date/time------ path
```

```
1     29505176 Feb 27 2006 17:56:52 +00:00 c7200-jk9o3s-mz.124-6.T
2        32768 Feb 24 2006 13:30:30 +00:00 file1.log

34738176 bytes available (29540352 bytes used)

c7200# show disk0: all

-#- --length-- -----date/time------ path
1     29505176 Feb 27 2006 17:56:52 +00:00 c7200-jk9o3s-mz.124-6.T
2        32768 Feb 24 2006 13:30:30 +00:00 file1.log

34738176 bytes available (29540352 bytes used)

******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
   Number of Heads:       4
   Number of Cylinders    984
   Sectors per Cylinder   32
   Sector Size            512
   Total Sectors          125952

ATA CARD FORMAT
   Number of FAT Sectors  62
   Sectors Per Cluster    8
   Number of Clusters     15693
   Number of Data Sectors 125812
   Base Root Sector       232
   Base FAT Sector        108
   Base Data Sector       264

ATA MONLIB INFO
   Image Monlib size = 73048
   Disk monlib size = 55296
   Name = NA
   Monlib end sector = NA
   Monlib Start sector = NA
   Monlib updated by = NA
   Monlib version = NA

c7200# show disk0: filesys

******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
   Number of Heads:       4
   Number of Cylinders    984
   Sectors per Cylinder   32
   Sector Size            512
   Total Sectors          125952

ATA CARD FORMAT
   Number of FAT Sectors  62
   Sectors Per Cluster    8
   Number of Clusters     15693
   Number of Data Sectors 125812
   Base Root Sector       232
   Base FAT Sector        108
   Base Data Sector       264

ATA MONLIB INFO
   Image Monlib size = 73048
   Disk monlib size = 55296
   Name = NA
```

```
Monlib end sector = NA
Monlib Start sector = NA
Monlib updated by = NA
Monlib version = NA
```

Related Commands

Command	Description
dir disk0:	Displays a directory listing of files on an ATA PCMCIA flash disk card located in slot 0.
dir disk1:	Displays a directory listing of files on an ATA PCMCIA flash disk card located in slot 1.
show disk1:	Displays flash or file system information for a disk located in slot 1.

show disk1:

To display flash or file system information for a disk located in slot 1, use the **show disk1:** command in user EXEC or privileged EXEC mode.

show disk1: [**all** | **filesys**]

Syntax Description

all	(Optional) The **all** keyword displays complete information about flash memory, including information about the individual devices in flash memory and the names and sizes of all system image files stored in flash memory, including those that are invalid.
filesys	(Optional) Displays the device information block, the status information, and the usage information.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
11.3AA	This command was introduced.
12.2	This command was incorporated into Cisco IOS Release 12.2.
12.3(7)T	This command was enhanced to display information about the ATA ROM monitor library (monlib) file.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **show disk1:** command is supported only on platforms that have a disk file system. Use the **show disk01:** command to display details about the files in a particular ATA PCMCIA flash disk memory card located in slot 1.

For more information regarding file systems and flash cards, access the *PCMCIA Filesystem Compatibility Matrix and Filesystem Information* document at the following URL:

http://www.cisco.com/en/US/partner/products/hw/routers/ps341/products_tech_note09186a00800a7515.shtml

Note The name of the ATA monlib file may contain a platform name that does not match the platform that you are using. Different platforms may have a similar name or the same name for their ATA monlib file.

Examples

The following examples show displays of information about the flash disks or file system information for a disk. The output is self-explanatory.

```
c7200# show disk1:

-#- --length-- -----date/time------ path
```

```
1     29505176 Feb 27 2006 17:56:52 +00:00 c7200-jk9o3s-mz.124-6.T
2        32768 Feb 24 2006 13:30:30 +00:00 file1.log

34738176 bytes available (29540352 bytes used)

c7200# show disk1: all

-#- --length-- -----date/time------ path
1     29505176 Feb 27 2006 17:56:52 +00:00 c7200-jk9o3s-mz.124-6.T
2        32768 Feb 24 2006 13:30:30 +00:00 file1.log

34738176 bytes available (29540352 bytes used)

******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
   Number of Heads:       4
   Number of Cylinders    984
   Sectors per Cylinder   32
   Sector Size            512
   Total Sectors          125952

ATA CARD FORMAT
   Number of FAT Sectors  62
   Sectors Per Cluster    8
   Number of Clusters     15693
   Number of Data Sectors 125812
   Base Root Sector       232
   Base FAT Sector        108
   Base Data Sector       264

ATA MONLIB INFO
   Image Monlib size = 73048
   Disk monlib size = 55296
   Name = NA
   Monlib end sector = NA
   Monlib Start sector = NA
   Monlib updated by = NA
   Monlib version = NA

c7200# show disk1: filesys

******** ATA Flash Card Geometry/Format Info ********

ATA CARD GEOMETRY
   Number of Heads:       4
   Number of Cylinders    984
   Sectors per Cylinder   32
   Sector Size            512
   Total Sectors          125952

ATA CARD FORMAT
   Number of FAT Sectors  62
   Sectors Per Cluster    8
   Number of Clusters     15693
   Number of Data Sectors 125812
   Base Root Sector       232
   Base FAT Sector        108
   Base Data Sector       264

ATA MONLIB INFO
   Image Monlib size = 73048
   Disk monlib size = 55296
   Name = NA
```

```
Monlib end sector = NA
Monlib Start sector = NA
Monlib updated by = NA
Monlib version = NA
```

Related Commands

Command	Description
dir disk0:	Displays a directory listing of files on an ATA PCMCIA flash disk card located in slot 0.
dir disk1:	Displays a directory listing of files on an ATA PCMCIA flash disk card located in slot 1.
show disk0:	Displays flash or file system information for a disk located in slot 0.

show environment

To display temperature, voltage, fan, and power supply information, use the **show environment** command in user EXEC or privileged EXEC mode.

show environment [**alarms** | **all** | **fans** | **hardware** | **last** | **leds** | **power-supply** | **table** | **temperature** | **voltages**]

Cisco 7000 Series, Cisco 7200 Series, Cisco 7304, and Cisco 7500 Series

show environment [**all** | **last** | **table**]

Cisco ASR 1000 Series

show environment {**all** | **counters** | **history** *sensor* | **location** *sensor* | **sensor** *sensor* | **table** *sensor*}

Syntax Description

alarms	(Optional) Displays the alarm contact information.
all	(Optional) Displays a detailed listing of all environmental monitor parameters (for example, the power supplies, temperature readings, voltage readings, and blower speeds). This is the default.
fans	(Optional) Displays blower and fan information.
hardware	(Optional) Displays hardware-specific information.
last	(Optional) Displays information on the last measurement made.
leds	(Optional) Displays the status of the MBus LEDs on the clock and scheduler cards and switch fabric cards.
power-supply	(Optional) Displays power supply voltage and current information. If applicable, displays the status of the redundant power supply.
table	(Optional) Displays the temperature, voltage, and blower ranges and thresholds. On the Cisco 7200 series, including the NPE-G2 in the Cisco 7200 VXR, the Cisco 7304 routers, and the Cisco 7500 series routers, the **table** keyword displays only the temperature and voltage thresholds.
temperature	(Optional) Displays temperature information.
voltages	(Optional) Displays voltage information.
counters	Displays operational counters.
history	Displays sensor state change history.
location	Displays sensors by location.
sensor	Displays sensor summary.
sensor	Sensor name.

Command Default

If no options are specified, the default is **all**.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
11.2 GS	The **alarms**, **fans**, **hardware**, **leds**, **power-supply**, **table, temperature**, and **voltages** keywords were added for the Cisco 12000 series GSRs.
11.3(6)AA	This command was expanded to monitor the RPS and board temperature for the Cisco AS5300 platform, Cisco 3600 series routers, Cisco 7200 series routers, and the Cisco 12000 series GSRs.
12.2(20)S	This command was integrated into Cisco IOS Release 12.2(20)S.
12.2(20)S2	This command was integrated into Cisco IOS Release 12.2(20)S2 to support MSCs and SPAs on the Cisco 7304 router using the **all**, **last**, and **table** keywords.
12.4(4)XD	This command was integrated into Cisco IOS Release 12.4(4)XD to support the NPE-G2 on the Cisco 7200 VXR using the **all**, **last**, and **table** keywords. Command output was modified for the NPE-G2.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1 on the Cisco ASR 1000 Series Routers.

Usage Guidelines

The availability of keywords depends on your system and platform. The command does not support SPAs on the Cisco 7200 series and on the NPE-G2 in the Cisco 7200 VXR routers.

A routine runs once a minute that reads environmental measurements from sensors and stores the output into a buffer. For shared port adapters (SPAs), the temperature and voltage sensors are read every few seconds to get environmental data. The environmental buffer is displayed on the console when you use the **show environment** command.

If a measurement exceeds desired margins, but has not exceeded fatal margins, a warning message is printed to the system console. The system software queries the sensors for measurements once a minute, but warnings for a given test point are printed at most once every hour for sensor readings in the warning range and once every 5 minutes for sensor readings in the critical range. If a measurement is out of line within these time segments, an automatic warning message appears on the console. As noted, you can query the environmental status with the **show environment** command at any time to determine whether a measurement is at the warning or critical tolerance.

A SPA is shut down when any of the SPA environment readings exceed the shutdown threshold.

If a shutdown occurs because of detection of fatal environmental margins, the last measured value from each sensor is stored in internal nonvolatile memory.

For environmental specifications, refer to the hardware installation and configuration publication for your individual chassis.

For network processor engines (NPEs), network services engines (NSEs), line cards, and modular services cards (MSCs), environmental information is recorded in the CISCO-ENVMON-MIB. SPAs are not supported by the CISCO-ENVMON-MIB. In Cisco IOS Release 12.2(20)S2 and later, the CISCO-ENTITY-SENSOR-MIB supports environmental information for SPAs, as well as NPEs, NSEs, line cards, and MSCs.

If the Cisco 12000 series GSR exceeds environmental conditions, a message similar to the following is displayed on the console:

```
%GSR_ENV-2-WARNING: Slot 3 Hot Sensor Temperature exceeds 40 deg C;
Check cooling systems
```

Note Blower temperatures that exceed environmental conditions do not generate a warning message.

You can also enable Simple Network Management Protocol (SNMP) notifications (traps or informs) to alert a network management system (NMS) when environmental thresholds are reached using the **snmp-server enable traps envmon** and **snmp-server host** global configuration commands.

Whenever Cisco IOS software detects a failure or recovery event from the DRPS unit, it sends an SNMP trap to the configured SNMP server. Unlike console messages, only one SNMP trap is sent when the failure event is first detected. Another trap is sent when the recovery is detected.

Cisco AS5300 DRPS software reuses the MIB attributes and traps defined in CISCO-ENVMON-MIB and CISCO-ACCESS-ENVMON-MIB. CISCO-ENVMON-MIB is supported by all Cisco routers with RPS units, and CISCO-ACCESS-ENVMON-MIB is supported by the Cisco 3600 series routers.

A power supply trap defined in CISCO-ENVMON-MIB is sent when a failure is detected and when a failure recovery occurs for the following events: input voltage fail, DC output voltage fail, thermal fail, and multiple failure events.

A fan failure trap defined in CISCO-ENVMON-MIB is sent when a fan failure or recovery event is detected by Cisco IOS software.

A temperature trap defined in CISCO-ACCESS-ENVMON-MIB is sent when a board over-temperature condition is detected by Cisco IOS software.

CISCO-ACCESS-ENVMON-MIB also defines an over-voltage trap. A similar trap is defined in CISCO-ENVMON-MIB, but it requires the ciscoEnvMonVoltageStatusValue in varbinds. This value indicates the current value of the voltage in the RPS. With Cisco AS5300 RPS units, the current voltage value is not sent to the motherboard.

CISCO-ENVMON-MIB is extended to add a new enumerated value, internalRedundant(5), for MIB attribute ciscoEnvMonSupplySource. This is used to identify a RPS unit.

Examples

Cisco ASR 1000 Series Routers

In the following example, the **show environment all** command displays system temperature, voltage, fan, and power supply conditions. (It does not display environmental information for SPAs.) The State column in **show environment all** output should show “Normal” except for fans where it indicates fan speed. A fan speed of 65% is normal.

```
Router# show environment all
Sensor List:  Environmental Monitoring
 Sensor           Location          State             Reading
 V1: VMA          F0                Normal            1801 mV
 V1: VMB          F0                Normal            1206 mV
 V1: VMC          F0                Normal            1206 mV
 V1: VMD          F0                Normal            1103 mV
 V1: VME          F0                Normal            1005 mV
 V1: 12v          F0                Normal            11967 mV
 V1: VDD          F0                Normal            3295 mV
 V1: GP1          F0                Normal            905 mV
 V2: VMA          F0                Normal            3295 mV
 V2: VMB          F0                Normal            2495 mV
 V2: VMC          F0                Normal            1499 mV
 V2: VMD          F0                Normal            1098 mV
```

```
 V2: VME          F0               Normal           1000 mV
 V2: VMF          F0               Normal           1000 mV
 V2: 12v          F0               Normal           11923 mV
 V2: VDD          F0               Normal           3295 mV
 V2: GP1          F0               Normal           751 mV
 Temp: Inlet      F0               Normal           27 Celsius
 Temp: Asic1      F0               Normal           44 Celsius
 Temp: Exhaust1   F0               Normal           36 Celsius
 Temp: Exhaust2   F0               Normal           34 Celsius
 Temp: Asic2      F0               Normal           40 Celsius
 V1: VMA          0                Normal           1103 mV
 V1: VMB          0                Normal           1201 mV
 V1: VMC          0                Normal           1503 mV
 V1: VMD          0                Normal           1801 mV
 V1: VME          0                Normal           2495 mV
 V1: VMF          0                Normal           3295 mV
 V1: 12v          0                Normal           11967 mV
 V1: VDD          0                Normal           3295 mV
 V1: GP1          0                Normal           751 mV
 V1: GP2          0                Normal           903 mV
 V2: VMB          0                Normal           1201 mV
 V2: 12v          0                Normal           11967 mV
 V2: VDD          0                Normal           3291 mV
 V2: GP2          0                Normal           903 mV
 Temp: Left       0                Normal           28 Celsius
 Temp: Center     0                Normal           29 Celsius
 Temp: Asic1      0                Normal           42 Celsius
 Temp: Right      0                Normal           27 Celsius
 V1: VMA          1                Normal           1103 mV
 V1: VMB          1                Normal           1201 mV
 V1: VMC          1                Normal           1503 mV
 V1: VMD          1                Normal           1801 mV
 V1: VME          1                Normal           2495 mV
 V1: VMF          1                Normal           3295 mV
 V1: 12v          1                Normal           11953 mV
 V1: VDD          1                Normal           3291 mV
 V1: GP1          1                Normal           754 mV
 V1: GP2          1                Normal           903 mV
 V2: VMB          1                Normal           1206 mV
 V2: 12v          1                Normal           11967 mV
 V2: VDD          1                Normal           3291 mV
 V2: GP2          1                Normal           905 mV
 Temp: Left       1                Normal           28 Celsius
 Temp: Center     1                Normal           30 Celsius
 Temp: Asic1      1                Normal           44 Celsius
 Temp: Right      1                Normal           28 Celsius
 PEM Iout         P0               Normal           37 A
 PEM Vout         P0               Normal           12 V AC
 PEM Vin          P0               Normal           116 V AC
 Temp: PEM        P0               Normal           28 Celsius
 Temp: FC         P0               Fan Speed 65%    25 Celsius
 Temp: FM         P1               Normal           1 Celsius
Temp: FC         P1               Fan Speed 65%    25 Celsius
 V1: VMA          R0               Normal           1118 mV
 V1: VMB          R0               Normal           3315 mV
 V1: VMC          R0               Normal           2519 mV
 V1: VMD          R0               Normal           1811 mV
 V1: VME          R0               Normal           1513 mV
 V1: VMF          R0               Normal           1220 mV
 V1: 12v          R0               Normal           12011 mV
 V1: VDD          R0               Normal           3300 mV
 V1: GP1          R0               Normal           913 mV
 V1: GP2          R0               Normal           1247 mV
 Temp: CPU        R0               Normal           29 Celsius
```

```
Temp: Outlet      R0                Normal            30 Celsius
Temp: Inlet       R0                Normal            25 Celsius
Temp: Asic1       R0                Normal            30 Celsius
```

Table 69 describes the significant fields shown in the display.

Table 69 show environment all Field Descriptions

Field	Description
Sensor	Sensor name.
Location	Chassis slot.
State	State description. One of the following values: • Critical—Critical alarm indicating a service-affecting condition. • Fan Speed—Fan speed (65% is normal). • Major—Major alarm indicating immediate action is needed. • Minor—Minor alarm indicating warning conditions. • Normal—Sensor reading is in acceptable range. • Shutdown—If automatic shutdown is enabled, indicates that the router will shut down.
Reading	Voltage or temperature detected by the sensor.

Cisco 7000 Series Routers, Cisco 7200 Series Routers

In the following example, the typical **show environment** display is shown when no warning conditions are in the system for the Cisco 7000 series and Cisco 7200 series routers. This information may vary slightly depending on the platform you are using. The date and time of the query are displayed, along with the data refresh information and a message indicating that there are no warning conditions.

```
Router> show environment

Environmental Statistics
  Environmental status as of 13:17:39 UTC Thu Jun 6 1996
  Data is 7 second(s) old, refresh in 53 second(s)

  All Environmental Measurements are within specifications
```

Table 70 describes the significant fields shown in the display.

Table 70 show environment Field Descriptions

Field	Description
Environmental status as of...	Current date and time.
Data is..., refresh in...	Environmental measurements are output into a buffer every 60 seconds, unless other higher-priority processes are running.
Status message	If environmental measurements are not within specification, warning messages are displayed.

NPE-G2 in Cisco 7200 VXR Routers

In the following example, additional temperature and voltage readings for the NPE-G2 in the Cisco 7200 VXR router are displayed by the **show environment all** command. Power supplies 1 and 2 are on, and all monitored variables are within the normal operating range.

```
Router_npe-g2# show environment all
Power Supplies:
Power Supply 1 is Zytek AC Power Supply. Unit is on.
Power Supply 2 is Zytek AC Power Supply. Unit is on.
Temperature readings:
NPE Inlet measured at 25C/77F
NPE Outlet measured at 28C/82F
CPU Die measured at 56C/132F             =======> additional temperature reading on NPE-G2
Voltage readings:
+3.30 V measured at +3.32 V              =======> additional voltage reading on NPE-G2
+1.50 V measured at +1.48 V              =======> additional voltage reading on NPE-G2
+2.50 V measured at +2.46 V              =======> additional voltage reading on NPE-G2
+1.80 V measured at +1.75 V              =======> additional voltage reading on NPE-G2
+1.20 V measured at +1.17 V              =======> additional voltage reading on NPE-G2
VDD_CPU measured at +1.28 V              =======> additional voltage reading on NPE-G2
VDD_MEM measured at +2.50 V              =======> additional voltage reading on NPE-G2
VTT measured at +1.25 V                  =======> additional voltage reading on NPE-G2
+3.45 V measured at +3.39 V
-11.95 measured at -11.93 V
+5.15 V measured at +4.96 V
+12.15 V measured at +12.18 V
Envm stats saved 0 time(s) since reload
```

Table 71 show environment all Field Descriptions for NPE-G2 in Cisco 7200 VXR Router

Field	Description
Power Supply *x* is present.	Specifies whether the indicated (*x*) power supply slot is populated. If a power supply slot is populated, the manufacturer name and whether it is an AC or DC power supply is displayed.
Unit is ...	Indicates whether the power supply status is on or off.
Temperature readings	Indicates the temperature of air coming in and going out of the NPE Inlet, NPE Outlet, and CPU Die areas.
NPE Inlet measured at 25C/77F	Indicates that the temperature measurements at the inlet area of the chassis is 25C/77F, which is within normal operating range. System shutdown for NPE Inlet is 80C/176F.
NPE Outlet measured at 28C/82F	Indicates that the temperature measurements at the outlet area of the chassis is 28C/82F, which is within normal operating range. System shutdown for NPE Outlet is 84C/183F.
CPU Die measured at 56C/132F	Indicates that the temperature measurement at the CPU Die (internal silicon of the CPU) area of the chassis is 56C/132F, which is within normal operating range. System shutdown for CPU Die is 100C/212F.

Table 71 show environment all Field Descriptions for NPE-G2 in Cisco 7200 VXR Router

Field	Description
Voltage readings: +3.30 V measured at +3.32 V +1.50 V measured at +1.48 V	System voltage measurements that indicate the actual measured value for the specified power rail, which is named after the expected target value. For example, the +3.30 V rail, with an expected value of +3.30 V, actually measures at +3.32 V. This is within the target range. For example, the +1.50 V rail, with an expected value of +1.50 V, actually measures at +1.48 V. This is within the target range.
VDD_CPU measured at +1.28 V	Indicates +1.28 V is the measured voltage of the VDD_CPU power rail, which is within normal operating range. The expected value is 1.3 V.
VDD_MEM measured at +2.50 V	Indicates +2.50 V is the measured voltage of the VDD_MEM power rail, which is within normal operating range. The expected value is 2.5 V.
VTT measured at +1.25 V	Indicates +1.25 V is the measured voltage of the VTT power rail, which is within normal operating range. The expected value is 1.25 V.

In the following example, the **show environment last** command displays the previously saved measurements (readings) from the last environmental reading before the router was shut down. The command also displays the reason why the router was shut down, which was “power supply shutdown” in this case.

```
Router_npe-g2# show environment last
NPE Inlet previously measured at 26C/78F
NPE Outlet previously measured at 28C/82F
CPU Die previously measured at 56C/132F
+3.30 V previously measured at +3.32
+1.50 V previously measured at +1.48
+2.50 V previously measured at +2.46
+1.80 V previously measured at +1.75
+1.20 V previously measured at +1.17
VDD_CPU previously measured at +1.28
VDD_MEM previously measured at +2.50
VTT previously measured at +1.25
+3.45 V previously measured at +3.39
-11.95 previously measured at -11.93
+5.15 V previously measured at +4.96
+12.15 V previously measured at +12.18
last shutdown reason - power supply shutdown
```

Table 72 show environment last Field Descriptions for NPE-G2 in Cisco 7200 VXR Router

Field	Description
NPE Inlet previously measured at 26C/78F	The last measured temperature of the inlet air of the router prior to shutdown.
NPE Outlet previously measured at 28C/82F	The last measured temperature of the outlet air of the router prior to shutdown.
CPU Die previously measured at 56C/132F	The last measured temperature of the CPU Die prior to shutdown.

Table 72 show environment last Field Descriptions for NPE-G2 in Cisco 7200 VXR Router

Field	Description
+3.30 V previously measured at +3.32	The last measured voltage of the 3.30 V power rail prior to shutdown.
VDD_CPU previously measured at +1.28	The last measured voltage of the VDD_CPU power rail prior to shutdown.
VDD_MEM previously measured at +2.50	The last measured voltage of the VDD_MEM power rail prior to shutdown.
VTT previously measured at +1.25	The last measured voltage of the VTT power rail prior to shutdown.
last shutdown reason	Indicates the reason for the shutdown.

In the following example, the **show environment table** command displays threshold levels in a table format of the environmental monitor parameters. It displays the high warning, high critical, and high shutdown temperature thresholds of the NPE inlet, NPE outlet, and CPU Die. It also displays the low and high critical voltage thresholds, and low and high shut down voltage thresholds for the power rails on the NPE-G2 in the Cisco 7200 VXR.

Note The low range temperatures, such as the LowShut, LowCrit, and LowWarn temperature thresholds, are not checked and are not displayed on the NPE-G2. Also the warning voltage thresholds, such as LowWarn and HighWarn, are not checked and are not displayed on the NPE-G2.

```
Router_npe-g2# show environment table
Sample Point LowShut LowCrit LowWarn HighWarn HighCrit HighShut
NPE Inlet                           44C/111F 59C/138F
NPE Outlet                          49C/120F 64C/147F
CPU Die                             75C/167F 85C/185F
System shutdown for NPE Inlet is 80C/176F
System shutdown for NPE Outlet is 84C/183F
System shutdown for CPU Die is 100C/212F
+3.30 V      +2.30   +3.12                  +3.47    +4.29
+1.50 V      +1.05   +1.40                  +1.56    +1.95
+2.50 V      +1.71   +2.34                  +2.61    +3.28
+1.80 V      +1.25   +1.67                  +1.91    +2.34
+1.20 V      +0.82   +1.13                  +1.28    +1.56
VDD_CPU      +0.89   +1.21                  +1.36    +1.71
VDD_MEM      +1.71   +2.34                  +2.61    +3.28
VTT          +0.85   +1.17                  +1.32    +1.64
+3.45 V      +2.38   +3.28                  +3.63    +4.49
-11.95 V     -8.44   -11.56                 -12.84   -15.78
+5.15 V      +3.59   +4.88                  +5.42    +6.71
+12.15 V     +8.55   +11.48                 +12.77   +15.82
```

Table 73 show environment table Field Descriptions for NPE-G2 in Cisco 7200 VXR Router

Field	Description
Sample Point	This is the area for which temperature or system voltage thresholds are displayed.
LowShut	This is the LowShut voltage threshold. If the voltage value is below the LowShut threshold, the router shuts down. **Note** The LowShut temperature value is not checked and its threshold is not displayed on the NPE-G2.
LowCrit	This is the low critical voltage threshold. If the voltage value is below the LowCrit threshold, a critical message is issued for an out-of-tolerance voltage value. The system continues to operate. However, the system is approaching shutdown. **Note** The LowCrit temperature value is not checked and its threshold is not displayed on the NPE-G2.
LowWarn	The LowWarn temperature threshold and LowWarn voltage threshold are not checked and the threshold information is not displayed on the NPE-G2.
HighWarn	This is the HighWarn temperature threshold. If the temperature reaches the HighWarn threshold, a warning message is issued for an out-of-tolerance temperature value. The system continues to operate, but operator action is recommended to bring the system back to a normal state. **Note** The HighWarn voltage threshold is not checked and its threshold is not displayed on the NPE-G2.
HighCrit	This is the HighCrit temperature or voltage threshold. If the temperature or voltage reaches the HighCrit level, a critical message is issued. The system continues to operate. However, the system is approaching shutdown. **Note** Beware that if the temperature reaches or exceeds the HighShut value, a Shutdown message is issued and the router shuts down.
HighShut	This is the HighShut temperature or voltage threshold. If the temperature or voltage level reaches or exceeds the HighShut value, a Shutdown message is issued and the router shuts down.

Table 73 show environment table Field Descriptions for NPE-G2 in Cisco 7200 VXR Router

Field	Description
NPE Inlet 44C/111F 59C/138F	These are the HighWarn and HighCrit temperature thresholds, respectively, for the NPE Inlet. If the NPE Inlet temperature value reaches the HighWarn (44C/111F) and HighCrit (59C/138F) levels, warning and critical messages, respectively, are issued. If the value reaches 44C/111F or greater, you receive a warning message indicating HighWarn. The system continues to operate, but operator action is recommended to bring the system back to a normal state. If the value reaches 59C/138F or greater, you receive a critical (HighCrit) message instead, that indicates the system continues to operate, but the system is approaching shutdown. **Note** Beware if the temperature reaches or exceeds 80C/176F, which is the HighShut value, a Shutdown message is issued, and the NPE Inlet area shuts down.
NPE Outlet 49C/120F 64C/147F	These are the HighWarn and HighCrit temperature thresholds, respectively, for the NPE Outlet. If the NPE Outlet temperature value reaches the HighWarn (49C/120F) and HighCrit (64C/147F) levels, warning and critical messages, respectively, are issued. If the value reaches 49C/120F or greater, you receive a warning message indicating HighWarn. The system continues to operate, but operator action is recommended to bring the system back to a normal state. If the value reaches 64C/147F or greater, you receive a critical (HighCrit) message instead that indicates the system continues to operate, but the system is approaching shutdown. **Note** Beware if the temperature reaches or exceeds 84C/183F, which is the HighShut value, a Shutdown message is issued, and the NPE Outlet area shuts down.

Table 73 show environment table Field Descriptions for NPE-G2 in Cisco 7200 VXR Router

Field	Description
CPU Die 75C/167F 85C/185F	These are the HighWarn and HighCrit temperature thresholds, respectively, for the CPU Die. If the CPU Die temperature value reaches the HighWarn (75C/167F) and HighCrit (85C/185F) levels, warning and critical messages, respectively, are issued. If the value reaches 75C/167F or greater, you receive a warning message indicating HighWarn. The system continues to operate, but operator action is recommended to bring the system back to a normal state. If the value reaches 85C/185F or greater, you receive a critical (HighCrit) message instead, that indicates the system continues to operate, but the system is approaching shutdown. **Note** Beware if the temperature reaches or exceeds 100C/212F, which is the HighShut value, a Shutdown message is issued and the CPU Die area shuts down.
System shutdown for NPE Inlet is 80C/176F	This is the HighShut temperature threshold for the NPE Inlet. If the temperature reaches or exceeds 80C/176F, a Shutdown message is issued and the NPE Inlet area is shut down.
System shutdown for NPE Outlet is 84C/183F	This is the HighShut temperature threshold for the NPE Outlet. If the temperature reaches or exceeds 84C/183F, a Shutdown message is issued and the NPE Outlet area is shut down.
System shutdown for CPU Die is 100C/212F	This is the HighShut temperature threshold for the CPU Die. If the temperature reaches or exceeds 100C/212F, a Shutdown message is issued and the CPU Die area is shut down.
+3.30 V +2.30 +3.12 +3.47 +4.29	The voltage thresholds for the +3.30 V power rail are as follows: • +2.30 is the LowShut voltage threshold. • +3.12 is the LowCrit voltage threshold. • +3.47 is the HighCrit voltage threshold. • +4.29 is the HighShut voltage threshold. **Note** The LowWarn and HighWarn voltage levels are not checked and their thresholds are not displayed on the NPE-G2.

Table 73 show environment table Field Descriptions for NPE-G2 in Cisco 7200 VXR Router

Field	Description
VDD_CPU +0.89 +1.21 +1.36 +1.71	The voltage thresholds for the VDD_CPU power rail are as follows: • +0.89 is the LowShut voltage threshold. • +1.21 is the LowCrit voltage threshold. • +1.36 is the HighCrit voltage threshold. • +1.71 is the HighShut voltage threshold. **Note** The LowWarn and HighWarn voltage levels are not checked and their thresholds are not displayed on the NPE-G2.
VDD_MEM +1.71 +2.34 +2.61 +3.28	The voltage thresholds for the VDD_MEM power rail are as follows: • +1.71 is the LowShut voltage threshold. • +2.34 is the LowCrit voltage threshold. • +2.61 is the HighCrit voltage threshold. • +3.28 is the HighShut voltage threshold. **Note** The LowWarn and HighWarn voltage levels are not checked and their thresholds are not displayed on the NPE-G2.
VTT +0.85 +1.17 +1.32 +1.64	The voltage thresholds for the VTT power rail are as follows: • +0.85 is the LowShut voltage threshold. • +1.17 is the LowCrit voltage threshold. • +1.32 is the HighCrit voltage threshold. • +1.64 is the HighShut voltage threshold. **Note** The LowWarn and HighWarn voltage levels are not checked and their thresholds are not displayed on the NPE-G2.

Cisco 7000 Series Routers

The following are examples of messages that display on the system console when a measurement has exceeded an acceptable margin:

```
ENVIRONMENTAL WARNING: Air flow appears marginal.
ENVIRONMENTAL WARNING: Internal temperature measured 41.3(C)
ENVIRONMENTAL WARNING: +5 volt testpoint measured 5.310(V)
```

The system displays the following message if voltage or temperature exceed maximum margins:

```
SHUTDOWN: air flow problem
```

In the following example, there have been two intermittent power failures since a router was turned on, and the lower power supply is not functioning. The last intermittent power failure occurred on Monday, June 10, 1996, at 11:07 p.m.

```
7000# show environment all

Environmental Statistics
  Environmental status as of 23:19:47 UTC Wed Jun 12 1996
  Data is 6 second(s) old, refresh in 54 second(s)

  WARNING: Lower Power Supply is NON-OPERATIONAL

  Lower Power Supply:700W, OFF     Upper Power Supply: 700W, ON

  Intermittent Powerfail(s): 2     Last on 23:07:05 UTC Mon Jun 10 1996

  +12 volts measured at  12.05(V)
   +5 volts measured at   4.96(V)
  -12 volts measured at -12.05(V)
  +24 volts measured at  23.80(V)

  Airflow temperature measured at 38(C)
  Inlet temperature measured at 25(C)
```

Table 74 describes the significant fields shown in the display.

Table 74 show environment all Field Descriptions for the Cisco 7000 Series Routers

Field	Description
Environmental status as of...	Date and time of last query.
Data is..., refresh in...	Environmental measurements are output into a buffer every 60 seconds, unless other higher-priority processes are running.
WARNING:	If environmental measurements are not within specification, warning messages are displayed.
Lower Power Supply	Type of power supply installed and its status (on or off).
Upper Power Supply	Type of power supply installed and its status (on or off).
Intermittent Powerfail(s)	Number of power hits (not resulting in shutdown) since the system was last booted.
Voltage specifications	System voltage measurements.
Airflow and inlet temperature	Temperature of air coming in and going out.

The following example is for the Cisco 7000 series routers. The router retrieves the environmental statistics at the time of the last shutdown. In this example, the last shutdown was Friday, May 19, 1995, at 12:40 p.m., so the environmental statistics at that time are displayed.

```
Router# show environment last

Environmental Statistics
  Environmental status as of 14:47:00 UTC Sun May 21 1995
  Data is 6 second(s) old, refresh in 54 second(s)

  WARNING: Upper Power Supply is NON-OPERATIONAL

LAST Environmental Statistics
  Environmental status as of 12:40:00 UTC Fri May 19 1995
```

```
  Lower Power Supply: 700W, ON     Upper Power Supply: 700W, OFF

  No Intermittent Powerfails

  +12 volts measured at  12.05(V)
   +5 volts measured at   4.98(V)
  -12 volts measured at -12.00(V)
  +24 volts measured at  23.80(V)

 Airflow temperature measured at 30(C)
  Inlet  temperature measured at 23(C)
```

Table 75 describes the significant fields shown in the display.

Table 75 show environment last Field Descriptions for the Cisco 7000 Series Routers

Field	Description
Environmental status as of...	Date and time of last query.
Data is..., refresh in...	Environmental measurements are output into a buffer every 60 seconds, unless other higher-priority processes are running.
WARNING:	If environmental measurements are not within specification, warning messages are displayed.
LAST Environmental Statistics	Displays test point values at time of the last environmental shutdown.
Lower Power Supply Upper Power Supply	For the Cisco 7000 router, indicates the status of the two 700W power supplies. For the Cisco 7010 router, indicates the status of the single 600W power supply.

The following example shows sample output for the current environmental status in tables that list voltage and temperature parameters. There are three warning messages: one each about the lower power supply, the airflow temperature, and the inlet temperature. In this example, voltage parameters are shown to be in the normal range, airflow temperature is at a critical level, and inlet temperature is at the warning level.

```
Router> show environment table

Environmental Statistics
  Environmental status as of Mon 11-2-1992 17:43:36
  Data is 52 second(s) old, refresh in 8 second(s)

  WARNING: Lower Power Supply is NON-OPERATIONAL
  WARNING: Airflow temperature has reached CRITICAL level at 73(C)
  WARNING: Inlet temperature has reached WARNING level at 41(C)

Voltage Parameters:

 SENSE        CRITICAL               NORMAL                CRITICAL
-------|--------------------|-----------------------|--------------------

+12(V)                10.20        12.05(V)       13.80
 +5(V)                 4.74         4.98(V)        5.26
-12(V)               -10.20       -12.05(V)      -13.80
+24(V)                20.00        24.00(V)       28.00
```

```
Temperature Parameters:

 SENSE      WARNING       NORMAL       WARNING       CRITICAL       SHUTDOWN
-------|-------------|------------|-------------|--------------|-----------

Airflow             10            60             70    73(C)       88
Inlet               10            39           41(C)   46          64
```

Table 76 describes the significant fields shown in the display.

Table 76 show environment table Field Descriptions for the Cisco 7000 Series Routers

Field	Description
SENSE (Voltage Parameters)	Voltage specification for a DC line.
SENSE (Temperature Parameters)	Air being measured. Inlet measures the air coming in, and Airflow measures the temperature of the air inside the chassis.
WARNING	System is approaching an out-of-tolerance condition.
NORMAL	All monitored conditions meet normal requirements.
CRITICAL	Out-of-tolerance condition exists.
SHUTDOWN	Processor has detected condition that could cause physical damage to the system.

Cisco 7200 Series Routers

The system displays the following message if the voltage or temperature enters the “Warning” range:

```
%ENVM-4-ENVWARN: Chassis outlet 3 measured at 55C/131F
```

The system displays the following message if the voltage or temperature enters the “Critical” range:

```
%ENVM-2-ENVCRIT: +3.45 V measured at +3.65 V
```

The system displays the following message if the voltage or temperature exceeds the maximum margins:

```
%ENVM-0-SHUTDOWN: Environmental Monitor initiated shutdown
```

The following message is sent to the console if a power supply has been inserted or removed from the system. This message relates only to systems that have two power supplies.

```
%ENVM-6-PSCHANGE: Power Supply 1 changed from Zytek AC Power Supply to removed
```

The following message is sent to the console if a power supply has been powered on or off. In the case of the power supply being shut off, this message can be due to the user shutting off the power supply or to a failed power supply. This message relates only to systems that have two power supplies.

```
%ENVM-6-PSLEV: Power Supply 1 state changed from normal to shutdown
```

The following is sample output from the **show environment all** command on the Cisco 7200 series routers when there is a voltage warning condition in the system:

```
7200# show environment all

Power Supplies:
        Power supply 1 is unknown. Unit is off.
        Power supply 2 is Zytek AC Power Supply. Unit is on.

Temperature readings:
        chassis inlet    measured at 25C/77F
        chassis outlet 1 measured at 29C/84F
```

```
        chassis outlet 2 measured at 36C/96F
        chassis outlet 3 measured at 44C/111F
Voltage readings:
        +3.45 V measured at +3.83 V:Voltage in Warning range!
        +5.15 V measured at +5.09 V
        +12.15  measured at +12.42 V
        -11.95  measured at -12.10 V
```

Table 77 describes the significant fields shown in the display.

Table 77 show environment all Field Descriptions for the Cisco 7200 Series Router

Field	Description
Power Supplies	Current condition of the power supplies including the type and whether the power supply is on or off.
Temperature readings	Current measurements of the chassis temperature at the inlet and outlet locations.
Voltage readings	Current measurement of the power supply test points.

The following example is for the Cisco 7200 series routers. This example shows the measurements immediately before the last shutdown and the reason for the last shutdown (if appropriate).

```
7200# show environment last

   chassis inlet      previously measured at 27C/80F
   chassis outlet 1   previously measured at 31C/87F
   chassis outlet 2   previously measured at 37C/98F
   chassis outlet 3   previously measured at 45C/113F
   +3.3 V             previously measured at 4.02
   +5.0 V             previously measured at 4.92
   +12.0 V            previously measured at 12.65
   -12.0 V            previously measured at 11.71

last shutdown reason - power supply shutdown
```

Table 78 describes the significant fields shown in the display.

Table 78 show environment last Field Descriptions for the Cisco 7200 Series Router

Field	Description
chassis inlet	Temperature measurements at the inlet area of the chassis.
chassis outlet	Temperature measurements at the outlet areas of the chassis.
voltages	Power supply test point measurements.
last shutdown reason	Possible shutdown reasons are power supply shutdown, critical temperature, and critical voltage.

The following example is for the Cisco 7200 series routers. This information lists the temperature and voltage shutdown thresholds for each sensor.

```
7200# show environment table

Sample Point      LowCritical    LowWarning     HighWarning    HighCritical
chassis inlet                                   40C/104F       50C/122F
chassis outlet 1                                43C/109F       53C/127F
chassis outlet 2                                75C/167F       75C/167F
```

```
chassis outlet 3                                    55C/131F        65C/149F
+3.45 V           +2.76          +3.10              +3.80           +4.14
+5.15 V           +4.10          +4.61              +5.67           +6.17
+12.15 V          +9.72          +10.91             +13.37          +14.60
-11.95 V          -8.37          -9.57              -14.34          -15.53
Shutdown system at 70C/158F
```

Table 79 describes the significant fields shown in the display.

Table 79 show environment table Field Descriptions for the Cisco 7200 Series Router

Field	Description
Sample Point	Area for which measurements are taken.
LowCritical	Level at which a critical message is issued for an out-of-tolerance voltage condition. The system continues to operate; however, the system is approaching shutdown.
LowWarning	Level at which a warning message is issued for an out-of-tolerance voltage condition. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
HighWarning	Level at which a warning message is issued. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
HighCritical	Level at which a critical message is issued. For the chassis, the router is shut down. For the power supply, the power supply is shut down.
Shutdown system at	The system is shut down if the specified temperature is met.

Cisco 7500 Series Routers

The sample output for the Cisco 7500 series routers may vary depending on the specific model (for example, the Cisco 7513 router). The following is sample output from the **show environment all** command on the Cisco 7500 series routers:

```
7500# show environment all

Arbiter type 1, backplane type 7513 (id 2)
Power supply #1 is 1200W AC (id 1), power supply #2 is removed (id 7)
Active fault conditions: none
Fan transfer point: 100%
Active trip points: Restart_Inhibit
15 of 15 soft shutdowns remaining before hard shutdown

                        1
              0123456789012
Dbus slots:   X     XX    X

card         inlet      hotpoint      exhaust
RSP(6)     35C/95F     47C/116F      40C/104F
RSP(7)     35C/95F     43C/109F      39C/102F

Shutdown temperature source is 'hotpoint' on RSP(6), requested RSP(6)

+12V measured at 12.31
+5V measured at 5.21
-12V measured at -12.07
+24V measured at 22.08
```

```
+2.5 reference is 2.49

PS1 +5V Current      measured at 59.61 A (capacity 200 A)
PS1 +12V Current     measured at 5.08 A (capacity 35 A)
PS1 -12V Current     measured at 0.42 A (capacity 3 A)
PS1 output is 378 W
```

Table 80 describes the significant fields shown in the display.

Table 80 show environment all Field Descriptions for the Cisco 7500 Series Routers

Field	Description
Arbiter type 1	Numbers indicating the arbiter type and backplane type.
Power supply	Number and type of power supply installed in the chassis.
Active fault conditions:	Lists any fault conditions that exist (such as power supply failure, fan failure, and temperature too high).
Fan transfer point:	Software-controlled fan speed. If the router is operating below its automatic restart temperature, the transfer point is reduced by 10 percent of the full range each minute. If the router is at or above its automatic restart temperature, the transfer point is increased in the same way.
Active trip points:	Compares temperature sensor against the values displayed at the bottom of the **show environment table** command output.
15 of 15 soft shutdowns remaining	When the temperature increases above the “board shutdown” level, a soft shutdown occurs (that is, the cards are shut down, and the power supplies, fans, and CI continue to operate). When the system cools to the restart level, the system restarts. The system counts the number of times this occurs and keeps the up/down cycle from continuing forever. When the counter reaches zero, the system performs a hard shutdown, which requires a power cycle to recover. The soft shutdown counter is reset to its maximum value after the system has been up for 6 hours.
Dbus slots:	Indicates which chassis slots are occupied.
card, inlet, hotpoint, exhaust	Temperature measurements at the inlet, hotpoint, and exhaust areas of the card. The (6) and (7) indicate the slot numbers. Dual Route Switch Processor (RSP) chassis can show two RSPs.
Shutdown temperature source	Indicates which of the three temperature sources is selected for comparison against the “shutdown” levels listed with the **show environment table** command.
Voltages (+12V, +5V, -12V, +24V, +2.5)	Voltages measured on the backplane.
PS1	Current measured on the power supply.

The following example is for the Cisco 7500 series routers. This example shows the measurements immediately before the last shutdown.

```
7500# show environment last

 RSP(4) Inlet       previously measured at 37C/98F
 RSP(4) Hotpoint    previously measured at 46C/114F
```

```
RSP(4) Exhaust      previously measured at 52C/125F
+12 Voltage         previously measured at 12.26
+5 Voltage          previously measured at 5.17
-12 Voltage         previously measured at -12.03
+24 Voltage         previously measured at 23.78
```

Table 81 describes the significant fields shown in the display.

Table 81 show environment last Field Descriptions for the Cisco 7500 Series Routers

Field	Description
RSP(4) Inlet, Hotpoint, Exhaust	Temperature measurements at the inlet, hotpoint, and exhaust areas of the card.
Voltages	Voltages measured on the backplane.

The following example is for the Cisco 7500 series router. This information lists the temperature and voltage thresholds for each sensor. These thresholds indicate when error messages occur. There are two level of messages: warning and critical.

```
7500# show environment table

Sample Point      LowCritical    LowWarning     HighWarning    HighCritical
RSP(4) Inlet                                    44C/111F       50C/122F
RSP(4) Hotpoint                                 54C/129F       60C/140F
RSP(4) Exhaust
+12 Voltage       10.90          11.61          12.82          13.38
+5 Voltage        4.61           4.94           5.46           5.70
-12 Voltage       -10.15         -10.76         -13.25         -13.86
+24 Voltage       20.38          21.51          26.42          27.65
2.5 Reference                    2.43           2.51
Shutdown boards at           70C/158F
Shutdown power supplies at   76C/168F
Restart after shutdown below 40C/104F
```

Table 82 describes the significant fields shown in the display.

Table 82 show environment table Field Descriptions for the Cisco 7500 Series Routers

Field	Description
Sample Point	Area for which measurements are taken.
LowCritical	Level at which a critical message is issued for an out-of-tolerance voltage condition. The system continues to operate; however, the system is approaching shutdown.
LowWarning	Level at which a warning message is issued for an out-of-tolerance voltage condition. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
HighWarning	Level at which a warning message is issued. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
HighCritical	Level at which a critical message is issued. For the chassis, the router is shut down. For the power supply, the power supply is shut down.

Table 82 show environment table Field Descriptions for the Cisco 7500 (continued)Series

Field	Description
Shutdown boards at	The card is shut down if the specified temperature is met.
Shutdown power supplies at	The system is shut down if the specified temperature is met.
Restart after shutdown	The system will restart when the specified temperature is met.

Cisco AS5300 Series Access Servers

In the following example, keywords and options are limited according to the physical characteristics of the system is shown:

```
as5300# show environment ?

  all    All environmental monitor parameters
  last   Last environmental monitor parameters
  table  Temperature and voltage ranges
  |      Output modifiers
  <cr>

as5300# show environment table

%This option not available on this platform
```

Cisco 12000 Series GSRs

The following examples are for the Cisco 12000 series GSRs.

The following is sample output from the **show environment** command for a Cisco 12012 router. Slots 0 through 11 are the line cards, slots 16 and 17 are the clock and scheduler cards, slots 18 through 20 are the switch fabric cards, slots 24 through 26 are the power supplies, and slots 28 and 29 are the blowers. An “NA” in the table means that no values were returned. In some cases it is because the equipment is not supported for that environmental parameter (for example, the power supply and blowers in slots 24, 26, 28, and 29 do not have a 3V power supply, so an NA is displayed).

```
Router# show environment

Slot #  3V      5V      MBUS 5V Hot Sensor      Inlet Sensor
        (mv)    (mv)    (mv)     (deg C)          (deg C)
0       3300    4992    5040       42.0            37.0
2       3296    4976    5136       40.0            33.0
4       3280    4992    5120       38.5            31.5
7       3280    4984    5136       42.0            32.0
9       3292    4968    5160       39.5            31.5
11      3288    4992    5152       40.0            30.5
16      3308    NA      5056       42.5            38.0
17      3292    NA      5056       40.5            36.5
18      3304    NA      5176       36.5            35.0
19      3300    NA      5184       37.5            33.5
20      3304    NA      5168       36.5            34.0
24      NA      5536    5120       NA              31.5
26      NA      5544    5128       NA              31.5
28      NA      NA      5128       NA              NA
29      NA      NA      5104       NA              NA

Slot #  48V     AMP_48
        (Volt)  (Amp)
24      46      12
26      46      19
```

```
Slot #  Fan 0    Fan 1    Fan 2
        (RPM)    (RPM)    (RPM)
28      2160     2190     2160
29      2130     2190     2070
```

Table 83 describes the significant fields shown and lists the equipment supported by each environmental parameter. “NA” indicates that the reading could not be obtained, so the command should be run again.

Table 83 show environment Field Descriptions for the Cisco 12000 Series Routers

Field	Description
Slot #	Slot number of the equipment. On the Cisco 12012 router, slots 0 through 11 are the line cards, slots 16 and 17 are the clock and scheduler cards, slots 18 through 20 are the switch fabric cards, slots 24 through 27 are the power supplies, and slots 28 and 29 are the blowers.
3V (mv)	Measures the 3V power supply on the card. The 3V power supply is on the line cards, GRP card, clock and scheduler cards, and switch fabric cards.
5V (mv)	Measures the 5V power supply on the card. The 5V power supply is on the line cards, GRP card, and power supplies.
MBUS 5V (mv)	Measures the 5V MBus on the card. The 5V MBus is on all equipment.
Hot Sensor (deg C)	Measures the temperature at the hot sensor on the card. The hot sensor is on the line cards, GRP card, clock and scheduler cards, switch fabric cards, and blowers.
Inlet Sensor (deg C)	Measures the current inlet temperature on the card. The inlet sensor is on the line cards, GRP card, clock and scheduler cards, switch fabric cards, and power supplies.
48V (Volt)	Measures the DC power supplies.
AMP_48 (Amp)	Measures the AC power supplies.
Fan 0, Fan 1, Fan 2 (RPM)	Measures the fan speed in rotations per minute.

The following is sample output from the **show environment all** command for the Cisco 12008 router. Slots 0 through 7 are the line cards, slots 16 and 17 are the clock scheduler cards (the clock scheduler cards control the fans), slots 18 through 20 are the switch fabric cards, and slots 24 and 26 are the power supplies. The Cisco 12008 router does not support slots 25, 27, 28, and 29. An “NA” in the table means that no values were returned. In some cases it is because the equipment is not supported for that environmental parameter (for example, the power supplies in slots 24 and 26 do not have a hot sensor, so an NA is displayed).

```
Router# show environment all

Slot #  Hot Sensor      Inlet Sensor
          (deg C)         (deg C)
2           31.0            22.0
5           33.5            26.5
16          25.5            21.5
18          22.0            21.0
19          22.5            21.0
24          NA              29.5
26          NA              24.5
```

```
Slot #  3V      5V      MBUS 5V
        (mv)    (mv)    (mv)
2       3292    5008    5136
5       3292    5000    5128
16      3272    NA      5128
18      3300    NA      5128
19      3316    NA      5128

Slot #  5V      MBUS 5V 48V     AMP_48
        (mv)    (mv)    (Volt)  (Amp)
24      0       5096    3       0
26      5544    5144    47      3

Slot #  Fan Information
16      Voltage 16V Speed slow: Main Fans Ok Power Supply fans Ok

Alarm Indicators
No alarms

Slot #  Card Specific Leds
16      Mbus OK SFCs Failed
18      Mbus OK
19      Mbus OK
24      Input Failed
26      Input Ok
```

The following is sample output from the **show environment table** command for a Cisco 12012 router. The **show environment table** command lists the warning, critical, and shutdown limits on your system and includes the GRP card and line cards (slots 0 to 15), clock and scheduler cards (slots 16 and 17), switch fabric cards (slots 18 to 20), and blowers.

```
Router# show environment table

Hot Sensor Temperature Limits (deg C):
                        Warning Critical Shutdown
GRP/GLC (Slots 0-15)       40      46      57
CSC     (Slots 16-17)      46      51      65
SFC     (Slots 18-20)      41      46      60

Inlet Sensor Temperature Limits (deg C):
                        Warning Critical Shutdown
GRP/GLC (Slots 0-15)       35      40      52
CSC     (Slots 16-17)      40      45      59
SFC     (Slots 18-20)      37      42      54

3V Ranges (mv):
                           Warning         Critical        Shutdown
                        Below   Above    Below  Above    Below  Above
GRP/GLC (Slots 0-15)     3200    3400     3100   3500     3050   3550
CSC     (Slots 16-17)    3200    3400     3100   3500     3050   3550
SFC     (Slots 18-20)    3200    3400     3100   3500     3050   3550

5V Ranges (mv):
                           Warning         Critical        Shutdown
                        Below   Above    Below  Above    Below  Above
GRP/GLC (Slots 0-15)     4850    5150     4750   5250     4680   5320

MBUS_5V Ranges (mv):
                           Warning         Critical        Shutdown
                        Below   Above    Below  Above    Below  Above
GRP/GLC (Slots 0-15)     5000    5250     4900   5350     4750   5450
CSC     (Slots 16-17)    4820    5150     4720   5250     4750   5450
SFC     (Slots 17-20)    5000    5250     4900   5350     4750   5450
```

```
Blower Operational Range (RPM):

Top Blower:
                Warning    Critical
                 Below      Below
Fan 0           1000        750
Fan 1           1000        750
Fan 2           1000        750

Bottom Blower:
                Warning    Critical
                 Below      Below
Fan 0           1000        750
Fan 1           1000        750
Fan 2           1000        750
```

The following is sample output from the **show environment leds** command for a Cisco 12012 router. The **show environment leds** command lists the status of the MBus LEDs on the clock, scheduler, and the switch fabric cards.

```
Router# show environment leds

16 leds Mbus OK
18 leds Mbus OK
19 leds Mbus OK
20 leds Mbus OK
```

Cisco 7304 Router

The following is sample output from the **show environment all** command on a Cisco 7304 router with modular services cards (MSCs) and shared port adapters (SPAs) installed:

```
Router# show environment all

Power Supplies:
        Power supply 1 is AC power supply. Unit is on.
        Power supply 2 is empty.
Fans:
        Fan 1 is on.
        Fan 2 is on.
Temperature readings:
  Active RP (NPEG100, slot 0):
        npeg100 outlet       measured at 29C/84F
        npeg100 inlet        measured at 34C/93F
        npeg100 hotspot      measured at 35C/95F
  Line card (7304-MSC-100, slot 4):
        7304-MSC-100         measured at 32C/89F
  Card in subslot 4/0:
        SPA-4FE-7304 inlet   measured at 31C/87F
        SPA-4FE-7304 outlet  measured at 32C/89F
Voltage readings:
  Active RP (NPEG100, slot 0):
        npe outlet  2.5  V   measured at  2.496 V
        npe outlet  3.3  V   measured at  3.302 V
        npe outlet  5.0  V   measured at  4.992 V
        npe outlet 12.0  V   measured at 11.812 V
        npe outlet  3.3c V   measured at  3.199 V
        npe inlet   1.5  V   measured at  1.494 V
        npe outlet  1.8  V   measured at  1.790 V
        npe outlet  1.2  V   measured at  1.198 V
        npe outlet  1.2c V   measured at  1.198 V
```

```
  Line card (7304-MSC-100, slot 4):
        7304-MSC-100 0.75 V  measured at  0.733 V
        7304-MSC-100 1.5 V   measured at  1.494 V
        7304-MSC-100 2.5 V   measured at  2.483 V
        7304-MSC-100 3.3 V   measured at  3.250 V
        7304-MSC-100 12 V    measured at 11.937 V
  Card in subslot 4/0:
        SPA-4FE-7304 1.8V    measured at  1.802 V
        SPA-4FE-7304 1.5V    measured at  1.503 V
        SPA-4FE-7304 2.5V    measured at  2.474 V
        SPA-4FE-7304 3.3V    measured at  3.252 V
        SPA-4FE-7304 1.0V    measured at  1.015 V
Envm stats saved 13 time(s) since reload
```

The following is sample output from the **show environment last** command on a Cisco 7304 router with MSCs and SPAs installed and an NSE-100:

```
Router# show environment last

Temperature information:
  NSE board:
        nse outlet           is unmeasured
        nse inlet            is unmeasured
        nse hotspot          is unmeasured
        nse db               is unmeasured
  Line card slot 4:
        7304-MSC-100         is unmeasured
  Card in subslot 4/1:
        SPA-4FE-7304 inlet   previously measured at 30C/86F
        SPA-4FE-7304 outlet  previously measured at 32C/89F
Voltage information:
  NSE board:
        nse outlet 1.8 V     is unmeasured
        nse outlet 2.5 V     is unmeasured
        nse outlet 3.3 V     is unmeasured
        nse outlet 5 V       is unmeasured
        nse outlet 12 V      is unmeasured
        nse inlet 1.8 V      is unmeasured
        nse inlet 3.3 V      is unmeasured
        nse inlet 1.5 V      is unmeasured
        nse hotspot 1.8 V    is unmeasured
        nse db 1.65 V        is unmeasured
        nse db 1.8 V         is unmeasured
  Line card slot 4:
        7304-MSC-100 0.75 V  is unmeasured
        7304-MSC-100 1.5 V   is unmeasured
        7304-MSC-100 2.5 V   is unmeasured
        7304-MSC-100 3.3 V   is unmeasured
        7304-MSC-100 12 V    is unmeasured
  Card in subslot 4/1:
        SPA-4FE-7304 1.8V    previously measured at  1.823 V
        SPA-4FE-7304 1.5V    previously measured at  1.512 V
        SPA-4FE-7304 2.5V    previously measured at  2.504 V
        SPA-4FE-7304 3.3V    previously measured at  3.258 V
        SPA-4FE-7304 1.0V    previously measured at  1.014 V
Last shutdown reason: shutdown undefined
```

The following is sample output from the **show environment table** command on a Cisco 7304 router with MSCs and SPAs installed:

```
Router# show environment table

Temperature tables:
  Active RP (NPEG100, slot 0):
        Sample Point        HighWarning     HighCritical HighShutdown
        npeg100 outlet      53C/127F        68C/154F        73C/163F
        npeg100 inlet       53C/127F        68C/154F        73C/163F
        npeg100 hotspot     53C/127F        68C/154F        73C/163F
  Line card (7304-MSC-100, slot 4):
        Sample Point        HighWarning     HighCritical HighShutdown
        7304-MSC-100        48C/118F        63C/145F        68C/154F
  Card in subslot 4/0:
        Sample Point        HighWarning     HighCritical HighShutdown
        SPA-4FE-7304 inlet  52C/125F        67C/152F        72C/161F
        SPA-4FE-7304 outlet 52C/125F        67C/152F        72C/161F
Voltage tables:
  Active RP (NPEG100, slot 0):
        Sample Point       LowShut  LowCrit  LowWarn  HighWarn HighCrit HighShut
        npe outlet  2.5  V 2.275 V  2.375 V  2.400 V  2.600 V  2.625 V  2.725 V
        npe outlet  3.3  V 3.003 V  3.135 V  3.185 V  3.415 V  3.465 V  3.597 V
        npe outlet  5.0  V 4.500 V  4.750 V  4.800 V  5.200 V  5.250 V  5.500 V
        npe outlet 12.0  V 9.960 V 10.440 V 10.800 V 13.200 V 13.560 V 14.040 V
        npe outlet  3.3c V 3.003 V  3.135 V  3.185 V  3.415 V  3.465 V  3.597 V
        npe inlet   1.5  V 1.350 V  1.425 V  1.455 V  1.545 V  1.575 V  1.650 V
        npe outlet  1.8  V 1.620 V  1.710 V  1.728 V  1.872 V  1.890 V  1.980 V
        npe outlet  1.2  V 1.128 V  1.164 V  1.167 V  1.233 V  1.236 V  1.272 V
        npe outlet  1.2c V 1.128 V  1.164 V  1.167 V  1.233 V  1.236 V  1.272 V
  Line card (7304-MSC-100, slot 4):
        Sample Point       LowShut  LowCrit  LowWarn  HighWarn HighCrit HighShut
        7304-MSC-100 0.75  0.559 V  0.600 V  0.600 V  0.900 V  0.900 V  0.941 V
        7304-MSC-100 1.5 V 1.350 V  1.440 V  1.455 V  1.545 V  1.560 V  1.650 V
        7304-MSC-100 2.5 V 2.250 V  2.375 V  2.400 V  2.600 V  2.625 V  2.750 V
        7304-MSC-100 3.3 V 2.970 V  3.135 V  3.168 V  3.432 V  3.465 V  3.630 V
        7304-MSC-100 12 V  9.960 V 10.440 V 10.800 V 13.200 V 13.560 V 14.040 V
  Card in subslot 4/0:
        Sample Point       LowShut  LowCrit  LowWarn  HighWarn HighCrit HighShut
        SPA-4FE-7304 1.8V  1.620 V  1.710 V  1.728 V  1.872 V  1.890 V  1.980 V
        SPA-4FE-7304 1.5V  1.350 V  1.425 V  1.440 V  1.560 V  1.575 V  1.650 V
        SPA-4FE-7304 2.5V  2.250 V  2.375 V  2.400 V  2.600 V  2.625 V  2.750 V
        SPA-4FE-7304 3.3V  2.970 V  3.135 V  3.168 V  3.432 V  3.465 V  3.630 V
        SPA-4FE-7304 1.0V  0.900 V  0.950 V  0.960 V  1.040 V  1.050 V  1.100 V
```

Table 84 describes the significant fields shown in the display.

Table 84 show environment table Field Descriptions for the Cisco 7304 Router

Field	Description
Sample Point	Area for which measurements are taken.
LowShut	Lowest level for an out-of-tolerance condition at which the system shuts itself down. For out-of-tolerance conditions with SPA environment variables, only the SPA is shut down.
LowCrit/LowCritical	Level at which a critical message is issued for an out-of-tolerance voltage condition. The system continues to operate; however, the system is approaching shutdown.

Table 84 show environment table Field Descriptions for the Cisco 7304 Router (continued)

Field	Description
LowWarn/LowWarning	Level at which a warning message is issued for an out-of-tolerance voltage condition. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
HighWarn/HighWarning	Level at which a warning message is issued for an out-of-tolerance voltage condition. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
HighCrit/HighCritical	Level at which a critical message is issued for an out-of-tolerance voltage condition. The system continues to operate; however, the system is approaching shutdown.
HighShut/HighShutdown	Highest level for an out-of-tolerance condition at which the system shuts itself down. For out-of-tolerance conditions with SPA environment variables, only the SPA is shut down.

Related Commands

Command	Description
snmp-server enable traps envmon	Controls (enables or disables) environmental monitoring SNMP notifications.
snmp-server host	Specifies how SNMP notifications should be sent (as traps or informs), the version of SNMP to use, the security level of the notifications (for SNMPv3), and the recipient (host) of the notifications.

show environment alarm

To display the information about the environmental alarm, use the **show environment alarm** command in user EXEC or privileged EXEC mode.

show environment alarm [{**status** | **threshold**} [***frutype***]]

Syntax Description

status	(Optional) Displays the operational FRU status.
threshold	(Optional) Displays the preprogrammed alarm thresholds.
frutype	(Optional) Alarm type; valid values are **all**, **backplane**, **clock** *number*, **earl** *slot*, **fan-tray**, **module** *slot*, **rp** *slot*, **power-supply** *number*, **supervisor** *slot*, and **vtt** *number*. See the Note for a list of valid values for *number* and *slot*.

Defaults

If you do not enter a *frutype*, all the information about the environmental alarm status is displayed.

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Valid values for the *frutype* are as follows:

- **clock** *number*—1 and 2.
- **earl** *slot*—See the Note for valid values.
- **module** *slot*—See the Note for valid values.
- **rp** *slot*—See the Note for valid values.
- **power-supply** *number*—1 and 2.
- **supervisor** *slot*—See the Note for valid values.
- **vtt** *number*—1 to 3.

Note The *slot* argument designates the module and port number. Valid values for *slot* depend on the chassis and module that are used. For example, if you have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the slot number are from 1 to 13 and valid values for the port number are from 1 to 48.

Examples

This example shows how to display all the information about the status of the environmental alarm:

```
Router> show environment alarm threshold

environmental alarm thresholds:

power-supply 1 fan-fail: OK
  threshold #1 for power-supply 1 fan-fail:
    (sensor value != 0) is system minor alarm
power-supply 1 power-output-fail: OK
  threshold #1 for power-supply 1 power-output-fail:
    (sensor value != 0) is system minor alarm
fantray fan operation sensor: OK
  threshold #1 for fantray fan operation sensor:
    (sensor value != 0) is system minor alarm
operating clock count: 2
  threshold #1 for operating clock count:
    (sensor value < 2) is system minor alarm
  threshold #2 for operating clock count:
    (sensor value < 1) is system major alarm
operating VTT count: 3
  threshold #1 for operating VTT count:
    (sensor value < 3) is system minor alarm
  threshold #2 for operating VTT count:
    (sensor value < 2) is system major alarm
VTT 1 OK: OK
  threshold #1 for VTT 1 OK:
    (sensor value != 0) is system minor alarm
VTT 2 OK: OK
  threshold #1 for VTT 2 OK:
    (sensor value != 0) is system minor alarm
VTT 3 OK: OK
  threshold #1 for VTT 3 OK:
    (sensor value != 0) is system minor alarm
clock 1 OK: OK
  threshold #1 for clock 1 OK:
    (sensor value != 0) is system minor alarm
clock 2 OK: OK
  threshold #1 for clock 2 OK:
    (sensor value != 0) is system minor alarm
module 1 power-output-fail: OK
  threshold #1 for module 1 power-output-fail:
    (sensor value != 0) is system major alarm
module 1 outlet temperature: 21C
  threshold #1 for module 1 outlet temperature:
    (sensor value > 60) is system minor alarm
  threshold #2 for module 1 outlet temperature:
    (sensor value > 70) is system major alarm
module 1 inlet temperature: 25C
  threshold #1 for module 1 inlet temperature:
    (sensor value > 60) is system minor alarm
  threshold #2 for module 1 inlet temperature:
    (sensor value > 70) is system major alarm
module 1 device-1 temperature: 30C
  threshold #1 for module 1 device-1 temperature:
    (sensor value > 60) is system minor alarm
  threshold #2 for module 1 device-1 temperature:
    (sensor value > 70) is system major alarm
module 1 device-2 temperature: 29C
  threshold #1 for module 1 device-2 temperature:
    (sensor value > 60) is system minor alarm
  threshold #2 for module 1 device-2 temperature:
    (sensor value > 70) is system major alarm
module 5 power-output-fail: OK
```

```
  threshold #1 for module 5 power-output-fail:
    (sensor value != 0) is system major alarm
module 5 outlet temperature: 26C
  threshold #1 for module 5 outlet temperature:
    (sensor value > 60) is system minor alarm
  threshold #2 for module 5 outlet temperature:
    (sensor value > 75) is system major alarm
module 5 inlet temperature: 23C
  threshold #1 for module 5 inlet temperature:
    (sensor value > 50) is system minor alarm
  threshold #2 for module 5 inlet temperature:
    (sensor value > 65) is system major alarm
EARL 1 outlet temperature: N/O
  threshold #1 for EARL 1 outlet temperature:
    (sensor value > 60) is system minor alarm
  threshold #2 for EARL 1 outlet temperature:
    (sensor value > 75) is system major alarm
EARL 1 inlet temperature: N/O
  threshold #1 for EARL 1 inlet temperature:
    (sensor value > 50) is system minor alarm
  threshold #2 for EARL 1 inlet temperature:
    (sensor value > 65) is system major alarm
Router>
```

Related Commands

Command	Description
show environment status	Displays the information about the operational FRU status.
show environment temperature	Displays the current temperature readings.

show environment cooling

To display the information about the cooling parameter, use the **show environment cooling** command in user EXEC or privileged EXEC mode.

show environment cooling

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is not supported in Cisco 7600 series routers that are configured with a Supervisor Engine 2.

Examples

This example shows how to display the information about the cooling parameter:

```
Router> show environment cooling

fan-tray 1:
  fan-tray 1 fan-fail: failed
fan-tray 2:
  fan 2 type: FAN-MOD-9
  fan-tray 2 fan-fail: OK
chassis cooling capacity: 690 cfm
ambient temperature: 55C
chassis per slot cooling capacity: 75 cfm

  module 1 cooling requirement: 70 cfm
  module 2 cooling requirement: 70 cfm
  module 5 cooling requirement: 30 cfm
  module 6 cooling requirement: 70 cfm
  module 8 cooling requirement: 70 cfm
  module 9 cooling requirement: 30 cfm
Router>
```

Related Commands

Command	Description
hw-module fan-tray version	Sets the fan-type (high or low power) version.

show environment status

To display the information about the operational FRU status, use the **show environment status** command in user EXEC or privileged EXEC mode.

show environment status [***frutype***]

Syntax Description

frutype	(Optional) FRU type; see the Note for a list of valid values.

Defaults

If you do not enter a *frutype*, all FRU status information is displayed.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(18)SXF	The output of the **show environment status power-supply** command was changed to include information about the high-capacity power supplies.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Valid values for the *frutype* are as follows:

- **all**—No arguments.
- **backplane**—No arguments.
- **clock** *number*—1 and 2.
- **earl** *slot*—See the Note for valid values.
- **fan-tray**—No arguments.
- **module** *slot*—See the Note for valid values.
- **power-supply** *number*—1 and 2.
- **rp** *slot*—See the Note for valid values.
- **supervisor** *slot*—See the Note for valid values.
- **vtt** *number*—1 to 3.

Note The *slot* argument designates the module and port number. Valid values for *slot* depend on the chassis and module that are used. For example, if you have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the slot number are from 1 to 13 and valid values for the port number are from 1 to 48.

Examples

This example shows how to display the information about the environmental status:

```
Router> show environment status

backplane:
  operating clock count: 2
  operating VTT count: 3
fan-tray:
  fantray fan operation sensor: OK
VTT 1:
  VTT 1 OK: OK
VTT 2:
  VTT 2 OK: OK
VTT 3:
  VTT 3 OK: OK
clock 1:
  clock 1 OK: OK, clock 1 clock-inuse: not-in-use
clock 2:
  clock 2 OK: OK, clock 2 clock-inuse: in-use
power-supply 1:
  power-supply 1 fan-fail: OK
  power-supply 1 power-output-fail: OK
module 1:
  module 1 power-output-fail: OK
  module 1 outlet temperature: 21C
  module 1 inlet temperature: 25C
  module 1 device-1 temperature: 30C
  module 1 device-2 temperature: 29C
  EARL 1 outlet temperature: N/O
  EARL 1 inlet temperature: N/O
module 5:
  module 5 power-output-fail: OK
  module 5 outlet temperature: 26C
  module 5 inlet temperature: 23C
  module 5 device-1 temperature: 26C
  module 5 device-2 temperature: 27C
Router>
```

This example shows how to display the information about the high-capacity power supplies:

```
Route># show environment status power-supply 2

power-supply 2:
  power-supply 2 fan-fail: OK
  power-supply 2 power-input 1: none
  power-supply 2 power-input 2: AC low
  power-supply 2 power-input 3: AC high
  power-supply 2 power-input 4: AC high
  power-supply 2 power-output: low (mode 1)
  power-supply 2 power-output-fail: OK
```

Table 85 describes the fields that are shown in the example.

Table 85 show environment status Command Output Fields

Field	Description
operating clock count	Physical clock count.
operating VTT count	Physical VTT count.
fan tray fan operation sensor	System fan tray failure status. The failure of the system fan tray is indicated as a minor alarm.

Table 85 show environment status Command Output Fields (continued)

Field	Description
VTT 1, VTT2, and VTT3	Status of the chassis backplane power monitors that are located on the rear of the chassis, under the rear cover. Operation of at least two VTTs is required for the system to function properly. A minor system alarm is signaled when one of the three VTTs fails. A major alarm is signaled when two or more VTTs fail and the supervisor engine is accessible through the console port.
clock # clock-inuse	Clock status. Failure of either clock is considered to be a minor alarm.
power-supply # fan-fail	Fan failure. Fan failures on either or both (if any) power supplies are considered minor alarms.
power-input-fail	Power input failure status (none, AC high, AC low).
power-output-fail	Power output failure status (high, low).
outlet temperature	Exhaust temperature value.
inlet temperature	Intake temperature value.
device-1 and device-2 temperature	Two devices that measure the internal temperature on each indicated module. The temperature shown indicates the temperature that the device is recording. The devices are not placed at an inlet or an exit but are additional reference points.

Related Commands

Command	Description
show environment alarm	Displays the information about the environmental alarm.
show environment temperature	Displays the current temperature readings.

show environment temperature

To display the current temperature readings, use the **show environment temperature** command in user EXEC or privileged EXEC mode.

show environment temperature [***frutype***]

Syntax Description

frutype	(Optional) Field replaceable unit (FRU) type; see the "Usage Guidelines" section for a list of valid values.

Defaults

If you do not enter a *frutype*, the module and EARL temperature readings are displayed.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17a)SX	The **show environment temperature module** command output was updated to include the following information: • The name of the ASIC of this sensor. • The names of the ASIC are listed if there is more than one ASIC. • The type of sensor is listed if there is more than one sensor on the ASIC. • Current temperature. • Major/minor threshold as read in the IDPROM. • Status of whether the current temperature has exceeded any temperature thresholds.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Valid values for the *frutype* are as follows:

- **earl** *slot*—See the Note below for valid values.
- **module** *slot*—See the Note below for valid values.
- **rp** *slot*—See the the Note below for valid values.
- **vtt** *number*—1 to 3.
- **clock** *number*—1 and 2.

Note The *slot* argument designates the module and port number. Valid values for *slot* depend on the chassis and module that are used. For example, if you have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the slot number are from 1 to 13 and valid values for the port number are from 1 to 48.

The **show environment temperature module** command output includes the updated information after an SCP response is received.

In the output display, the following applies:

- N/O means not operational—The sensor is broken, returning impossible values.
- N/A means not available—The sensor value is presently not available; try again later.
- VTT 1, 2, and 3 refer to the power monitors that are located on the chassis backplane under the rear cover.

Examples

This example shows how to display the temperature information for a specific module:

```
Router> show environment temperature module 5

module 5 outlet temperature: 34C
  module 5 inlet temperature: 27C
  module 5 device-1 temperature: 42C
  module 5 device-2 temperature: 41C
  module 5 asic-1 (SSO-1) temp: 29C
  module 5 asic-2 (SSO-2) temp: 29C
  module 5 asic-3 (SSO-3) temp: 29C
  module 5 asic-4 (SSO-4) temp: 28C
  module 5 asic-5 (SSA-1) temp: 29C
  module 5 asic-6 (HYPERION-1) temp: 29C
Router>
```

This example shows how to display the temperature readings for all modules:

```
Router> show environment temperature

VTT 1 outlet temperature: 25C
  VTT 2 outlet temperature: 24C
  VTT 3 outlet temperature: 28C
  module 1 outlet temperature: 24C
  module 1 device-2 temperature: 29C
  RP 1 outlet temperature: 25C
  RP 1 inlet temperature: 29C
  EARL 1 outlet temperature: 25C
  EARL 1 inlet temperature: 22C
  module 5 outlet temperature: 27C
  module 5 inlet temperature: 22C
Router>
```

Table 86 describes the fields that are shown in the example.

Table 86 show environment temperature Command Output Fields

Field	Description
outlet temperature	Exhaust temperature value.

Table 86 show environment temperature Command Output Fields

Field	Description
inlet temperature	Intake temperature value.
device-1 and device-2 temperature	Two devices that measure the internal temperature on the indicated module. The temperature shown indicates the temperature that the device is recording. The devices are not placed at an inlet or an exit but are additional reference points.

Related Commands

Command	Description
show environment alarm	Displays the information about the environmental alarm.
show environment status	Displays the information about the operational FRU status.

show errdisable detect

To display the error-disable detection status, use the **show errdisable detect** command in user EXEC or privileged EXEC mode.

show errdisable detect

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17b)SXA	This command was changed to include packet-buffer error status information.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to display the error-disable detection status:

```
Router> show errdisable detect

ErrDisable Reason    Detection status
-----------------    ----------------
udld                 Enabled
bpduguard            Enabled
rootguard            Enabled
packet-buffer-err    Enabled
pagp-flap            Enabled
dtp-flap             Enabled
link-flap            Enabled
Router#
```

Related Commands

Command	Description
errdisable detect cause	Enables the error-disable detection.

show errdisable recovery

To display the information about the error-disable recovery timer, use the **show errdisable recovery** command in EXEC mode.

show errdisable recovery

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to display the information about the error-disable recovery timer:

```
Router# show errdisable recovery

ErrDisable Reason    Timer Status
-----------------    --------------
udld                 Enabled
bpduguard            Enabled
rootguard            Enabled
pagp-flap            Enabled
dtp-flap             Enabled
link-flap            Enabled

Timer interval:300 seconds

Interfaces that will be enabled at the next timeout:

Interface    Errdisable reason    Time left(sec)
---------    -----------------    --------------
Fa9/4           link-flap             279
```

Related Commands

Command	Description
errdisable recovery	Configures the recovery mechanism variables.
show interfaces status	Displays the interface status or a list of interfaces in an error-disabled state on LAN ports only.

show fastblk

To display fast block memory information, use the **show fastblk** command in privileged EXEC mode.

show fastblk [**detailed**]

Syntax Description

detailed	(Optional) Displays detailed allocated fast block memory pool information.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(22)T	This command was introduced.

Usage Guidelines

Use this command to display allocated fast block memory pool details. When no memory pools are allocated, the “no fastblk memory pools allocated” message is displayed.

Examples

The following is sample output from the **show fastblk** command using the **detailed** keyword. The fields are self-explanatory.

```
Router# show fastblk detailed

Pool name: SCTP ApplReq      flags:DYN_POOL
 total = 400 inuse = 0, free = 400, max = 0
 increment = 200, threshold = 100, hist max = 400
 alloc failures = 0, sub-pool creation failures = 0
 subpool: blks = 0x62968A2C, total = 400, inuse= 0, free = 400
          delete count = 0, flags:
Pool name: SCTP BufSegHdr      flags:DYN_POOL
 total = 9000 inuse = 0, free = 9000, max = 0
 increment = 4500, threshold = 6750, hist max = 9000
 alloc failures = 0, sub-pool creation failures = 0
 subpool: blks = 0x62B8E2F4, total = 9000, inuse= 0, free = 9000
          delete count = 0, flags:
Pool name: SCTP DestAddr      flags:DYN_POOL
 total = 80 inuse = 0, free = 80, max = 0
 increment = 40, threshold = 20, hist max = 80
 alloc failures = 0, sub-pool creation failures = 0
 subpool: blks = 0x62972534, total = 80, inuse= 0, free = 80
          delete count = 0, flags:
Pool name: SCTP Addr      flags:DYN_POOL POOL_HAS_GRWN
 total = 200 inuse = 100, free = 100, max = 0
 increment = 50, threshold = 50, hist max = 200
 alloc failures = 31, sub-pool creation failures = 0
 subpool: blks = 0x6271B6D0, total = 50, inuse= 0, free = 50
          delete count = 0, flags: DYN_SUBPOOL
 subpool: blks = 0x6271D730, total = 50, inuse= 0, free = 50
          delete count = 0, flags: DYN_SUBPOOL
 subpool: blks = 0x6297680C, total = 100, inuse= 100, free = 0
          delete count = 0, flags:
Pool name: SCTP ChunkDesc      flags:DYN_POOL
```

```
 total = 9000 inuse = 0, free = 9000, max = 0
 increment = 4500, threshold = 6750, hist max = 9000
 alloc failures = 0, sub-pool creation failures = 0
 subpool: blks = 0x62BE6160, total = 1471, inuse= 0, free = 1471
          delete count = 0, flags:
 subpool: blks = 0x62D8D768, total = 7529, inuse= 0, free = 7529
          delete count = 0, flags:
Pool name: SCTP DgramHdr      flags:DYN_POOL
 total = 9000 inuse = 0, free = 9000, max = 0
 increment = 4500, threshold = 6750, hist max = 9000
 alloc failures = 0, sub-pool creation failures = 0
 subpool: blks = 0x62BFE848, total = 9000, inuse= 0, free = 9000
          delete count = 0, flags:
Pool name: SCTP Assoc      flags:DYN_POOL
 total = 100 inuse = 0, free = 100, max = 0
 increment = 50, threshold = 25, hist max = 100
 alloc failures = 0, sub-pool creation failures = 0
 subpool: blks = 0x62E0A778, total = 100, inuse= 0, free = 100
          delete count = 0, flags:
Pool name: SCTP Instance      flags:DYN_POOL
 total = 200 inuse = 50, free = 150, max = 0
 increment = 100, threshold = 50, hist max = 200
 alloc failures = 0, sub-pool creation failures = 0
 subpool: blks = 0x62C33434, total = 200, inuse= 50, free = 150
          delete count = 0, flags:
Pool name: SCTP Assoc Stats      flags:DYN_POOL
 total = 100 inuse = 0, free = 100, max = 0
 increment = 50, threshold = 25, hist max = 100
 alloc failures = 0, sub-pool creation failures = 0
 subpool: blks = 0x62C39EA0, total = 100, inus
```

show file descriptors

To display a list of open file descriptors, use the **show file descriptors** command in EXEC mode.

show file descriptors

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.3 AA	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

File descriptors are the internal representations of open files. You can use this command to learn if another user has a file open.

Examples

The following is sample output from the **show file descriptors** command:

```
Router# show file descriptors

File Descriptors:

   FD  Position  Open  PID  Path
    0    187392  0001    2  tftp://dirt/hampton/c4000-i-m.a
    1    184320  030A    2  flash:c4000-i-m.a
```

Table 87 describes the fields shown in the display.

Table 87 show file descriptors Field Descriptions

Field	Description
FD	File descriptor. The file descriptor is a small integer used to specify the file once it has been opened.
Position	Byte offset from the start of the file.
Open	Flags supplied when opening the file.
PID	Process ID of the process that opened the file.
Path	Location of the file.

show file information

To display information about a file, use the **show file information** command in EXEC mode.

show file information *file-url*

Syntax Description

file-url	The URL of the file to display.

Command Modes

EXEC

Command History

Release	Modification
11.3 AA	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

The following is sample output from the **show file information** command:

```
Router# show file information tftp://dirt/hampton/c2500-j-l.a

tftp://dirt/hampton/c2500-j-l.a:
  type is image (a.out) [relocatable, run from flash]
  file size is 8624596 bytes, run size is 9044940 bytes [8512316+112248+420344]
  Foreign image

Router# show file information slot0:c7200-js-mz

slot0:c7200-js-mz:
  type is image (elf) []
  file size is 4770316 bytes, run size is 4935324 bytes
  Runnable image, entry point 0x80008000, run from ram

Router1# show file information nvram:startup-config

nvram:startup-config:
  type is ascii text
```

Table 88 describes the possible file types.

Table 88 Possible File Types

Types	Description
image (a.out)	Runnable image in a.out format.
image (elf)	Runnable image in elf format.
ascii text	Configuration file or other text file.
coff	Runnable image in coff format.
ebcdic	Text generated on an IBM mainframe.

Table 88 Possible File Types (continued)

Types	Description
lzw compression	Lzw compressed file.
tar	Text archive file used by the Channel Interface Processor (CIP).

show file systems

To list available file systems, use the **show file systems** command in privileged EXEC mode.

show file systems

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.3AA	This command was introduced.
12.3(7)T	This command was enhanced to display information about the ATA ROM monitor library (monlib) file.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI and the output was modified.
12.4(24)T	This command was integrated into Cisco IOS Release 12.4(24)T and the output was modified.

Usage Guidelines

Use this command to learn the alias names, the Prefixes column in the output of the file systems that your router supports.

Examples

The following is sample output from the **show file systems** command:

```
Router# show file systems

File Systems:

        Size(b)       Free(b)      Type  Flags  Prefixes
              -             -       ram     rw   tmp:
              -             -    opaque     rw   system:
       42541056      42541056      disk     rw   disk1: disk1:0:#
*     512065536      30834688      disk     rw   disk0:#
       65536000      19811932     flash     rw   bootflash: sup-bootflash:
              -             -    opaque     ro   ivfs:
         129004        102228     nvram     rw   const_nvram:
      125802334             0    opaque     ro   microcode: sup-microcode:
              0     609689428    opaque     rw   image: sup-image:
              -             -    opaque     rw   null:
              -             -    opaque     ro   tar:
        1964024       1949453     nvram     rw   nvram:
              -             -   network     rw   rcp:
              -             -   network     rw   tftp:
              -             -   network     rw   http:
              -             -   network     rw   ftp:
```

```
          -            -      disk     rw   disk1:1:
          -            -      disk     rw   disk1:2:
  512065536     30842880      disk     rw   slavedisk0:#
          -            -      disk     rw   slavedisk1: slavedisk1:0:
   65536000     19328264     flash     rw   slavesup-bootflash:
    1964024      1919757     nvram     rw   slavenvram:
     129004       102228     nvram     rw   slaveconst_nvram:
   65536000     65536000     flash     rw   slavebootflash:
          -            -     nvram     rw   slavercsf:
          -            -    opaque     rw   slavesystem:
          -            -      disk     rw   slavedisk1:1:
          -            -      disk     rw   slavedisk1:2:
          -            -      disk     rw   slavedisk1:3:
```

Table 89 describes the significant fields shown in the display.

Table 89 show file systems Field Descriptions

Field	Description
Size(b)	Amount of memory in the file system (in bytes).
Free(b)	Amount of free memory in the file system (in bytes).
Type	Type of file system. The file system can be one of the following types: • disk—The file system is for a rotating medium. • flash—The file system is for a flash memory device. • network—The file system is a network file system (TFTP, rcp, FTP, and so on). • nvram—The file system is for an NVRAM device. • opaque—The file system is a locally generated “pseudo” file system (for example, the “system”) or a download interface, such as brimux. • ram—The file system is for a RAM or EPROM device. • tty—The file system is for a collection of terminal devices. • unknown—The file system is of unknown type.
Flags	Permissions for the file system. The file system can have one of the following permission states: • ro—The file system is Read Only. • wo—The file system is Write Only. • rw—The file system is Read/Write.
Prefixes	Alias for the file system. Prefixes marked with a pound symbol (#) indicate a bootable disk.

show flh-log

The **show flh-log** command has been replaced by the **more flh:logfile** command. See the description of the **more flh:logfile** command for more information.

show fm inspect

To display the list and status of the access control lists (ACLs) and ports on which context based access control (CBAC) is configured, use the **show fm inspect** command in user EXEC or privileged EXEC mode.

show fm inspect [detail | **interface** *type mod/port***]**

Syntax Description

detail	(Optional) Displays all of the flow information.
interface *type*	Interface type; possible valid values are **ethernet**, **fastethernet**, **gigabitethernet**, **tengigabitethernet**, **port-channel**, **pos**, **atm**, **null**, **tunnel**, and **ge-wan**.
mod/port	Module and port number.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If you can configure a VLAN access control list (VACL) on the port before you configure CBAC, the status displayed is INACTIVE; otherwise, it is ACTIVE. If policy feature card (PFC) resources are exhausted, the command displays BRIDGE and is followed by the number of failed currently active NetFlow requests that have been sent to the MSFC2 for processing.

The **show fm inspect** command output includes this information:

- interface:—Interface on which the internet protocol (IP) inspect feature is enabled
- (direction)—Direction in which the IP inspect feature is enabled (IN or OUT)
- acl name:—Name that is used to identify packets being inspected
- status:—(ACTIVE or INACTIVE) displays if HW-assist is provided for this interface+direction (ACTIVE=hardware assisted or INACTIVE)

The optional **detail** keyword displays the ACEs that are part of the ACL that is used for IP inspect on the given interface direction.

Examples

This example shows how to display the list and status of CBAC-configured ACLs and ports:

```
Router> show fm inspect
```

```
interface:Vlan305(in) status :ACTIVE
         acl name:deny
           interfaces:
              Vlan305(out):status ACTIVE
```

Related Commands

Command	Description
show fm summary	Displays a summary of FM Information.

show fm interface

To display the detailed information about the feature manager on a per-interface basis, use the **show fm interface** command in user EXEC or privileged EXEC mode.

show fm interface {**interface** *type mod/port* | **null** *interface-number* | **port-channel** *number* | **vlan** *vlan-id*}

Syntax Description

type	Interface type; possible valid values are **ethernet**, **fastethernet**, **gigabitethernet**, **tengigabitethernet**, **port-channel**, **pos**, **atm**, **null**, **tunnel**, and **ge-wan**.
mod/port	Module and port number.
null *interface-number*	Specifies the null interface; the valid value is **0**.
port-channel *number*	Specifies the channel interface; valid values are a maximum of 64 values ranging from 1 to 282.
vlan *vlan-id*	Specifies the virtual local area network (VLAN); valid values are from 1 to 4094.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17a)SX	The order of the information that is displayed in the **show fm interface vlan** command output was changed.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **pos**, **atm**, and **ge-wan** keywords are supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2.

The *interface-number* argument designates the module and port number. Valid values for *interface-number* depend on the specified interface type and the chassis and module that are used. For example, if you specify a Gigabit Ethernet interface and have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the module number are from 1 to 13 and valid values for the port number are from 1 to 48.

The **port-channel** *number* values from 257 to 282 are supported on the CSM and the FWSM only.

Examples

This example shows how to display the detailed information about the feature manager on a specified interface:

```
Router> show fm interface fastethernet 2/26

Interface:FastEthernet2/26 IP is enabled
  hw[EGRESS] = 1, hw[INGRESS] = 0
  hw_force_default[EGRESS] = 0, hw_force_default[INGRESS] = 1
  mcast = 0
  priority = 2
  reflexive = 0
  inbound label:24
        protocol:ip
          feature #:1
          feature id:FM_IP_ACCESS
          ACL:113
                vmr IP value #1:0, 0, 0, 0, 0, 0, 0, 6 - 1
                vmr IP mask #1:0, 0, FFFF, FFFF, 0, 0, 0, FF
                vmr IP value #2:642D4122, 0, 0, 0, 1, 0, 0, 6 - 1
                vmr IP mask #2:FFFFFFFF, 0, 0, 0, 1, 0, 0, FF
                vmr IP value #3:0, 64020302, 0, 0, 6, 0, 0, 6 - 1
                vmr IP mask #3:0, FFFFFFFF, 0, 0, 6, 0, 0, FF
                vmr IP value #4:0, 64020302, 0, 0, A, 0, 0, 6 - 1
                vmr IP mask #4:0, FFFFFFFF, 0, 0, A, 0, 0, FF
                vmr IP value #5:0, 64020302, 0, 0, 12, 0, 0, 6 - 1
                vmr IP mask #5:0, FFFFFFFF, 0, 0, 12, 0, 0, FF
                vmr IP value #6:0, 0, 0, 0, 0, 0, 0, 0 - 2
                vmr IP mask #6:0, 0, 0, 0, 0, 0, 0, 0
  outbound label:3
        protocol:ip
          feature #:1
          feature id:FM_IP_WCCP
          Service ID:0
          Service Type:0
Router>
```

This example shows how to display the detailed information about the feature manager on a specific VLAN:

```
Router> show fm interface vlan 21

Interface: Vlan21 IP is disabled
hw_state[INGRESS] = not reduced, hw_state[EGRESS] = not reduced
mcast = 0
priority = 0
flags = 0x0
inbound label: 8
Feature IP_VACL:
-------------------------------------------------------------------------------
FM_FEATURE_IP_VACL_INGRESS i/f: Vl21 map name: test
===============================================================================
-------------------------------------------------------------
IP Seq. No: 10 Seq. Result : VACL_ACTION_FORWARD_CAPTURE
-------------------------------------------------------------
DPort - Destination Port SPort - Source Port Pro - Protocol
X - XTAG TOS - TOS Value Res - VMR Result
RFM - R-Recirc. Flag MRTNP - M-Multicast Flag R - Reflexive flag
- F-Fragment flag - T-Tcp Control N - Non-cachable
- M-More Fragments - P-Mask Priority(H-High, L-Low)
Adj. - Adj. Index T - M(Mask)/V(Value) FM - Flow Mask
NULL - Null FM SAO - Source Only FM DAO - Dest. Only FM
SADA - Sour.& Dest. Only VSADA - Vlan SADA Only FF - Full Flow
VFF - Vlan Full Flow F-VFF - Either FF or VFF A-VSD - Atleast VSADA
```

```
A-FF - Atleast FF A-VFF - Atleast VFF A-SON - Atleast SAO
A-DON - Atleast DAO A-SD - Atleast SADA SHORT - Shortest
A-SFF - Any short than FF A-EFF - Any except FF A-EVFF- Any except VFF
A-LVFF- Any less than VFF ERR - Flowmask Error
+----+-+---------------+---------------+-----+-----+---+---+-+---+-----+----+------+
|Indx|T| Dest Ip Addr | Source Ip Addr|DPort|SPort|Pro|RFM|X|ToS|MRTNP|Adj.| FM |
+----+-+---------------+---------------+-----+-----+---+---+-+---+-----+----+------+
1 V 22.2.2.2 21.1.1.1 0 0 0 --- 0 0 ----L ---- SHORT
M 255.255.255.255 255.255.255.255 0 0 0 000 0 0
TM_PERMIT_RESULT
2 V 32.2.2.2 31.1.1.1 0 0 0 --- 0 0 ----L ---- SHORT
M 255.255.255.255 255.255.255.255 0 0 0 000 0 0
TM_PERMIT_RESULT
3 V 0.0.0.0 0.0.0.0 0 0 0 --- 0 0 ----L ---- SHORT
M 0.0.0.0 0.0.0.0 0 0 0 000 0 0
TM_L3_DENY_RESULT

------------------------------------------------------------
IP Seq. No: 65536 Seq. Result : VACL_ACTION_DROP
------------------------------------------------------------
+----+-+---------------+---------------+-----+-----+---+---+-+---+-----+----+------+
|Indx|T| Dest Ip Addr | Source Ip Addr|DPort|SPort|Pro|RFM|X|ToS|MRTNP|Adj.| FM |
+----+-+---------------+---------------+-----+-----+---+---+-+---+-----+----+------+
1 V 0.0.0.0 0.0.0.0 0 0 0 --- 0 0 ----L ---- SHORT
M 0.0.0.0 0.0.0.0 0 0 0 000 0 0
TM_PERMIT_RESULT
Router>
```

Related Commands

Command	Description
show fm summary	Displays a summary of FM Information.

show fm reflexive

To display the information about the reflexive entry for the dynamic feature manager, use the **show fm reflexive** command in privileged EXEC mode.

show fm reflexive

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to display the information about the reflexive entry for the dynamic feature manager:

```
Router# show fm reflexive

Reflexive hash table:
        Vlan613:refacl, OUT-REF, 64060E0A, 64060D0A, 0, 0, 7, 783, 6

Router#
```

show fm summary

To display a summary of feature manager information, use the **show fm summary** command in user EXEC or privileged EXEC mode.

show fm summary

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to display a summary of feature manager information:

```
Router> show fm summary

Current global ACL merge algorithm:BDD
Interface:FastEthernet2/10
  ACL merge algorithm used:
    inbound direction:  ODM
    outbound direction:BDD
  TCAM screening for features is ACTIVE outbound
  TCAM screening for features is ACTIVE inbound
Interface:FastEthernet2/26
  ACL merge algorithm used:
    inbound direction:  ODM
    outbound direction:BDD
  TCAM screening for features is ACTIVE outbound
  TCAM screening for features is INACTIVE inbound
.
.
.
Router>
```

Related Commands

Command	Description
show fm interface	Displays the detailed information about the feature manager on a per-interface basis.

show funi

To display the frame-based user-network interface information, use the **show funi** command in user EXEC or privileged EXEC mode.

show funi {**arp-server** [**atm** *atm-interface-number*] | **class-links** {*vpi/vci-value* | *vci-value* | *connection-name*} | **ilmi-configuration** | **ilmi-status** [**atm** *atm-interface-number*] | **map** | **pvc** [*vpi/vci-value* | *vci-value* | *connection-name* | **dbs** | **ppp**] | **route** | **traffic** | **vp** [*atm-vpi-number*] | **vc** [*atm-vcd-number* | *connection-name* | **detail** [**prefix** {**interface** | **vc_name** | **vcd** | **vpi/vci**}] | **interface atm** *atm-interface-number* [*connection-name* | **detail** [**prefix** {**interface** | **vc_name** | **vcd** | **vpi/vci**}]] | **range** *lower-vcd-limit upper-vcd-limit* [*connection-name* | **detail** [**prefix** {**interface** | **vc_name** | **vcd** | **vpi/vci**}]] | **interface atm** *atm-interface-number* [*connection-name* | **detail** [**prefix** {**interface** | **vc_name** | **vcd** | **vpi/vci**}]] | **summary** [**atm** *atm-interface-number*]]}

Syntax Description

arp-server	Displays Asynchronous Transfer Mode (ATM) address resolution protocol server table information.
atm *atm-interface-number*	(Optional) Specifies the ATM interface and the ATM interface number.
class-links	Displays ATM VC-class links information.
vpi/vci-value	(Optional) Specifies the Virtual Path Identifier or Virtual Channel Identifier (VPI/VCI) value (slash is mandatory).
vci-value	(Optional) Specifies the virtual circuit interface value.
connection-name	(Optional) Specifies the connection name.
ilmi-configuration	Displays the top-level Integrated Local Management Interface (ILMI) information.
ilmi-status	Display ATM interface ILMI information.
map	Displays ATM static mapping information.
pvc	Displays ATM Permanent Virtual Circuits (PVC) information.
dbs	Displays the DBS information on a virtual circuit.
ppp	Displays the PPP over ATM information
route	Displays ATM route information.
traffic	Displays ATM statistics.
vp	Displays ATM virtual path information.
atm-vpi-number	(Optional) Specifies the VPI number.
vc	Displays ATM virtual circuit information.
atm-vcd-number	(Optional) Specifies the ATM Virtual Circuit Descriptor (VCD) number.
detail	Displays the detailed information of all VCs.
prefix	(Optional) Specifies the prefix for the output ordering.
interface	Specifies the type of interface. When this keyword is used along with the **prefix** keyword it displays the interface values in ascending order.
vc_name	Displays the VC names in the alphabetical order.
vcd	Displays the VCD value in the ascending order.
vpi/vci	Displays the VPI/VCI value in the ascending order.

range	Displays the range of VCs.
lower-vcd-limit	Specifies the lower limit VCD value.
upper-vcd-limit	Specifies the upper limit VCD value.
summary	Display summary of VCs.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.4(24)T	This command was introduced.
Cisco IOS XE 2.3	This command was implemented on Cisco ASR 1000 series routers.

Usage Guidelines

Use this command to display the frame-based user-network interface information with the available keywords and arguments.

Examples

The following is sample output from the **show funi traffic** command. The fields are self-explanatory:

```
Router# show funi traffic

Input OAM Queue: 0/4136 (size/max)
0 Input packets
0 Output packets
0 Broadcast packets
0 Packets received on non-existent VC
0 Packets attempted to send on non-existent VC
0 OAM cells received
F5 InEndloop: 0, F5 InSegloop: 0, F5 InAIS: 0, F5 InRDI: 0
F5 InEndcc: 0, F5 InSegcc: 0,
F4 InEndloop: 0, F4 InSegloop: 0, F4 InAIS: 0, F4 InRDI: 0
0 OAM cells sent
F5 OutEndloop: 0, F5 OutSegloop: 0,     F5 OutAIS: 0    F5 OutRDI: 0
F5 OutEndcc: 0, F5 OutSegcc: 0,
F4 OutEndloop: 0, F4 OutSegloop: 0,     F4 OutRDI: 0    F4 OutAIS: 0
0 OAM cell drops
```

The following is sample out from the **show funi vc detail prefix interface** command. The fields are self-explanatory:

```
Router# show funi vc detail prefix interface

Description: N/A
ATM2/0 ATM2/0: VCD: 1, VPI: 1, VCI: 100
ATM2/0 UBR, PeakRate: 0 (0 cps)
ATM2/0 AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0, Encapsize: 12
ATM2/0 OAM frequency: 0 second(s)
ATM2/0 InARP frequency: 15 minutes(s)
ATM2/0 Transmit priority 6
ATM2/0 InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InCells: 0, OutCells: 0
ATM2/0 InPRoc: 0, OutPRoc: 0, Broadcasts: 0
ATM2/0 InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
```

```
ATM2/0 InPktDrops: 0, OutPktDrops: 0
ATM2/0 CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0, LengthViolation: 0, CPIE0
ATM2/0 Out CLP=1 Pkts: 0, Cells: 0
ATM2/0 OAM cells received: 0
ATM2/0 OAM cells sent: 0
ATM2/0 Status: INACTIVE
Description: N/A
ATM2/0 ATM2/0: VCD: 2, VPI: 1, VCI: 101
ATM2/0 UBR, PeakRate: 0 (0 cps)
ATM2/0 AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0, Encapsize: 12
ATM2/0 OAM frequency: 0 second(s)
```

The following is sample out from the **show funi vc detail prefix vc_name** command. The fields are self-explanatory:

```
Router# show funi vc detail prefix vc_name

Description: N/A
ATM2/0: VCD: 1, VPI: 1, VCI: 100
UBR, PeakRate: 0 (0 cps)
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0, Encapsize: 12
OAM frequency: 0 second(s)
InARP frequency: 15 minutes(s)
Transmit priority 6
InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InCells: 0, OutCells: 0
InPRoc: 0, OutPRoc: 0, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
InPktDrops: 0, OutPktDrops: 0
CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0, LengthViolation: 0, CPIErrors: 0
Out CLP=1 Pkts: 0, Cells: 0
OAM cells received: 0
OAM cells sent: 0
Status: INACTIVE
Description: N/A
ATM2/0: VCD: 2, VPI: 1, VCI: 101
UBR, PeakRate: 0 (0 cps)
AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0, Encapsize: 12
OAM frequency: 0 second(s)
InARP frequency: 15 minutes(s)
```

The following is sample out from the **show funi vc detail prefix pvi/vci** command. The fields are self-explanatory:

```
Router# show funi vc detail prefix vpi/vci

Description: N/A
VPI/VCI: 1/100 ATM2/0: VCD: 1, VPI: 1, VCI: 100
VPI/VCI: 1/100 UBR, PeakRate: 0 (0 cps)
VPI/VCI: 1/100 AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0, Encapsize: 2
VPI/VCI: 1/100 OAM frequency: 0 second(s)
VPI/VCI: 1/100 InARP frequency: 15 minutes(s)
VPI/VCI: 1/100 Transmit priority 6
VPI/VCI: 1/100 InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InCells: 0, OutCells: 0
VPI/VCI: 1/100 InPRoc: 0, OutPRoc: 0, Broadcasts: 0
VPI/VCI: 1/100 InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
VPI/VCI: 1/100 InPktDrops: 0, OutPktDrops: 0
VPI/VCI: 1/100 CrcErrors: 0, SarTimeOuts: 0, OverSizedSDUs: 0, LengthViolation:0
VPI/VCI: 1/100 Out CLP=1 Pkts: 0, Cells: 0
VPI/VCI: 1/100 OAM cells received: 0
VPI/VCI: 1/100 OAM cells sent: 0
VPI/VCI: 1/100 Status: INACTIVE
Description: N/A
```

```
VPI/VCI: 1/101 ATM2/0: VCD: 2, VPI: 1, VCI: 101
VPI/VCI: 1/101 UBR, PeakRate: 0 (0 cps)
VPI/VCI: 1/101 AAL5-LLC/SNAP, etype:0x0, Flags: 0xC20, VCmode: 0x0, Encapsize: 2
```

show identity policy

To display identity policy information in a tabular form, use the **show identity policy** command in privileged EXEC mode.

show identity policy [*name*]

Syntax Description

name	(Optional) Name of the identity policy.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(18)SX	This command was introduced.

Examples

The following is output from the **show identity policy** command:

```
Router# show identity policy
Policy Name            ACL             Redirect ACL            Redirect URL
================================================================================
p1                     some-acl        NONE                    NONE
p2                     another-acl     redirect-acl            http://www.foo.com/bar.html
Router#
```

The following is output for the policy named p2:

```
Router# show identity policy p2
Name: p2
Description: NONE
Access-Group: another-acl
URL-Redirect Match ACL: redirect-acl
URL-Redirect URL: http://www.foo.com/bar.html
Router#
```

Related Commands

Command	Description
show running-configuration	Displays the running configuration for a router.

show identity profile

To display identity profile information in a tabular form, use the **show identity profile** command in privileged EXEC mode.

show identity profile [**default** | **dot1x** | **eapoudp**]

Syntax Description

default	(Optional) Displays default identity profile information.
dot1x	(Optional) Displays 802.1x identity profile information.
eapoudp	(Optional) Displays EAPoUDP identity profile information.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(18)SX	This command was introduced.

Examples

The following is output from the **show identity profile** command:

```
Router# show running identity profile
Service Type: default

Default Authorized Device Policy: NONE
Default Non-Authorized Device Policy: NONE
Device / Address / Mask              Allowed        Policy
============================================================
Cisco IP Phone                       Authorized     DEFAULT

Service Type: dot1x

Default Authorized Device Policy: NONE
Default Non-Authorized Device Policy: NONE

Device / Address / Mask              Allowed        Policy
============================================================
0001.0203.0405 /   ffff.ffff.ffff    Authorized     p2

Service Type: eapoudp
Device / Address / Mask              Allowed        Policy
============================================================
10.0.0.0        / 255.0.0.0          Authorized     p1
Router#
```

Related Commands

Command	Description
show running-configuration	Displays the running configuration for a router.

show gsr

To display hardware information on the Cisco 12000 series Gigabit Switch Routers (GSRs), use the **show gsr** command in EXEC mode.

show gsr [**chassis-info** [**details**]]

Syntax Description

chassis-info	(Optional) Displays backplane NVRAM information.
details	(Optional) In addition to the information displayed, this option includes hexadecimal output of the backplane NVRAM information.

Command Modes

EXEC

Command History

Release	Modification
11.2GS	This command was introduced to support the Cisco 12000 series GSRs.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to determine the type of hardware installed in your Cisco 12000 series GSR router.

Examples

The following is sample output from the **show gsr** command for a Cisco 12012 router. This command shows the type and state of the card installed in the slot.

```
Router# show gsr

Slot 0  type  = Route Processor
        state = IOS Running  MASTER
Slot 7  type  = 1 Port Packet Over SONET OC-12c/STM-4c
        state = Card Powered
Slot 16 type  = Clock Scheduler Card
        state = Card Powered  PRIMARY CLOCK
```

The following is sample output from the **show gsr chassis-info** command for a Cisco 12012 router:

```
Router# show gsr chassis-info

Backplane NVRAM [version 0x20] Contents -
  Chassis: type 12012 Fab Ver: 1
    Chassis S/N: ZQ24CS3WT86MGVHL
  PCA: 800-3015-1  rev: A0  dev: 257  HW ver: 1.0
    Backplane S/N: A109EXPR75FUNYJK
  MAC Addr: base 0000.EAB2.34FF  block size: 1024
  RMA Number: 0x5F-0x2D-0x44  code: 0x01  hist: 0x1A
```

show gt64010 (7200)

To display all GT64010 internal registers and interrupt status on the Cisco 7200 series routers, use the **show gt64010** command in EXEC mode.

show gt64010

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command displays information about the CPU interface, DRAM/device address space, device parameters, direct memory access (DMA) channels, timers and counters, and protocol control information (PCI) internal registers. The information is generally useful for diagnostic tasks performed by technical support only.

Examples

The following is a partial sample output for the **show gt64010** command:

```
Router# show gt64010

GT64010 Channel 0 DMA:
 dma_list=0x6088C3EC, dma_ring=0x4B018480, dma_entries=256
 dma_free=0x6088CECC, dma_reqt=0x6088CECC, dma_done=0x6088CECC
 thread=0x6088CEAC, thread_end=0x6088CEAC
 backup_thread=0x0, backup_thread_end=0x0
 dma_working=0, dma_complete=6231, post_coalesce_frames=6231
 exhausted_dma_entries=0, post_coalesce_callback=6231

GT64010 Register Dump: Registers at 0xB4000000

CPU Interface:
 cpu_interface_conf   : 0x80030000 (b/s 0x00000380)
 addr_decode_err      : 0xFFFFFFFF (b/s 0xFFFFFFFF)
Processor Address Space :
 ras10_low            : 0x00000000 (b/s 0x00000000)
 ras10_high           : 0x07000000 (b/s 0x00000007)
 ras32_low            : 0x08000000 (b/s 0x00000008)
 ras32_high           : 0x0F000000 (b/s 0x0000000F)
 cs20_low             : 0xD0000000 (b/s 0x000000D0)
 cs20_high            : 0x74000000 (b/s 0x00000074)
 cs3_boot_low         : 0xF8000000 (b/s 0x000000F8)
 cs3_boot_high        : 0x7E000000 (b/s 0x0000007E)
 pci_io_low           : 0x00080000 (b/s 0x00000800)
 pci_io_high          : 0x00000000 (b/s 0x00000000)
 pci_mem_low          : 0x00020000 (b/s 0x00000200)
 pci_mem_high         : 0x7F000000 (b/s 0x0000007F)
```

```
 internal_spc_decode  : 0xA0000000 (b/s 0x000000A0)

 bus_err_low          : 0x00000000 (b/s 0x00000000)
 bus_err_high         : 0x00000000 (b/s 0x00000000)
.
.
.
```

show hardware

To display the hardware-specific information for a router, use the **show hardware** command in user EXEC or privileged EXEC mode.

show hardware

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.4(22)T	This command was introduced.

Usage Guidelines

Use the **show hardware** command to display the hardware specific information for a router.

Examples

The following is sample output from the **show hardware** command:

```
Router# show hardware

Cisco IOS Software, 7200 Software (C7200-ADVENTERPRISEK9-M), Version 12.4(22)T,)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Fri 10-Oct-08 10:10 by prod_rel_team

ROM: System Bootstrap, Version 12.2(4r)B2, RELEASE SOFTWARE (fc2)
BOOTLDR: 7200 Software (C7200-KBOOT-M), Version 12.3(16), RELEASE SOFTWARE (fc4)

Router uptime is 1 day, 16 hours, 32 minutes
System returned to ROM by reload at 04:13:23 UTC Wed Aug 12 2009
System image file is "disk0:Default-IOS-Image-Do-Not-Delete"
Last reload reason: Reload Command


This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.
```

```
Cisco 7206VXR (NPE400) processor (revision A) with 491520K/32768K bytes of memo.
Processor board ID 31410931
R7000 CPU at 350MHz, Implementation 39, Rev 3.3, 256KB L2 Cache
6 slot VXR midplane, Version 2.7

Last reset from power-on

PCI bus mb0_mb1 (Slots 0, 1, 3 and 5) has a capacity of 600 bandwidth points.
Current configuration on bus mb0_mb1 has a total of 600 bandwidth points.
This configuration is within the PCI bus capacity and is supported.

PCI bus mb2 (Slots 2, 4, 6) has a capacity of 600 bandwidth points.
Current configuration on bus mb2 has a total of 180 bandwidth points
This configuration is within the PCI bus capacity and is supported.

Please refer to the following document "Cisco 7200 Series Port Adaptor
Hardware Configuration Guidelines" on Cisco.com <http://www.cisco.com>
for c7200 bandwidth points oversubscription and usage guidelines.

2 FastEthernet interfaces
4 Serial interfaces
125K bytes of NVRAM.

62976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
125440K bytes of ATA PCMCIA card at slot 1 (Sector size 512 bytes).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2002
```

Related Commands

Command	Description
show interfaces	Displays statistics for all interfaces configured on the router or access server.

show health-monitor

To display the system Health Monitor status information, use the **show health-monitor** command in user EXEC or privileged EXEC mode.

show health-monitor [**summary**]

Syntax Description

summary	(Optional) Displays a summary of the status information.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced in a release earlier than Cisco IOS Release 15.0(1)M.

Usage Guidelines

Use this command to display the state of the hardware and software subsystem. Health Monitor is a Cisco IOS subsystem that monitors the state of the individual hardware and software subsystems. This monitoring helps in early detection and recovery of faults in the subsystem.

Examples

The following is sample output from **show health-monitor** command. The fields are self explanatory.

```
Router# show health-monitor summary

Chassis:
   Power Supply                            Failure
   Temperature                                  OK
   Fans                                         OK

Memory:
   Free Memory processor                        OK
   Memory Fragmentation Processor               OK
   Free Memory I/O                              OK
   Memory Fragmentation I/O                     OK

DFC's:
   Slot 1 - Empty DFC           Not in operation
   Slot 2 - Empty DFC           Not in operation
   Slot 3 - AS5X-FC                             OK
   Slot 4 - Empty DFC           Not in operation
   Slot 5 - Empty DFC           Not in operation
   Slot 6 - Empty DFC           Not in operation
   Slot 7 - Empty DFC           Not in operation
```

show history

To list the commands you have entered in the current EXEC session, use the **show history** command in EXEC mode.

show history

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The command history feature provides a record of EXEC commands you have entered. The number of commands that the history buffer will record is determined by the **history size** line configuration command or the **terminal history size** EXEC command.

Table 90 lists the keys and functions you can use to recall commands from the command history buffer.

Table 90 History Keys

Key	Function
Ctrl-P or Up Arrow[1]	Recalls commands in the history buffer in a backward sequence, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Ctrl-N or Down Arrow[1]	Returns to more recent commands in the history buffer after recalling commands with Ctrl-P or the Up Arrow. Repeat the key sequence to recall successively more recent commands.

1. The arrow keys function only with ANSI-compatible terminals.

Examples

The following is sample output from the **show history** command, which lists the commands the user has entered in EXEC mode for this session:

```
Router# show history
  help
  where
  show hosts
  show history
Router#
```

Related Commands

Command	Description
history size	Enables the command history function, or changes the command history buffer size for a particular line.
terminal history size	Enables the command history feature for the current terminal session, or changes the size of the command history buffer for the current terminal session.

show history all

To display command history and reload information of a router, use the **show history all** command in user EXEC or privileged EXEC mode.

show history all

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.4(22)T	This command was introduced.

Usage Guidelines

Use the **show history all** command to display command history and reload information of a router.

Examples

The following is sample output from the **show history all** command:

```
Router# show history all

This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

Cisco 7206VXR (NPE400) processor (revision A) with 491520K/32768K bytes of memo.
Processor board ID 31410931
R7000 CPU at 350MHz, Implementation 39, Rev 3.3, 256KB L2, 4096KB L3 Cache
6 slot VXR midplane, Version 2.7

Last reset from power-on

PCI bus mb0_mb1 (Slots 0, 1, 3 and 5) has a capacity of 600 bandwidth points.
Current configuration on bus mb0_mb1 has a total of 600 bandwidth points.
This configuration is within the PCI bus capacity and is supported.

PCI bus mb2 (Slots 2, 4, 6) has a capacity of 600 bandwidth points.
Current configuration on bus mb2 has a total of 180 bandwidth points
This configuration is within the PCI bus capacity and is supported.
```

```
Please refer to the following document "Cisco 7200 Series Port Adaptor
Hardware Configuration Guidelines" on Cisco.com <http://www.cisco.com>
for c7200 bandwidth points oversubscription and usage guidelines.

2 FastEthernet interfaces
4 Serial interfaces
125K bytes of NVRAM.
Installed image archive

*Aug 12 04:17:08.415: %LINEPROTO-5-UPDOWN: Line protocol on Interface VoIP-Nullp
*Aug 12 04:17:08.419: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state p
*Aug 12 04:17:08.419: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state p
*Aug 12 04:17:08.419: %LINK-3-UPDOWN: Interface Serial2/0, changed state to down
*Aug 12 04:17:08.419: %LINK-3-UPDOWN: Interface Serial2/1, changed state to down
*Aug 12 04:17:08.419: %LINK-3-UPDOWN: Interface Serial3/0, changed state to up
*Aug 12 04:17:08.419: %LINK-3-UPDOWN: Interface Serial3/1, changed state to up
*Aug 12 04:17:08.419: %LINEPROTO-5-UPDOWN: Line protocol on Interface SSLVPN-VIp
62976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
125440K bytes of ATA PCMCIA card at slot 1 (Sector size 512 bytes).
8192K bytes of Flash internal SIMM (Sector size 256K).
*Aug 12 04:17:09.419: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEtherp
*Aug 12 04:17:09.419: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEtherp
*Aug 12 04:17:09.419: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/0n
*Aug 12 04:17:09.419: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2/1n
*Aug 12 04:17:09.419: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0p
*Aug 12 04:17:09.419: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/1p
*Aug 12 04:17:12.411: %LINK-3-UPDOWN: Interface Serial3/0, changed state to down
*Aug 12 04:17:12.411: %LINK-3-UPDOWN: Interface Serial3/1, changed state to down
*Aug 12 04:17:13.411: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/0n
*Aug 12 04:17:13.411: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3/1n


         --- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]:

% Please answer 'yes' or 'no'.
Would you like to enter the initial configuration dialog? [yes/no]: no


Would you like to terminate autoinstall? [yes]: yes
CMD: 'access-list 199 permit icmp host 10.10.10.10 host 20.20.20.20' 04:18:15 U9
CMD: 'crypto map NiStTeSt1 10 ipsec-manual' 04:18:15 UTC Wed Aug 12 2009
CMD: 'match address 199
' 04:18:15 UTC Wed Aug 12 2009
CMD: 'set peer 20.20.20.20
' 04:18:15 UTC Wed Aug 12 2009
CMD: 'exit' 04:18:15 UTC Wed Aug 12 2009
CMD: 'no access-list 199' 04:18:15 UTC Wed Aug 12 2009
CMD: 'no crypto map NiStTeSt1' 04:18:15 UTC Wed Aug 12 2009

*Aug 12 04:18:15.403: %SYS-5-RESTART: System restarted --
Cisco IOS Software, 7200 Software (C7200-ADVENTERPRISEK9-M), Version 12.4(22)T,)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Fri 10-Oct-08 10:10 by prod_rel_team
*Aug 12 04:18:15.415: %ENTITY_ALARM-6-INFO: ASSERT INFO Fa0/0 Physical Port Adm
*Aug 12 04:18:15.415: %ENTITY_ALARM-6-INFO: ASSERT INFO Fa0/1 Physical Port Adm
*Aug 12 04:18:15.499: %CRYPTO-6-ISAKMP_ON_OFF: ISAKMP is OFF
*Aug 12 04:18:15.499: %CRYPTO-6-GDOI_ON_OFF: GDOI is OFF
*Aug 12 04:18:15.599: %ENTITY_ALARM-6-INFO: ASSERT INFO Se2/0 Physical Port Adm
*Aug 12 04:18:15.599: %ENTITY_ALARM-6-INFO: ASSERT INFO Se2/1 Physical Port Adm
*Aug 12 04:18:15.599: %ENTITY_ALARM-6-INFO: ASSERT INFO Se3/0 Physical Port Adm
```

```
*Aug 12 04:18:15.599: %ENTITY_ALARM-6-INFO: ASSERT INFO Se3/1 Physical Port Adm
*Aug 12 04:18:15.599: %SNMP-5-COLDSTART: SNMP agent on host Router is undergoint
*Aug 12 04:18:15.823: %SYS-6-BOOTTIME: Time taken to reboot after reload =  314s
*Aug 12 04:18:16.715: %LINK-5-CHANGED: Interface Serial2/0, changed state to adn
*Aug 12 04:18:16.719: %LINK-5-CHANGED: Interface FastEthernet0/0, changed staten
*Aug 12 04:18:16.723: %LINK-5-CHANGED: Interface FastEthernet0/1, changed staten
*Aug 12 04:18:16.727: %LINK-5-CHANGED: Interface Serial2/1, changed state to adn
*Aug 12 04:18:16.727: %LINK-5-CHANGED: Interface Serial3/0, changed state to adn
*Aug 12 04:18:16.727: %LINK-5-CHANGED: Interface Serial3/1, changed state to adn
*Aug 12 04:18:17.719: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthern
*Aug 12 04:18:17.723: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEther9
CMD: 'conf t' 04:18:30 UTC Wed Aug 12 2009
CMD: 'hostname 7206-3' 04:19:02 UTC Wed Aug 12 2009
CMD: 'ip host sjc-tftp02 171.69.17.17' 04:19:02 UTC Wed Aug 12 2009
CMD: 'ip host sjc-tftp01 171.69.17.19' 04:19:03 UTC Wed Aug 12 2009
CMD: 'ip host dirt 171.69.1.129' 04:19:03 UTC Wed Aug 12 2009
CMD: 'interface FastEthernet0/0' 04:19:03 UTC Wed Aug 12 2009
CMD: 'no ip proxy-arp' 04:19:03 UTC Wed Aug 12 2009
CMD: 'ip address 10.4.9.80 255.255.255.0' 04:19:03 UTC Wed Aug 12 2009
CMD: 'no shutdown' 04:19:04 UTC Wed Aug 12 2009
CMD: 'exit' 04:19:04 UTC Wed Aug 12 2009
CMD: 'ip classless' 04:19:05 UTC Wed Aug 12 2009

*Aug 12 04:19:06.123: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state p
*Aug 12 04:19:06.123: %ENTITY_ALARM-6-INFO: CLEAR INFO Fa0/0 Physical Port Admi9
CMD: 'ip default-network 0.0.0.0' 04:19:06 UTC Wed Aug 12 2009
CMD: 'ip default-gateway 10.4.9.1' 04:19:06 UTC Wed Aug 12 2009
CMD: 'config-register 0x2002' 04:19:07 UTC Wed Aug 12 2009
```

Related Commands

Command	Description
show history	Displays commands entered in the current EXEC session.

show hosts

To display the default domain name, the style of name lookup service, a list of name server hosts, and the cached list of hostnames and addresses specific to a particular Domain Name System (DNS) view or for all configured DNS views, use the **show hosts** command in privileged EXEC mode.

show hosts [**vrf** *vrf-name*] [**view** [*view-name* | **default**] [**all**] [*hostname* | **summary**]

Syntax Description

vrf *vrf-name*	(Optional) The *vrf-name* argument specifies the name of the Virtual Private Network (VPN) routing and forwarding (VRF) instance associated with the DNS view whose hostname cache entries are to be displayed. Default is the global VRF (that is, the VRF whose name is a NULL string) with the specified or default DNS view. **Note** More than one DNS view can be associated with a VRF. To uniquely identify a DNS view, specify both the view name and the VRF with which it is associated.
view *view-name*	(Optional) The *view-name* argument specifies the DNS view whose hostname cache information is to be displayed. Default is the default (unnamed) DNS view associated with the specified or global VRF. **Note** More than one DNS view can be associated with a VRF. To uniquely identify a DNS view, specify both the view name and the VRF with which it is associated.
default	(Optional) Displays the default view.
all	(Optional) Display all the host tables.
hostname	(Optional) The specified hostname cache information displayed is to be limited to entries for a particular hostname. Default is the hostname cache information for all hostname entries in the cache.
summary	(Optional) The specified hostname cache information is to be displayed in brief summary format. Disabled by default.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
12.2T	Support was added for Cisco modem user interface feature.
12.4(4)T	The **vrf**, **all**, and **summary** keywords and *vrf-name* and *hostname* arguments were added.
12.4(9)T	The **view** keyword and *view-name* argument were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command displays the default domain name, the style of name lookup service, a list of name server hosts, and the cached list of hostnames and addresses specific to a particular DNS view or for all configured DNS views.

If you specify the **show hosts** command without any optional keywords or arguments, only the entries in the global hostname cache will be displayed.

If the output from this command extends beyond the bottom of the screen, press the Space bar to continue or press the Q key to terminate command output.

Examples

The following is sample output from the **show hosts** command with no parameters specified:

```
Router# show hosts

Default domain is CISCO.COM
Name/address lookup uses domain service
Name servers are 192.0.2.220
Host Flag Age Type Address(es)
EXAMPLE1.CISCO.COM (temp, OK) 1 IP 192.0.2.10
EXAMPLE2.CISCO.COM (temp, OK) 8 IP 192.0.2.50
EXAMPLE3.CISCO.COM (temp, OK) 8 IP 192.0.2.115
EXAMPLE4.CISCO.COM (temp, EX) 8 IP 192.0.2.111
EXAMPLE5.CISCO.COM (temp, EX) 0 IP 192.0.2.27
EXAMPLE6.CISCO.COM (temp, EX) 24 IP 192.0.2.30
```

The following is sample output from the **show hosts** command that specifies the VRF vpn101:

```
Router# show hosts vrf vpn101

Default domain is example.com
Domain list: example1.com, example2.com, example3.com
Name/address lookup uses domain service
Name servers are 192.0.2.204, 192.0.2.205, 192.0.2.206

Codes: UN - unknown, EX - expired, OK - OK, ?? - revalidate
       temp - temporary, perm - permanent
       NA - Not Applicable None - Not defined

Host                      Port  Flags      Age Type   Address(es)
user                      None  (perm, OK)  0   IP    192.0.2.001
www.example.com           None  (perm, OK)  0   IP    192.0.2.111
                                                      192.0.2.112
```

Table 91 describes the significant fields shown in the display.

Table 91 show hosts Field Descriptions

Field	Description
Default domain	Default domain name to be used to complete unqualified names if no domain list is defined.
Domain list	List of default domain names to be tried in turn to complete unqualified names.
Name/address lookup	Style of name lookup service.
Name servers	List of name server hosts.

Table 91 show hosts Field Descriptions (continued)

Field	Description
Host	Learned or statically defined hostname. Statically defined hostname-to-address mappings can be added to the DNS hostname cache for a DNS view by using the **ip hosts** command.
Port	TCP port number to connect to when using the defined hostname in conjunction with an EXEC connect or Telnet command.
Flags	Indicates additional information about the hostname-to-IP address mapping. Possible values are as follows: • EX—Entries marked EX are expired. • OK—Entries marked OK are believed to be valid. • perm—A permanent entry is entered by a configuration command and is not timed out. • temp—A temporary entry is entered by a name server; the Cisco IOS software removes the entry after 72 hours of inactivity. • ??—Entries marked ?? are considered suspect and subject to revalidation.
Age	Number of hours since the software last referred to the cache entry.
Type	Type of address. For example, IP, Connectionless Network Service (CLNS), or X.121. If you have used the **ip hp-host global** configuration command, the **show hosts** command will display these hostnames as type HP-IP.
Address(es)	IP address of the host. One host may have up to eight addresses.

Related Commands

Command	Description
clear host	Removes static hostname-to-address mappings from the hostname cache for the specified DNS view or all DNS views.
ip host	Defines static hostname-to-address mappings in the DNS hostname cache for a DNS view.

show html

To display module and port information, use the **show html** command in privileged EXEC mode.

show html {**module** [**ports** [**l2**]] | **port** [**all** | **l2** | **l3**] [**shortnames**]} {**command** *line* | **count** | **names** | **options**}

Syntax Description

module	Displays module information.
ports	(Optional) Displays the number of ports on the module.
l2	(Optional) Displays information about the Layer2 (l2) module.
port	Displays port information.
all	(Optional)Displays information about the Layer 2 and Layer 3 modules.
l2	(Optional) Displays information about the Layer2 (l2) module.
l3	(Optional) Displays information about the Layer3 (l3) module.
shortnames	(Optional) Displays port short names.
command	Displays execute command over ports information.
line	Displays command to execute over modules information.
count	Displays the module count.
names	Displays the module names.
options	Displays the module options.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(24)T	This command was introduced in a release earlier than Cisco IOS Release 12.4(24)T.
12.2(33)SXI	This command was integrated into a release earlier than Cisco IOS Release 12.2(33)SXI.
12.2(33)SRC	This command was integrated into a release earlier than Cisco IOS Release 12.2(33)SRC.

Usage Guidelines

Use the **show html** command to display module and port information.

Examples

The following is sample output from the **show html** command using the **port** and **names** keywords. The field descriptions are self-explanatory.

```
Router# show html port names

this[0] = "FastEthernet0/0";
this[1] = "FastEthernet0/1";
this[2] = "Serial2/0";
this[3] = "Serial2/1";
```

```
this[4] = "Serial3/0";
this[5] = "Serial3/0.1";
this[6] = "Serial3/1";
this[7] = "Tunnel0";
this[8] = "Tunnel1";
this[9] = "Tunnel2";
this[10] = "Tunnel3";
this[11] = "Virtual-Access1";
this[12] = "Virtual-Template1";
this[13] = "vmi1";
this[14] = "vmi2";
```

The following is sample output from the **show html** command using the **port**, **all,** and **options** keywords. The ouput is self-explanatory.

```
Router# show html port all options

<option>FastEthernet0/0
<option>FastEthernet0/1
<option>Serial2/0
<option>Serial2/1
<option>Serial3/0
<option>Serial3/0.1
<option>Serial3/1
<option>Tunnel0
<option>Tunnel1
<option>Tunnel2
<option>Tunnel3
<option>Virtual-Access1
<option>Virtual-Template1
<option>VoIP-Null0
<option>vmi1
<option>vmi2
```

show idb

To display information about the status of interface descriptor blocks (IDBs), use the **show idb** command in privileged EXEC mode.

show idb

Syntax Description

This command has nor arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1	This command was introduced.
12.2(15)T	The output of this command was changed to show additional information.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

The following is sample output from the **show idb** command:

```
Router# show idb

Maximum number of Software IDBs 8192.  In use 17.

                       HWIDBs     SWIDBs
Active                      5         14
Inactive                   10          3
Total IDBs                 15         17
Size each (bytes)        5784       2576
Total bytes             86760      43792

HWIDB#1   1   2   GigabitEthernet0/0 0 5, HW IFINDEX, Ether)
HWIDB#2   2   3   GigabitEthernet9/0 0 5, HW IFINDEX, Ether)
HWIDB#3   3   4   GigabitEthernet9/1 6 5, HW IFINDEX, Ether)
HWIDB#4   4   5   GigabitEthernet9/2 6 5, HW IFINDEX, Ether)
HWIDB#5   13  1   Ethernet0 4 5, HW IFINDEX, Ether)
```

Table 92 describes the significant fields shown in the display.

Table 92 show idb Field Descriptions

Field	Description
In use	Total number of software IDBs (SWIDBs) that have been allocated. This number never decreases. SWIDBs are never deallocated.
Active	Total number of hardware IDBs (HWIDBs) and SWIDBs that are allocated and in use.
Inactive	Total number of HWIDBs and SWIDBs that are allocated but not in use.
Total	Total number of HWIDBs and SWIDBs that are allocated.

show idprom

To display the identification programmable read-only memory (IDPROM) information for field-replaceable units (FRUs), use the **show idprom** command in privileged EXEC mode.

show idprom {**all** | *frutype*} [**detail**]

Syntax Description

all	Displays the information for all FRU types.
frutype	Type of FRU for information to be displayed; see the "Usage Guidelines" section for valid values.
detail	(Optional) Displays the detailed display of IDPROM data (verbose).

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	This command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was integrated into Release 12.2(17d)SXB.
12.2(18)SXE	The **module** keyword was modified to support slot/subslot addressing for shared port adapters (SPAs) and SPA interface processors (SIPs), and the optional **clei** keyword was added. The **interface** keyword was replaced by the **transceiver** keyword.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Valid entries for *frutype* are as follows:

- **backplane**
- **clock** *number*—1 and 2.
- **earl** *slot*—See the following paragraph for valid slot values.
- **module** *slot/port* | {*slot* | *slot/subslot* [**clei**] }—See the following paragraphs for valid values and descriptions.
- **rp** *slot*—See the following paragraph for valid slot values.
- **power-supply**—1 and 2.
- **supervisor** *slot*—See the following paragraph for valid slot values.
- **transceiver** {*slot/subslot/port* | *slot*/*subslot* [**GigabitEthernet** | **GigabitEthernetWAN**]}
- **vtt** *number*—1 to 3.

The **module** *slot*/*port* argument designates the module slot location and port number.

Valid values for *slot* depend on the specified interface type and the chassis and module that are used. For example, if you specify a Gigabit Ethernet interface and have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the module number are from 1 to 13 and valid values for the port number are from 1 to 48.

The **module** {*slot* | *slot*/*subslot* [**clei**]} syntax designates either the *slot* location alone of the SIP in the chassis (to show information for the SIP only), or the *slot* location of the SIP and the *subslot* location of a SPA installed within the SIP (to display information for a SPA only). Valid values for *slot* depend on the chassis model (2–13), and valid values for *subslot* depend on the SIP type (such as 0–3 for a Cisco 7600 SIP-200 and Cisco 7600 SIP-400). The optional **clei** keyword specifies display of the Common Language Equipment Identification (CLEI) information for the specified SIP or SPA.

Use the **show idprom backplane** command to display the chassis serial number.

Use the **transceiver** *slot*/*subslot*/*port* form of the command to display information for transceivers installed in a SPA, where *slot* designates the location of the SIP, *subslot* designates the location of the SPA, and *port* designates the interface number.

The **interface** *interface slot* keyword and arguments supported on GBIC security-enabled interfaces have been replaced by the **transceiver** keyword option.

To specify LAN Gigabit Ethernet interfaces, use the **show idprom transceiver** *slot*/*subslot* **GigabitEthernet** form of the command.

- To specify WAN Gigabit Ethernet interfaces, use the **show idprom transceiver** *slot*/*subslot* **GigabitEthernetWAN** form of the command.

Examples

This example shows how to display IDPROM information for clock 1:

```
Router# show idprom clock 1

IDPROM for clock #1
  (FRU is 'Clock FRU')
  OEM String = 'Cisco Systems'
  Product Number = 'WS-C6000-CL'
  Serial Number = 'SMT03073115'
  Manufacturing Assembly Number = '73-3047-04'
  Manufacturing Assembly Revision = 'A0'
  Hardware Revision = 1.0
  Current supplied (+) or consumed (-) = 0.000A
```

Table 93 describes the significant fields shown in the display.

Table 93 show idprom Field Descriptions

Field	Description
FRU is	Indicates the type of the field-replacement unit (FRU) to which the information that follows applies.
OEM String	Names the original equipment manufacturer (OEM).
Product Number	A number that identifies a product line.
Serial Number	A number that uniquely identifies the product itself.
Manufacturing Assembly Number	A number that identifies the hardware identification number.
Manufacturing Assembly Revision	A number that identifies the manufacturing assembly number.
Hardware Revision	A number that represents the hardware upgrade.
Current supplied (+) or consumed (-)	Indicated the amount of electrical current that the device supples or uses.

This example shows how to display IDPROM information for power supply 1:

```
Router# show idprom power-supply 1

IDPROM for power-supply #1
  (FRU is '110/220v AC power supply, 1360 watt')
  OEM String = 'Cisco Systems, Inc.'
  Product Number = 'WS-CAC-1300W'
  Serial Number = 'ACP03020001'
  Manufacturing Assembly Number = '34-0918-01'
  Manufacturing Assembly Revision = 'A0'
  Hardware Revision = 1.0
  Current supplied (+) or consumed (-) = 27.460A
```

This example shows how to display detailed IDPROM information for power supply 1:

```
Router# show idprom power-supply 1 detail

IDPROM for power-supply #1
IDPROM image:

  (FRU is '110/220v AC power supply, 1360 watt')

IDPROM image block #0:
  hexadecimal contents of block:
  00: AB AB 01 90 11 BE 01 00 00 02 AB 01 00 01 43 69    ..............Ci
  10: 73 63 6F 20 53 79 73 74 65 6D 73 2C 20 49 6E 63    sco Systems, Inc
  20: 2E 00 57 53 2D 43 41 43 2D 31 33 30 30 57 00 00    ..WS-CAC-1300W..
  30: 00 00 00 00 00 00 41 43 50 30 33 30 32 30 30 30    ......ACP0302000
  40: 31 00 00 00 00 00 00 00 00 00 33 34 2D 30 39 31    1.........34-091
  50: 38 2D 30 31 00 00 00 00 00 00 41 30 00 00 00 00    8-01......A0....
  60: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00    ................
  70: 00 00 00 01 00 00 00 00 00 00 00 09 00 0C 00 03    ................
  80: 00 01 00 06 00 01 00 00 00 00 0A BA 00 00 00 00    ................

  block-signature = 0xABAB, block-version = 1,
  block-length = 144, block-checksum = 4542

  *** common-block ***
  IDPROM capacity (bytes) = 256  IDPROM block-count = 2
  FRU type = (0xAB01,1)
  OEM String = 'Cisco Systems, Inc.'
  Product Number = 'WS-CAC-1300W'
  Serial Number = 'ACP03020001'
  Manufacturing Assembly Number = '34-0918-01'
  Manufacturing Assembly Revision = 'A0'
  Hardware Revision = 1.0
  Manufacturing bits = 0x0  Engineering bits = 0x0
  SNMP OID = 9.12.3.1.6.1.0
  Power Consumption = 2746 centiamperes    RMA failure code = 0-0-0-0
  *** end of common block ***

IDPROM image block #1:
  hexadecimal contents of block:
  00: AB 01 01 14 02 5F 00 00 00 00 00 00 00 0A BA    ....._..........
  10: 0A BA 00 16                                     ....

  block-signature = 0xAB01, block-version = 1,
  block-length = 20, block-checksum = 607

  *** power supply block ***
  feature-bits:  00000000 00000000
  rated current at 110v:  2746    rated current at 220v:  2746   (centiamperes)
```

```
  CISCO-STACK-MIB SNMP OID = 22  *** end of power supply block ***

End of IDPROM image
```

This example shows how to display IDPROM information for the backplane:

```
Router# show idprom backplane

IDPROM for backplane #0
  (FRU is 'Catalyst 6000 9-slot backplane')
  OEM String = 'Cisco Systems'
  Product Number = 'WS-C6009'
  Serial Number = 'SCA030900JA'
  Manufacturing Assembly Number = '73-3046-04'
  Manufacturing Assembly Revision = 'A0'
  Hardware Revision = 1.0
  Current supplied (+) or consumed (-) = 0.000A
```

The following example shows sample output for a Cisco 7600 SIP-400 installed in slot 3 of the router:

```
Router# show idprom module 3

IDPROM for module #3
  (FRU is '4-subslot SPA Interface Processor-400')
  OEM String = 'Cisco Systems'
  Product Number = '7600-SIP-400'
  Serial Number = 'JAB0851042X'
  Manufacturing Assembly Number = '73-8404-10'
  Manufacturing Assembly Revision = '09'
  Hardware Revision = 0.95
  Current supplied (+) or consumed (-) = -6.31A
```

The following example shows sample output for the **clei** form of the command on a Cisco 7600 SIP-200 installed in slot 2 of the router:

```
Router# show idprom module 2 clei

FRU             PID                 VID SN          CLEI
--------------- ------------------- --- ----------- ----------
module #2       7600-SIP-200        V01
```

The following example shows sample output for the **detail** form of the command on a Cisco 7600 SIP-400 installed in slot 3 of the router:

```
Router# show idprom module 3 detail

IDPROM for module #3
IDPROM image:

  (FRU is '4-subslot SPA Interface Processor-400')

IDPROM image block #0:

  block-signature = 0xABAB, block-version = 3,
  block-length = 160, block-checksum = 4600

  *** common-block ***
  IDPROM capacity (bytes) = 512  IDPROM block-count = 2
  FRU type = (0x6003,1103)
  OEM String = 'Cisco Systems'
  Product Number = '7600-SIP-400'
  Serial Number = 'JAB0851042X'
  Manufacturing Assembly Number = '73-8404-10'
  Manufacturing Assembly Revision = '09'
```

```
  Manufacturing Assembly Deviation = '00'
  Hardware Revision = 0.95
  Manufacturing bits = 0x0  Engineering bits = 0x0
  SNMP OID = 9.5.1.3.1.1.2.1103
  Power Consumption = -631 centiamperes    RMA failure code = 0-0-0-0
  CLEI =
  VID =
  *** end of common block ***

IDPROM image block #1:

  block-signature = 0x6003, block-version = 2,
  block-length = 103, block-checksum = 2556

  *** linecard specific block ***
  feature-bits =   00000000 00000000
  hardware-changes-bits =   00000000 00000000
  card index = 158
  mac base = 0012.4310.D840
  mac_len = 128
  num_processors = 1
  epld_num = 0
  epld_versions = 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000
  port numbers:
    pair #0: type=00, count=00
    pair #1: type=00, count=00
    pair #2: type=00, count=00
    pair #3: type=00, count=00
    pair #4: type=00, count=00
    pair #5: type=00, count=00
    pair #6: type=00, count=00
    pair #7: type=00, count=00
  sram_size = 0
  sensor_thresholds =
    sensor #0: critical = 75 oC, warning = 60 oC
    sensor #1: critical = 70 oC, warning = 55 oC
    sensor #2: critical = 80 oC, warning = 65 oC
    sensor #3: critical = 75 oC, warning = 60 oC
    sensor #4: critical = -128 oC (sensor not present), warning = -128 oC (sensor not
present)
    sensor #5: critical = -128 oC (sensor not present), warning = -128 oC (sensor not
present)
    sensor #6: critical = -128 oC (sensor not present), warning = -128 oC (sensor not
present)
    sensor #7: critical = -128 oC (sensor not present), warning = -128 oC (sensor not
present)
  max_connector_power = 3600
  cooling_requirement = 35
  ambient_temp = 55
  *** end of linecard specific block ***

End of IDPROM image
```

The following example shows sample output for a 4-Port OC-3c/STM-1 ATM SPA installed in subslot 0 of the SIP installed in slot 5 of the router:

```
Router# show idprom module 5/0

IDPROM for SPA module #5/0
        (FRU is '4-port OC3/STM1 ATM Shared Port Adapter')
        Product Identifier (PID) : SPA-4XOC3-ATM
        Version Identifier (VID) : V01
        PCB Serial Number        : PRTA2604138
```

```
        Top Assy. Part Number    : 68-2177-01
        73/68 Board Revision     : 05
        73/68 Board Revision     : 01
        Hardware Revision        : 0.224
        CLEI Code                : UNASSIGNED
```

The following example shows sample output for the **clei** form of the command for a 4-Port OC-3c/STM-1 POS SPA installed in subslot 3 of the SIP installed in slot 2 of the router:

```
Router# show idprom module 2/3 clei

FRU             PID                  VID SN          CLEI
--------------- -------------------- --- ----------- ----------
SPA module #2/3 SPA-4XOC3-POS        V01 PRTA0304155 UNASSIGNED
```

The following example shows sample output for the **detail** form of the command for a 4-Port OC-3c/STM-1 POS SPA installed in subslot 3 of the SIP installed in slot 2 of the router:

```
Router# show idprom module 2/3 detail

IDPROM for SPA module #2/3
        (FRU is '4-port OC3/STM1 POS Shared Port Adapter')
        EEPROM version           : 4
        Compatible Type          : 0xFF
        Controller Type          : 1088
        Hardware Revision        : 0.230
        Boot Timeout             : 0 msecs
        PCB Serial Number        : PRTA0304155
        Part Number              : 73-9313-02
        73/68 Board Revision     : 04
        Fab Version              : 02
        RMA Test History         : 00
        RMA Number               : 0-0-0-0
        RMA History              : 00
        Deviation Number         : 0
        Product Identifier (PID) : SPA-4XOC3-POS
        Version Identifier (VID) : V01
        Top Assy. Part Number    : 68-2169-01
        73/68 Board Revision     : 10
        System Clock Frequency   : 00 00 00 00 00 00 00 00
                                   00 00 00 00 00
        CLEI Code                : UNASSIGNED
        Base MAC Address         : 00 00 00 00 00 00
        MAC Address block size   : 0
        Manufacturing Test Data  : 00 00 00 00 00 00 00 00
        Field Diagnostics Data   : 00 00 00 00 00 00 00 00
        Calibration Data         : Minimum: 0 dBmV, Maximum: 0 dBmV
              Calibration values :
        Power Consumption        : 16200 mWatts (Maximum)
        Environment Monitor Data : 01 08 F6 48 43 34 F6 48
                                   43 34 02 31 0C E4 46 32
                                   28 13 07 09 C4 46 32 28
                                   13 07 00 00 00 00 00 00
                                   00 05 DC 46 32 28 13 07
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 00 00 00
                                   00 00 00 00 00 FE 02 00
                                   00
        Asset ID                 :
        Asset Alias              :
```

show inventory

To display the product inventory listing of all Cisco products installed in the networking device, use the **show inventory** command in user EXEC or privileged EXEC mode.

show inventory [raw] [*entity***]**

Syntax Description

raw	(Optional) Retrieves information about all of the Cisco products—referred to as entities—installed in the Cisco networking device, even if the entities do not have a product ID (PID) value, a unique device identifier (UDI), or other physical identification.
entity	(Optional) Name of a Cisco entity (for example, chassis, backplane, module, or slot). A quoted string may be used to display very specific UDI information; for example "sfslot 1" will display the UDI information for slot 1 of an entity named sfslot.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.0(27)S	This command was integrated into Cisco IOS Release 12.0(27)S.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(18)SXE5	This command was integrated into Cisco IOS Release 12.2(18)SXE5.

Usage Guidelines

The **show inventory** command retrieves and displays inventory information about each Cisco product in the form of a UDI. The UDI is a combination of three separate data elements: a product identifier (PID), a version identifier (VID), and the serial number (SN).

The PID is the name by which the product can be ordered; it has been historically called the "Product Name" or "Part Number." This is the identifier that one would use to order an exact replacement part.

The VID is the version of the product. Whenever a product has been revised, the VID will be incremented. The VID is incremented according to a rigorous process derived from Telcordia GR-209-CORE, an industry guideline that governs product change notices.

The SN is the vendor-unique serialization of the product. Each manufactured product will carry a unique serial number assigned at the factory, which cannot be changed in the field. This is the means by which to identify an individual, specific instance of a product.

The UDI refers to each product as an entity. Some entities, such as a chassis, will have subentities like slots. Each entity will display on a separate line in a logically ordered presentation that is arranged hierarchically by Cisco entities.

Use the **show inventory** command without options to display a list of Cisco entities installed in the networking device that are assigned a PID.

Examples

The following is sample output from the **show inventory** command without any keywords or arguments. This sample output displays a list of Cisco entities installed in a router that are assigned a PID.

```
Router# show inventory

NAME: "Chassis", DESCR: "12008/GRP chassis"
PID: GSR8/40           ,  VID: V01,  SN: 63915640

NAME: "slot 0", DESCR: "GRP"
PID: GRP-B             ,  VID: V01,  SN: CAB021300R5

NAME: "slot 1", DESCR: "4 port ATM OC3 multimode"
PID: 4OC3/ATM-MM-SC    ,  VID: V01,  SN: CAB04036GT1

NAME: "slot 3", DESCR: "4 port 0C3 POS multimode"
PID: LC-4OC3/POS-MM    ,  VID: V01,  SN: CAB014900GU

NAME: "slot 5", DESCR: "1 port Gigabit Ethernet"
PID: GE-GBIC-SC-B      ,  VID: V01,  SN: CAB034251NX

NAME: "slot 7", DESCR: "GRP"
PID: GRP-B             ,  VID: V01,  SN: CAB0428AN4O

NAME: "slot 16", DESCR: "GSR 12008 Clock Scheduler Card"
PID: GSR8-CSC/ALRM     ,  VID: V01,  SN: CAB0429AUYH

NAME: "sfslot 1", DESCR: "GSR 12008 Switch Fabric Card"
PID: GSR8-SFC          ,  VID: V01,  SN: CAB0428ALOS

NAME: "sfslot 2", DESCR: "GSR 12008 Switch Fabric Card"
PID: GSR8-SFC          ,  VID: V01,  SN: CAB0429AU0M

NAME: "sfslot 3", DESCR: "GSR 12008 Switch Fabric Card"
PID: GSR8-SFC          ,  VID: V01,  SN: CAB0429ARD7

NAME: "PSslot 1", DESCR: "GSR 12008 AC Power Supply"
PID: FWR-GSR8-AC-B     ,  VID: V01,  SN: CAB041999CW
```

Table 94 describes the fields shown in the display.

Table 94 show inventory Field Descriptions

Field	Description
NAME	Physical name (text string) assigned to the Cisco entity. For example, console or a simple component number (port or module number), such as "1," depending on the physical component naming syntax of the device.
DESCR	Physical description of the Cisco entity that characterizes the object. The physical description includes the hardware serial number and the hardware revision.
PID	Entity product identifier. Equivalent to the entPhysicalModelName MIB variable in RFC 2737.
VID	Entity version identifier. Equivalent to the entPhysicalHardwareRev MIB variable in RFC 2737.
SN	Entity serial number. Equivalent to the entPhysicalSerialNum MIB variable in RFC 2737.

For diagnostic purposes, the **show inventory** command can be used with the **raw** keyword to display every RFC 2737 entity including those without a PID, UDI, or other physical identification.

Note The **raw** keyword option is primarily intended for troubleshooting problems with the **show inventory** command itself.

```
Router# show inventory raw

NAME: "Chassis", DESCR: "12008/GRP chassis"
PID:                   ,  VID: V01,  SN: 63915640

NAME: "slot 0", DESCR: "GRP"
PID:                   ,  VID: V01,  SN: CAB021300R5

NAME: "slot 1", DESCR: "4 port ATM OC3 multimode"
PID: 4OC3/ATM-MM-SC    ,  VID: V01,  SN: CAB04036GT1

NAME: "slot 3", DESCR: "4 port 0C3 POS multimode"
PID: LC-4OC3/POS-MM    ,  VID: V01,  SN: CAB014900GU
```

Enter the **show inventory** command with an *entity* argument value to display the UDI information for a specific type of Cisco entity installed in the networking device. In this example, a list of Cisco entities that match the sfslot argument string is displayed.

```
Router# show inventory sfslot

NAME: "sfslot 1", DESCR: "GSR 12008 Switch Fabric Card"
PID: GSR8-SFC          ,  VID: V01,  SN: CAB0428ALOS

NAME: "sfslot 2", DESCR: "GSR 12008 Switch Fabric Card"
PID: GSR8-SFC          ,  VID: V01,  SN: CAB0429AU0M

NAME: "sfslot 3", DESCR: "GSR 12008 Switch Fabric Card"
PID: GSR8-SFC          ,  VID: V01,  SN: CAB0429ARD7
```

You can request even more specific UDI information using the **show inventory** command with an *entity* argument value that is enclosed in quotation marks. In this example, only the details for the entity that exactly matches the sfslot 1 argument string are displayed.

```
Router# show inventory "sfslot 1"

NAME: "sfslot 1", DESCR: "GSR 12008 Switch Fabric Card"
PID: GSR8-SFC          ,  VID: V01,  SN: CAB0428ALOS
```

Related Commands

Command	Description
show diag	Displays diagnostic information about the controller, interface processor, and port adapters for a networking device.
show tech-support	Displays general information about the router when it reports a problem.

show logging

To display the state of system logging (syslog) and the contents of the standard system logging buffer, use the **show logging** command in privileged EXEC mode.

show logging [**slot** *slot-number* | **summary**]

Syntax Description

slot *slot-number*	(Optional) Displays information in the syslog history table for a specific line card. Slot numbers range from 0 to 11 for the Cisco 12012 Internet router and 0 to 7 for the Cisco 12008 Internet router.
summary	(Optional) Displays counts of messages by type for each line card.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
11.2 GS	This command was modified. The **slot** and **summary** keywords were added for the Cisco 12000.
12.2(8)T	This command was modified. Command output was expanded to show the status of the logging count facility (“Count and time-stamp logging messages”).
12.2(15)T	This command was modified. Command output was expanded to show the status of XML syslog formatting.
12.3(2)T	This command was modified. Command output was expanded (on supported software images) to show details about the status of system logging processed through the Embedded Syslog Manager (ESM). These lines appear as references to “filtering” or “filter modules”.
12.3(2)XE	This command was integrated into Cisco IOS Release 12.3(2)XE.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(11)T	This command was modified. Command-line interface (CLI) output was modified to show message discriminators defined at the router and syslog sessions associated with those message discriminators.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
12.2(33)SXI1	This command was modified. Support for the command in the user EXEC mode was removed.

Usage Guidelines

This command runs on the privileged EXEC mode. To enter the privileged EXEC mode, type **enable** in the user EXEC mode and press Enter. Provide a password, if prompted.

This command displays the state of syslog error and event logging, including host addresses, and which logging destinations (console, monitor, buffer, or host) logging is enabled. This command also displays Simple Network Management Protocol (SNMP) logging configuration parameters and protocol activity.

This command will also display the contents of the standard system logging buffer, if logging to the buffer is enabled. Logging to the buffer is enabled or disabled using the [**no**] **logging buffered** command. The number of system error and debugging messages in the system logging buffer is determined by the configured size of the syslog buffer. This size of the syslog buffer is also set using the **logging buffered** command.

To enable and set the format for syslog message time stamping, use the **service timestamps log** command.

If debugging is enabled (using any **debug** command), and the logging buffer is configured to include level 7 (debugging) messages, debug output will be included in the system log. Debugging output is not formatted like system error messages and will not be preceded by the percent symbol (%).

Examples

The following is sample output from the **show logging** command on a software image that supports the Embedded Syslog Manager (ESM) feature:

```
Router> enable
Router# show logging

Syslog logging: enabled (10 messages dropped, 5 messages rate-limited,
                0 flushes, 0 overruns, xml disabled, filtering disabled)
    Console logging: level debugging, 31 messages logged, xml disabled,
                     filtering disabled
    Monitor logging: disabled
    Buffer logging: level errors, 36 messages logged, xml disabled,
                    filtering disabled
    Logging Exception size (8192 bytes)
    Count and timestamp logging messages: disabled

No active filter modules.


    Trap logging: level informational, 45 message lines logged

Log Buffer (8192 bytes):
```

The following example shows output from the **show logging** command after a message discriminator has been configured. Included in this example is the command to configure the message discriminator.

```
Router(config)# logging discriminator ATTFLTR1 severity includes 1,2,5 rate-limit 100

Specified MD by the name ATTFLTR1 is not found.
Adding new MD instance with specified MD attribute values.

Router(config)# end
Router#

000036: *Oct 20 16:26:04.570: %SYS-5-CONFIG_I: Configured from console by console

Router> enable
Router# show logging

Syslog logging: enabled (11 messages dropped, 0 messages rate-limited,
    0 flushes, 0 overruns, xml disabled, filtering disabled)

No Active Message Discriminator.
```

```
Inactive Message Discriminator:
ATTFLTR1  severity group includes 1,2,5
    rate-limit not to exceed 100 messages per second

Console logging: level debugging, 25 messages logged, xml disabled, filtering disabled
Monitor logging: level debugging, 0 messages logged, xml disabled, filtering disabled
Buffer logging:  level debugging, 25 messages logged, xml disabled, filtering disabled
Logging Exception size (8192 bytes)
Count and timestamp logging messages: disabled

No active filter modules.

Trap logging: level debugging, 28 message lines logged
Logging to 172.25.126.15  (udp port 1300,  audit disabled, authentication disabled,
    encryption disabled, link up),
    28 message lines logged,
    0 message lines rate-limited,
    0 message lines dropped-by-MD,
    xml disabled, sequence number disabled
    filtering disabled
Logging to 172.25.126.15  (tcp port 1307,  audit disabled, authentication disabled,
    encryption disabled, link up),
    28 message lines logged,
    0 message lines rate-limited,
    0 message lines dropped-by-MD,
    xml disabled, sequence number disabled, filtering disabled
Logging to 172.20.1.1  (udp port 514,  audit disabled,
    authentication disabled, encryption disabled, link up),
    28 message lines logged,
    0 message lines rate-limited,
    0 message lines dropped-by-MD,
    xml disabled, sequence number disabled
    filtering disabled

Log Buffer (1000000 bytes):
```

Table 95 describes the significant fields shown in the output for the two preceding examples.

Table 95 show logging Field Descriptions

Field	Description
Syslog logging:	Shows general state of system logging (enabled or disabled), the status of logged messages (number of messages dropped, rate-limited, or flushed), and whether XML formatting or ESM filtering is enabled.
No Active Message Discriminator	Indicates that a message discriminator is not being used.
Inactive Message Discriminator:	Identifies a configured message discriminator that has not been invoked.
Console logging:	Logging to the console port. Shows “disabled” or, if enabled, the severity level limit, number of messages logged, and whether XML formatting or ESM filtering is enabled. Corresponds to the configuration of the **logging console**, **logging console xml**, or **logging console filtered** command.

Table 95 show logging Field Descriptions (continued)

Field	Description
Monitor logging:	Logging to the monitor (all TTY lines). Shows "disabled" or, if enabled, the severity level limit, number of messages logged, and whether XML formatting or ESM filtering is enabled. Corresponds to the configuration of the **logging monitor**, **logging monitor xml**, or **logging monitor filtered** command.
Buffer logging:	Logging to the standard syslog buffer. Shows "disabled" or, if enabled, the severity level limit, number of messages logged, and whether XML formatting or ESM filtering is enabled. Corresponds to the configuration of the **logging buffered**, **logging buffered xml**, or **logging buffered filtered** command.
Trap logging:	Logging to a remote host (syslog collector). Shows "disabled" or, if enabled, the severity level limit, number of messages logged, and whether XML formatting or ESM filtering is enabled. (The word "trap" means a trigger in the system software for sending error messages to a remote host.) Corresponds to the configuration of the **logging host** command. The severity level limit is set using the **logging trap** command.
SNMP logging	Displays whether SNMP logging is enabled, the number of messages logged, and the retransmission interval. If not shown on your platform, use the **show logging history** command.
Logging Exception size (8192 bytes)	Corresponds to the configuration of the **logging exception** command.
Count and timestamp logging messages:	Corresponds to the configuration of the **logging count** command.
No active filter modules.	Appears if no syslog filter modules are configured with the **logging filter** command. Syslog filter modules are Tcl script files used when the Embedded Syslog Manager (ESM) is enabled. ESM is enabled when any of the **filtered** keywords are used in the logging commands. If configured, the URL and filename of configured syslog filter modules will appear at this position in the output. Syslog filter modules are executed in the order in which they appear here.
Log Buffer (8192 bytes):	The value in parentheses corresponds to the configuration of the **logging buffered** *buffer-size* command. If no messages are currently in the buffer, the output ends with this line. If messages are stored in the syslog buffer, they appear after this line.

The following example shows that syslog messages from the system buffer are included, with time stamps. In this example, the software image does not support XML formatting or ESM filtering of syslog messages.

```
Router> enable
Router# show logging

Syslog logging:enabled (2 messages dropped, 0 flushes, 0 overruns)
```

```
    Console logging:disabled
    Monitor logging:level debugging, 0 messages logged
    Buffer logging:level debugging, 4104 messages logged
    Trap logging:level debugging, 4119 message lines logged
        Logging to 192.168.111.14, 4119 message lines logged
Log Buffer (262144 bytes):

Jul 11 12:17:49 EDT:%BGP-4-MAXPFX:No. of prefix received from 209.165.200.225
(afi 0) reaches 24, max 24
! THE FOLLOWING LINE IS A DEBUG MESSAGE FROM NTP.
! NOTE THAT IT IS NOT PRECEEDED BY THE % SYMBOL.
Jul 11 12:17:48 EDT: NTP: Maxslew = 213866
Jul 11 15:15:41 EDT:%SYS-5-CONFIG:Configured from
tftp://host.com/addc5505-rsm.nyiix
.Jul 11 15:30:28 EDT:%BGP-5-ADJCHANGE:neighbor 209.165.200.226 Up
.Jul 11 15:31:34 EDT:%BGP-3-MAXPFXEXCEED:No. of prefix received from
209.165.200.226 (afi 0):16444 exceed limit 375
.Jul 11 15:31:34 EDT:%BGP-5-ADJCHANGE:neighbor 209.165.200.226 Down BGP
Notification sent
.Jul 11 15:31:34 EDT:%BGP-3-NOTIFICATION:sent to neighbor 209.165.200.226 3/1
(update malformed) 0 bytes
 .
 .
 .
```

The software clock keeps an “authoritative” flag that indicates whether the time is authoritative (believed to be accurate). If the software clock has been set by a timing source (for example, via NTP), the flag is set. If the time is not authoritative, it will be used only for display purposes. Until the clock is authoritative and the “authoritative” flag is set, the flag prevents peers from synchronizing to the software clock.

Table 96 describes the symbols that precede the time stamp.

Table 96 Time Stamping Symbols for syslog Messages

Symbol	Description	Example
*	Time is not authoritative: the software clock is not in sync or has never been set.	*15:29:03.158 UTC Tue Feb 25 2003:
(blank)	Time is authoritative: the software clock is in sync or has just been set manually.	15:29:03.158 UTC Tue Feb 25 2003:
.	Time is authoritative, but NTP is not synchronized: the software clock was in sync, but has since lost contact with all configured NTP servers.	.15:29:03.158 UTC Tue Feb 25 2003:

The following is sample output from the **show logging summary** command for a Cisco 12012 router. A number in the column indicates that the syslog contains that many messages for the line card. For example, the line card in slot 9 has 1 error message, 4 warning messages, and 47 notification messages.

Note For similar log counting on other platforms, use the **show logging count** command.

```
Router> enable
Router# show logging summary

+-----+-------+-------+-------+-------+-------+-------+-------+-------+
 SLOT | EMERG | ALERT | CRIT  | ERROR |WARNING| NOTICE| INFO  | DEBUG |
```

```
+-----+-------+-------+-------+-------+-------+-------+-------+-------+
|* 0* |     . |     . |     . |     . |     . |     . |     . |     . |
|  1  |       |       |       |       |       |       |       |       |
|  2  |       |       |       |     1 |     4 |    45 |       |       |
|  3  |       |       |       |       |       |       |       |       |
|  4  |       |       |       |     5 |     4 |    54 |       |       |
|  5  |       |       |       |       |       |       |       |       |
|  6  |       |       |       |       |       |       |       |       |
|  7  |       |       |       |    17 |     4 |    48 |       |       |
|  8  |       |       |       |       |       |       |       |       |
|  9  |       |       |       |     1 |     4 |    47 |       |       |
| 10  |       |       |       |       |       |       |       |       |
| 11  |       |       |       |    12 |     4 |    65 |       |       |
+-----+-------+-------+-------+-------+-------+-------+-------+-------+
```

Table 97 describes the logging level fields shown in the display.

Table 97 show logging summary Field Descriptions

Field	Description
SLOT	Indicates the slot number of the line card. An asterisk next to the slot number indicates the GRP card whose error message counts are not displayed. For information on the GRP card, use the **show logging** command.
EMERG	Indicates that the system is unusable.
ALERT	Indicates that immediate action is needed.
CRIT	Indicates a critical condition.
ERROR	Indicates an error condition.
WARNING	Indicates a warning condition.
NOTICE	Indicates a normal but significant condition.
INFO	Indicates an informational message only.
DEBUG	Indicates a debugging message.

Related Commands

Command	Description
clear logging	Clears messages from the logging buffer.
logging count	Enables the error log count capability.
logging history size	Changes the number of syslog messages stored in the history table of the router.
logging linecard	Logs messages to an internal buffer on a line card and limits the logging messages displayed on terminal lines other than the console line to messages with a level at or above level.
service timestamps	Configures the system to time-stamp debugging or logging messages.
show logging count	Displays a summary of system error messages (syslog messages) by facility and severity.
show logging xml	Displays the state of system logging and the contents of the XML-specific logging buffer.

show logging count

To display a summary of the number of times certain system error messages are occuring, use the **show logging** command in privileged EXEC mode.

show logging count

Syntax Description

This command has no arguements or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(8)T	This command was introduced.

Usage Guidelines

To enable the error log count capability (syslog counting feature), use the **logging count** command in global configuration mode.

This feature works independently of the various settings of the other logging commands (such as [**no**] **logging on**, [**no**] **logging buffered**, and so on). In other words, turning off logging by other means does not stop the counting and timestamping from occuring.

This command displays information such as the number of times a particular system error message occurs and the time stamp of the last occurrence of the specified message. System error messages are grouped into logical units called “Facilities” based on Cisco IOS software components.

To determine if system error message counting is enabled, use the **show logging** command.

The **service timestamps** command configuration determines the timestamp format (shown in the “Last Time” column) of **show logging count** command output. There is not quite enough space for all options of the possible options (datetime, milliseconds, and timezone) of the **service timestamps datetime** command to be displayed at the same time. As a result, if **msec** is selected, **timezone** will not be displayed. If **show-timezone** is selected but not **msec**, then the time zone will be displayed.

Occasionally, the length of the message name plus the facility name contains too many characters to be printed on one line. The CLI attempts to keep the name and facility name on one line but, if necessary, the line will be wrapped, so that the first line contains the facility name and the second line contains the message name and the rest of the columns.

Examples

The following example shows the number of times syslog messages have occurred and the most recent time that each error message occurred. In this example, the **show logging** command is used to determine if the syslog counting feature is enabled:

```
Router# show logging | include count
Count and timestamp logging messages: enabled

Router# show logging count

Facility       Message Name                    Sev  Occur  Last Time
===============================================================================
```

```
SYS             BOOTTIME                        6    1   00:00:12
SYS             RESTART                         5    1   00:00:11
SYS             CONFIG_I                        5    1   00:00:05
-------------   -----------------------------  ------------------------------
SYS TOTAL                                           3

LINEPROTO       UPDOWN                          5   13   00:00:19
-------------   -----------------------------  ------------------------------
LINEPROTO TOTAL                                    13

LINK            UPDOWN                          3    1   00:00:18
LINK            CHANGED                         5   12   00:00:09
-------------   -----------------------------  ------------------------------
LINK TOTAL                                         13

SNMP            COLDSTART                       5    1   00:00:11
-------------   -----------------------------  ------------------------------
SNMP TOTAL                                          1
```

Table 98 describes the significant fields shown in the display.

Table 98 show logging count Field Descriptions

Field	Description
Facility	The facility, such as syslog, from which these error messages are occurring.
Message Name	The name of this message.
Sev	The severity level of this message.
Occur	How many times this message has occurred.
Last Time	The last (most recent) time this message occurred. Timestamping is by default based on the system uptime (for example “3w1d” indicates 3 weeks and 1 day from the last system reboot.)
Sys Total / Lineproto Total / Link Total / SNMP Total	Total number of error messages that have occurred for the specified Facility.

In the following example, the user is interested only in the totals:

```
Router# show logging count | include total
SYS TOTAL                                           3
LINEPROTO TOTAL                                    13
LINK TOTAL                                         13
SNMP TOTAL                                          1
```

Related Commands

Command	Description
clear logging	Clears messages from the logging buffer.
logging count	Enables the system error message log count capability.
service timestamps	Configures the system to time-stamp debugging or logging messages.
show logging	Displays general information about the state of system logging.

show logging history

To display information about the state of the syslog history table, use the **show logging history** command in privileged EXEC mode.

show logging history

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command displays information about the syslog history table, such as the table size, the status of messages, and text of messages stored in the table. Messages stored in the table are governed by the **logging history** global configuration command.

Examples

The following example shows sample output from the **show logging history** command. In this example, notifications of severity level 5 (notifications) through severity level 0 (emergencies) are configured to be written to the logging history table.

```
Router# show logging history

Syslog History Table: 1 maximum table entries,
saving level notifications or higher
0 messages ignored, 0 dropped, 15 table entries flushed,
SNMP notifications not enabled
  entry number 16: SYS-5-CONFIG_I
  Configured from console by console
  timestamp: 1110
Router#
```

Table 99 describes the significant fields shown in the output.

Table 99 show logging history Field Descriptions

Field	Description
maximum table entry	Number of messages that can be stored in the history table. Set with the **logging history size** command.
saving level notifications <x> or higher	Level of messages that are stored in the history table and sent to the SNMP server (if SNMP notification is enabled). The severity level can be configured with the **logging history** command.

Table 99 show logging history Field Descriptions (continued)

Field	Description
messages ignored	Number of messages not stored in the history table because the severity level is greater than that specified with the **logging history** command.
dropped	Number of messages that could not be processed due to lack of system resources. Dropped messages do not appear in the history table and are not sent to the SNMP server.
table entries flushed	Number of messages that have been removed from the history table to make room for newer messages.
SNMP notifications	Whether syslog traps of the appropriate level are sent to the SNMP server. The sending of syslog traps are enabled or disabled through the **snmp-server enable traps syslog** command.
entry number:	Number of the message entry in the history table. In the example above, the message "SYS-5-CONFIG_I Configured from console by console" indicates a syslog message consisting of the facility name (SYS), which indicates where the message came from, the severity level (5) of the message, the message name (CONFIG_I), and the message text.
timestamp	Time, based on the up time of the router, that the message was generated.

Related Commands

Command	Description
clear logging	Clears messages from the logging buffer.
logging history	Limits syslog messages sent to the router's history table to a specified severity level.
logging history size	Changes the number of syslog messages that can be stored in the history table.
logging linecard	Logs messages to an internal buffer on a line card. This command limits the logging messages displayed on terminal lines other than the console line to messages with a level at or above level.
snmp-server enable traps	The [**no**] **snmp-server enable traps syslog** form of this command controls (enables or disables) the sending of system-logging messages to a network management station.

show logging system

To display the System Event Archive (SEA) logs, use the **show logging system** command in user EXEC mode or privileged EXEC mode.

show logging system [**disk** [*file-location*] | **last** [*num-of-last-log-msgs*]]

Syntax Description

disk	(Optional) Displays SEA log disk, where the logs will be stored.
disk *file-location*	(Optional) Displays SEA logs from the specified file location. The **disk** keyword when used along with *file-location* argument displays SEA logs from the specified file location.
last *num-of-last-log-msgs*	(Optional) Displays the specified number of log messages.

Command Default

This command has no default settings.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.
12.2(33)SCC	This command was introduced for the Cisco uBR10012 Router in the Cisco IOS Software Release 12.2(33)SCC.

Usage Guidelines

The **show logging system** command displays the latest messages first.

Examples

The following example shows a sample output of the show logging system command that displays the specified number of latest system log messages:

```
Router# show logging system

SEQ: MM/DD/YY HH:MM:SS MOD/SUB: SEV, COMP, MESSAGE
=================================================
1: 01/24/07 15:38:40 6/-1 : MAJ, GOLD, syndiagSyncPinnacle failed in slot 6
2: 01/24/07 15:38:40 6/-1 : MAJ, GOLD, queryHyperionSynched[6]: Hyperion out of sync in
sw_mode 1
3: 01/24/07 15:38:40 6/-1 : MAJ, GOLD, queryHyperionSynched[6]: Hyperion out of sync in
sw_mode 1
4: 01/24/07 15:38:40 6/-1 : MAJ, GOLD, queryHyperionSynched[6]: Hyperion out of sync in
sw_mode 1
5: 01/24/07 15:38:40 6/-1 : MAJ, GOLD, queryHyperionSynched[6]: Hyperion out of sync in
sw_mode 1
6: 01/24/07 15:38:40 6/-1 : MAJ, GOLD, queryHyperionSynched[6]: Hyperion out of sync in
sw_mode 1
```

```
7: 01/24/07 15:38:39 6/-1 : MAJ, GOLD, queryHyperionSynched[6]: Hyperion out of sync in
sw_mode 1
```

Table 100 describes the significant fields shown in the display.

Table 100 show logging system Field Descriptions

Field	Description
MOD/SUB	Module or the submodule that generated the log message.
SEV	Severity level of the message.
COMP	Software component that has logged the message.

The following example shows a sample output of the show logging system command that displays SEA logs from the specified file location:

```
Router# show logging system disk disk0:my_log.dat

SEQ: MM/DD/YY HH:MM:SS MOD/SUB: SEV, COMP, MESSAGE
=================================================
1: 02/01/95 00:35:51     2/3/-1: MAJ, GOLD, lc_ctrl_proc_obfl_info:test SEA log in
DFC:Diagnostic OBFL testing
2: 02/01/95 00:35:09     2/5/-1: MAJ, GOLD, diag_hit_sys_limit[3/2]: sp_netint_thr[0]
3: 02/01/95 00:35:09     2/5/-1: MAJ, GOLD, diag_hit_sys_limit[3/2]: SP[81%],Tx_rate[408],
Rx_rate[0]
4: 02/01/95 00:35:08     2/5/-1: MAJ, GOLD, diag_hit_sys_limit[3/2]: sp_netint_thr[0]
5: 02/01/95 00:35:08     2/5/-1: MAJ, GOLD, diag_hit_sys_limit[3/2]: SP[82%],Tx_rate[453],
Rx_rate[0]
6: 02/01/95 00:35:08     2/5/-1: MAJ, GOLD, test_c2cot_hm_ch0_test[3]: port 13, chnl 0,
Skipped Fabric Channel HM Test
7: 02/01/95 00:35:08     2/5/-1: MAJ, GOLD,
fabric_hm_inband_loopback_test[3/13]:diag_hit_sys_limit!test skipped.
8: 02/01/95 00:35:08     2/5/-1: MAJ, GOLD, diag_hit_sys_limit[3/13]: sp_netint_thr[0]
9: 02/01/95 00:35:08     2/5/-1: MAJ, GOLD, diag_hit_sys_limit[3/13]: SP[83%],
Tx_rate[453], Rx_rate[0]
```

Cisco uBR10012 Universal Broadband Router

The following example shows a sample output of the **show logging system** command on the Cisco uBR10012 Router:

```
Router# show logging system

SEQ: MM/DD/YY HH:MM:SS MOD/SUB: SEV, COMP,    MESSAGE
=================================================
1: 05/06/09 04:10:11     6/0: NON, SEATEST, "Test disk1":"
```

The following command is used to identify the disk on PRE currently being used to store the sea_log.dat file. The following example shows a sample output of the **show logging system disk** command executed on the Cisco uBR10012 router:

```
Router# show logging system disk

SEA log disk: disk1:
```

The following command is used to view the specified number of log messages stored in the sea_log.dat file. The following example shows a sample output of the **show logging system last 10** command on the Cisco uBR10012 router:

```
Router# show logging system last 10

SEQ: MM/DD/YY HH:MM:SS MOD/SUB: SEV, COMP,    MESSAGE
=================================================
1: 05/06/09 04:47:48 5/0: NON, SEATEST, "Second Message"
2: 05/06/09 04:47:31 6/0: NON, SEATEST, "First Message"
```

Related Commands

clear logging system	Clears the event records stored in the SEA.
copy logging system	Copies the archived system events to another location.
logging system	Enables or disables the SEA logging system.

show logging xml

To display the state of system message logging in an XML format, and to display the contents of the XML syslog buffer, use the **show logging xml** command in privileged EXEC mode.

show logging xml

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRE	This command was integrated into Cisco IOS Release 12.2(33)SRE.

Usage Guidelines

This command displays the same syslog state information as the standard **show logging** command, but displays the information in XML format. This command also displays the content of the XML syslog buffer (if XML-formatted buffer logging is enabled).

Examples

The following example compares the output of the standard **show logging** command with the output of the **show logging xml** command so that you can see how the standard information is formatted in XML.

```
Router# show logging

Syslog logging: enabled (10 messages dropped, 6 messages rate-limited, 0 flushes, 0
overruns, xml enabled)
    Console logging: level debugging, 28 messages logged, xml enabled
    Monitor logging: level debugging, 0 messages logged, xml enabled
    Buffer logging: level debugging, 2 messages logged, xml enabled (2 messages logged)
    Logging Exception size (8192 bytes)
    Count and timestamp logging messages: disabled
    Trap logging: level informational, 35 message lines logged
        Logging to 10.2.3.4, 1 message lines logged, xml disabled
        Logging to 192.168.2.1, 1 message lines logged, xml enabled

Log Buffer (8192 bytes):

00:04:20: %SYS-5-CONFIG_I: Configured from console by console
00:04:41: %SYS-5-CONFIG_I: Configured from console by console

Router# show logging xml

<syslog-logging status="enabled" msg-dropped="10" msg-rate-limited="6" flushes="0"
overruns="0"><xml>enabled</xml></syslog-logging>
    <console-logging level="debugging"
messages-logged="28"><xml>enabled</xml></console-logging>
    <monitor-logging level="debugging"
messages-logged="0"><xml>enabled</xml></monitor-logging>
```

```
    <buffer-logging level="debugging" messages-logged="2"><xml
messages-logged="2">enabled</xml></buffer-logging>
    <logging-exception size="8192 bytes"></logging-exception>
    <count-and-timestamp-logging status="disabled"></count-and-timestamp-logging>
    <trap-logging level="informational" messages-lines-logged="35"></trap-logging>
        <logging-to><dest id="0" ipaddr="10.2.3.4"
message-lines-logged="1"><xml>disabled</xml><dest></logging-to>
        <logging-to><dest id="1" ipaddr="192.168.2.1"
message-lines-logged="1"><xml>enabled</xml><dest></logging-to>

<log-xml-buffer size="44444 bytes"></log-xml-buffer>

<ios-log-msg><facility>SYS</facility><severity>5</severity><msg-id>CONFIG_I</msg-id><time>
00:04:20</time><args><arg id="0">console</arg><arg
id="1">console</arg></args></ios-log-msg>
<ios-log-msg><facility>SYS</facility><severity>5</severity><msg-id>CONFIG_I</msg-id><time>
00:04:41</time><args><arg id="0">console</arg><arg
id="1">console</arg></args></ios-log-msg>
Router#
```

Table 101 describes the significant fields shown in the displays.

Table 101 show logging and show logging xml Field Descriptions

Field	Description	XML Tag
Syslog logging	The global state of system message logging (syslog); “enabled” or “disabled.”	syslog-logging
Console logging	State of logging to console connections.	console-logging
Monitor logging	State of logging to monitor (TTY and Telnet) connections.	monitor-logging
Buffer logging	State of logging to the local system logging buffer.	buffer-logging
Count and timestamp logging messages:	Indicates whether the logging count feature is enabled. Corresponds to the **logging count** command.	count-and-timestamp-logging
Trap logging	State of logging to a remote host.	trap-logging

Related Commands

Command	Description
show logging	Displays the contents of the standard syslog buffer.
show logging count	Displays counts of each system error message.
show logging history	Displays the contents of the SNMP syslog history table.

show memory

To display statistics about memory when Cisco IOS or Cisco IOS software Modularity images are running, use the **show memory** command in user EXEC or privileged EXEC mode.

Cisco IOS Software

show memory [*memory-type*] [**free**] [**overflow**] [**summary**]

Cisco IOS Software Modularity

show memory

Syntax Description

memory-type	(Optional) Memory type to display (**processor**, **multibus**, **io**, or **sram**). If *memory-type* is not specified, statistics for all memory types present are displayed.
free	(Optional) Displays free memory statistics.
overflow	(Optional) Displays details about memory block header corruption corrections when the **exception memory ignore overflow** global configuration command is configured.
summary	(Optional) Displays a summary of memory usage including the size and number of blocks allocated for each address of the system call that allocated the block.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
12.3(7)T	This command was enhanced with the **overflow** keyword to display details about memory block header corruption corrections.
12.2(25)S	The command output was updated to display information about transient memory pools.
12.3(14)T	The command output was updated to display information about transient memory pools.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(18)SXF4	This command was implemented in Cisco IOS Software Modularity images.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Cisco IOS Software

The **show memory** command displays information about memory available after the system image decompresses and loads.

Cisco IOS Software Modularity

No optional keywords or arguments are supported for the **show memory** command when a Software Modularity image is running. To display details about PSOIX and Cisco IOS style system memory information when Software Modularity images are running, use the **show memory detailed** command.

Examples

Example output varies between Cisco IOS software images and Cisco IOS Software Modularity software images. To view the appropriate output, choose one of the following sections:

- Cisco IOS Software
- Cisco IOS Software Modularity

Cisco IOS Software

The following is sample output from the **show memory** command:

```
Router# show memory

                Head   Total(b)    Used(b)    Free(b)  Lowest(b) Largest(b)
Processor    B0EE38    5181896    2210036    2971860    2692456    2845368

          Processor memory
Address   Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What
B0EE38     1056 0         B0F280     1                  18F132    List Elements
B0F280     2656 B0EE38    B0FD08     1                  18F132    List Headers
B0FD08     2520 B0F280    B10708     1                  141384    TTY data
B10708     2000 B0FD08    B10F00     1                  14353C    TTY Input Buf
B10F00      512 B10708    B11128     1                  14356C    TTY Output Buf
B11128     2000 B10F00    B11920     1                  1A110E    Interrupt Stack
B11920       44 B11128    B11974     1                  970DE8    *Init*
B11974     1056 B11920    B11DBC     1                  18F132    messages
B11DBC       84 B11974    B11E38     1                  19ABCE    Watched Boolean
B11E38       84 B11DBC    B11EB4     1                  19ABCE    Watched Boolean
B11EB4       84 B11E38    B11F30     1                  19ABCE    Watched Boolean
B11F30       84 B11EB4    B11FAC     1                  19ABCE    Watched Boolean
```

The following is sample output from the **show memory free** command:

```
Router# show memory free

                Head   Total(b)    Used(b)    Free(b)  Lowest(b) Largest(b)
Processor       B0EE38    5181896    2210076    2971820    2692456    2845368

          Processor memory
Address   Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What
             24    Free list 1
CEB844       32  CEB7A4 CEB88C      0  0       0       96B894    SSE Manager
             52    Free list 2
             72    Free list 3
             76    Free list 4
             80    Free list 5
D35ED4       80 D35E30   D35F4C     0  0       D27AE8  96B894    SSE Manager
D27AE8       80 D27A48   D27B60     0  D35ED4  0       22585E    SSE Manager
             88    Free list 6
            100    Free list 7
D0A8F4      100 D0A8B0   D0A980     0  0       0       2258DA    SSE Manager
            104    Free list 8
B59EF0      108 B59E8C   B59F84     0  0       0       2258DA    (fragment)
```

The output of the **show memory free** command contains the same types of information as the **show memory** output, except that only free memory is displayed, and the information is ordered by free list.

The first section of the display includes summary statistics about the activities of the system memory allocator. Table 102 describes the significant fields shown in the first section of the display.

Table 102 show memory Field Descriptions—First Section

Field	Description
Head	Hexadecimal address of the head of the memory allocation chain.
Total(b)	Sum of used bytes plus free bytes.
Used(b)	Amount of memory in use.
Free(b)	Amount of memory not in use.
Lowest(b)	Smallest amount of free memory since last boot.
Largest(b)	Size of largest available free block.

The second section of the display is a block-by-block listing of memory use. Table 103 describes the significant fields shown in the second section of the display.

Table 103 Characteristics of Each Block of Memory—Second Section

Field	Description
Address	Hexadecimal address of block.
Bytes	Size of block (in bytes).
Prev.	Address of previous block (should match the address on previous line).
Next	Address of next block (should match the address on next line).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of previous free block (if free).
NextF	Address of next free block (if free).
Alloc PC	Address of the system call that allocated the block.
What	Name of process that owns the block, or “(fragment)” if the block is a fragment, or “(coalesced)” if the block was coalesced from adjacent free blocks.

The **show memory io** command displays the free I/O memory blocks. On the Cisco 4000 router, this command quickly shows how much unused I/O memory is available.

The following is sample output from the **show memory io** command:

```
Router# show memory io

Address   Bytes Prev.   Next     Ref  PrevF   NextF   Alloc PC  What
6132DA0   59264 6132664 6141520  0    0       600DDEC  3FCF0     *Packet Buffer*
600DDEC     500 600DA4C 600DFE0  0   6132DA0 600FE68  0
600FE68     376 600FAC8 600FFE0  0   600DDEC 6011D54  0
6011D54     652 60119B4 6011FEO  0   600FE68 6013D54  0
614FCA0     832 614F564 614FFE0  0   601FD54 6177640  0
6177640 2657056 6172E90 0        0   614FCA0 0        0
Total: 2723244
```

The following example displays details of a memory block overflow correction when the **exception memory ignore overflow** global configuration command is configured:

```
Router# show memory overflow

Count    Buffer Count     Last corrected      Crashinfo files

1        1                00:11:17            slot0:crashinfo_20030620-075755
Traceback   607D526C 608731A0 607172F8 607288E0 607A5688 607A566C
```

The report includes the amount of time since the last correction was made and the name of the file that logged the memory block overflow details.

The **show memory sram** command displays the free SRAM memory blocks. For the Cisco 4000 router, this command supports the high-speed static RAM memory pool to make it easier for you to debug or diagnose problems with allocation or freeing of such memory.

The following is sample output from the **show memory sram** command:

```
Router# show memory sram

Address   Bytes Prev.   Next     Ref  PrevF   NextF   Alloc PC  What
7AE0      38178 72F0    0        0    0       0       0
Total     38178
```

The following example of the **show memory** command used on the Cisco 4000 router includes information about SRAM memory and I/O memory:

```
Router# show memory

               Head   Total(b)    Used(b)    Free(b)  Lowest(b) Largest(b)
Processor    49C724   28719324    1510864   27208460   26511644   15513908
      I/O   6000000    4194304    1297088    2897216    2869248    2896812
     SRAM      1000      65536      63400       2136       2136       2136

Address   Bytes Prev.   Next     Ref  PrevF   NextF   Alloc PC  What
1000       2032 0       17F0       1                   3E73E     *Init*
17F0       2032 1000    1FE0       1                   3E73E     *Init*
1FE0        544 17F0    2200       1                   3276A     *Init*
2200         52 1FE0    2234       1                   31D68     *Init*
2234         52 2200    2268       1                   31DAA     *Init*
2268         52 2234    229C       1                   31DF2     *Init*
72F0       2032 6E5C    7AE0       1                   3E73E     Init
7AE0      38178 72F0    0          0    0      0       0
```

The **show memory summary** command displays a summary of all memory pools and memory usage per Alloc PC (address of the system call that allocated the block).

The following is a partial sample output from the **show memory summary** command. This output shows the size, blocks, and bytes allocated. Bytes equal the size multiplied by the blocks. For a description of the other fields, see Table 102 and Table 103.

```
Router# show memory summary

Head    Total(b)     Used(b)     Free(b)  Lowest(b) Largest(b)
Processor    B0EE38    5181896    2210216    2971680    2692456    2845368

          Processor memory
Alloc PC        Size     Blocks      Bytes    What
0x2AB2           192          1        192    IDB: Serial Info
0x70EC            92          2        184    Init
0xC916           128         50       6400    RIF Cache
0x76ADE         4500          1       4500    XDI data
0x76E84         4464          1       4464    XDI data
```

```
0x76EAC          692          1         692    XDI data
0x77764          408          1         408    Init
0x77776          116          1         116    Init
0x777A2          408          1         408    Init
0x777B2          116          1         116    Init
0xA4600           24          3          72    List
0xD9B5C           52          1          52    SSE Manager
.
.
.
0x0                0       3413     2072576    Pool Summary
0x0                0         28     2971680    Pool Summary (Free Blocks)
0x0               40       3441      137640    Pool Summary (All Block Headers)
0x0                0       3413     2072576    Memory Summary
0x0                0         28     2971680    Memory Summary (Free Blocks)
```

Cisco IOS Software Modularity

The following is sample output from the **show memory** command when a Cisco IOS Software Modularity image is running.

```
Router# show memory

System Memory: 262144K total, 116148K used, 145996K free 4000K kernel reserved
```

Table 104 describes the significant fields shown in the display.

Table 104 show memory (Software Modularity Image) Field Descriptions

Field	Description
total	Total amount of memory on the device, in kilobytes.
used	Amount of memory in use, in kilobytes.
free	Amount of memory not in use, in kilobytes.
kernel reserved	Amount of memory reserved by the kernel, in kilobytes.

Related Commands

Command	Description
exception memory ignore overflow	Configures the Cisco IOS software to correct corruptions in memory block headers and allow a router to continue its normal operation.
show memory detailed	Displays POSIX and Cisco IOS style system memory information.
show processes memory	Displays memory used per process.

show memory allocating-process

To display statistics on allocated memory with corresponding allocating processes, use the **show memory allocating-process** command in user EXEC or privileged EXEC mode.

show memory allocating-process [**totals**]

Syntax Description

totals	(Optional) Displays allocating memory totals.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Usage Guidelines

The **show memory allocating-process** command displays information about memory available after the system image decompresses and loads.

Examples

The following is sample output from the **show memory allocating-process** command:

```
Router# show memory allocating-process

    Head Total(b)Used(b)Free(b)Lowest(b)Largest(b)
Processor 44E03560186632636261318961605007401604020521530782O4
     Fast 44DE35601310725828072792727927 2764

          Processor memory

 Address  Bytes Prev.    Next     Ref    Alloc Proc    Alloc PC  What
6148EC40   1504 0        6148F24C   1  *Init*          602310FC  List Elements
6148F24C   3004 6148EC40 6148FE34   1  *Init*          60231128  List Headers
6148FE34   9000 6148F24C 61492188   1  *Init*          6023C634  Interrupt Stack
61492188     44 6148FE34 614921E0   1  *Init*          60C17FD8  *Init*
614921E0   9000 61492188 61494534   1  *Init*          6023C634  Interrupt Stack
61494534     44 614921E0 6149458C   1  *Init*          60C17FD8  *Init*
6149458C    220 61494534 61494694   1  *Init*          602450F4  *Init*
61494694   4024 6149458C 61495678   1  *Init*          601CBD64  TTY data
.
.
.
```

Table 105 describes the significant fields shown in the display.

Table 105 show memory allocating-process Field Descriptions

Field	Description
Head	Hexadecimal address of the head of the memory allocation chain.
Total(b)	Sum of used bytes plus free bytes.

Table 105 show memory allocating-process Field Descriptions (continued)

Field	Description
Used(b)	Amount of memory in use in bytes.
Free(b)	Amount of memory not in use (in bytes).
Lowest(b)	Smallest amount of free memory since last boot (in bytes).
Largest(b)	Size of largest available free block (in bytes).
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).
Prev.	Address of the preceding block (should match the address on preceding row).
Next	Address of the following block (should match the address on following row).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
Alloc PC	Address of the system call that allocated the block.
What	Name of process that owns the block, or "(fragment)" if the block is a fragment, or "(coalesced)" if the block was coalesced from adjacent free blocks.

The following is sample output from the **show memory allocating-process totals** command:

```
Router# show memory allocating-process totals

               Head    Total(b)     Used(b)     Free(b)   Lowest(b)  Largest(b)
Processor   44E03560   186632636    26142524   160490112   160402052   153078204
     Fast   44DE3560      131072       58280       72792       72792       72764

Allocator PC Summary for: Processor

    PC          Total   Count  Name
0x4041AF8C    5710616    3189  *Packet Data*
0x4041AF40    2845480    3190  *Packet Header*
0x404DBA28    1694556     203  Process Stack
0x4066EA68    1074080      56  Init
0x404B5F68    1049296       9  pak subblock chunk
0x41DCF230     523924      47  TCL Chunks
0x404E2488     448920       6  MallocLite
0x4066EA8C     402304      56  Init
0x40033878     397108       1  Init
0x41273E24     320052       1  CEF: table event ring
0x404B510C     253152      24  TW Buckets
0x42248F0C     229428       1  Init
0x42248F28     229428       1  Init
0x42248F48     229428       1  Init
0x423FF210     218048       5  Dn48oC!M
0x421CB530     208144       1  epa crypto blk
0x417A07F0     196764       3  L2TP Hash Table
0x403AFF50     187836       3  Init
```

Table 106 describes the significant fields shown in the display.

Table 106 show memory allocating-process totals Field Descriptions

Field	Description
Head	Hexadecimal address of the head of the memory allocation chain.
Total(b)	Sum of used bytes plus free bytes.
Used(b)	Amount of memory in use (in bytes).
Free(b)	Amount of memory not in use (in bytes).
Lowest(b)	Smallest amount of free memory since last boot (in bytes).
Largest(b)	Size of the largest available free block in bytes.
PC	Program counter
Total	Total memory allocated by the process (in bytes).
Count	Number of allocations.
Name	Name of the allocating process.

Related Commands

Command	Description
show processes memory	Displays memory used per process.

show memory dead

To display statistics on memory allocated by processes that have terminated, use the **show memory dead** command in user EXEC or privileged EXEC mode.

show memory dead [**totals**]

Syntax Description

totals	(Optional) Displays memory totals for processes that have been terminated.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The **show memory dead** command displays information about processes that have been terminated. Terminated processes accounts for memory allocated under another process.

Examples

The following is sample output from the **show memory dead** command:

```
Router# show memory dead

              Head    Total(b) Used(b)     Free(b)   Lowest(b)  Largest(b)
      I/O    600000    2097152 461024    1636128    1635224    1635960

          Processor memory

 Address  Bytes Prev.    Next     Ref  PrevF   NextF   Alloc PC  What
1D8310       60 1D82C8   1D8378     1                  3281FFE   Router Init
2CA964       36 2CA914   2CA9B4     1                  3281FFE   Router Init
2CAA04      112 2CA9B4   2CAAA0     1                  3A42144   OSPF Stub LSA RBTree
2CAAA0       68 2CAA04   2CAB10     1                  3A420D4   Router Init
2ED714       52 2ED668   2ED774     1                  3381C84   Router Init
2F12AC       44 2F124C   2F1304     1                  3A50234   Router Init
2F1304       24 2F12AC   2F1348     1                  3A420D4   Router Init
2F1348       68 2F1304   2F13B8     1                  3381C84   Router Init
300C28      340 300A14   300DA8     1                  3381B42   Router Init
```

Table 107 describes the significant fields shown in the display.

Table 107 show memory dead Field Descriptions

Field	Description
Head	Hexadecimal address of the head of the memory allocation chain.
Total(b)	Sum of used bytes plus free bytes.
Used(b)	Amount of memory in use.
Free(b)	Amount of memory not in use (in bytes).
Lowest(b)	Smallest amount of free memory since last boot (in bytes).
Largest(b)	Size of the largest available free block (in bytes).
Address	Hexadecimal address of the block (in bytes).
Bytes	Size of the block (in bytes).
Prev.	Address of the preceding block.
Next	Address of the following block.
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of the preceding free block (if free).
NextF	Address of the following free block (if free).
Alloc PC	Address of the program counter that allocated the block.
What	Name of the process that owns the block, or “(fragment)” if the block is a fragment, or “(coalesced)” if the block was coalesced from adjacent free blocks.

show memory debug incremental

To display information about memory leaks after a starting time has been established, use the **show memory debug incremental** command in privileged EXEC mode.

show memory debug incremental {**allocations** | **leaks** [**lowmem** | **summary**] | **status**}

Syntax Description

allocations	Displays all memory blocks that were allocated after issuing the **set memory debug incremental starting-time** command.
leaks	Displays only memory that was leaked after issuing the **set memory debug incremental starting-time** command.
lowmem	(Optional) Forces the memory leak detector to work in low memory mode, making no memory allocations.
summary	(Optional) Reports summarized memory leaks based on allocator_pc and size of the memory block.
status	Displays all memory blocks that were allocated after issuing the **set memory debug incremental starting-time** command.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4T	The summary keyword was added.

Usage Guidelines

The **show memory debug incremental allocations** command displays all the memory blocks that were allocated after the **set memory debug incremental starting-time** command was entered. The displayed memory blocks are just memory allocations, they are not necessarily leaks.

The **show memory debug incremental leaks** command provides output similar to the **show memory debug leaks** command, except that it displays only memory that was leaked after the **set memory debug incremental starting-time** command was entered.

The **show memory debug incremental leaks lowmem** command forces memory leak detection to work in low memory mode. The amount of time taken for analysis is considerably greater than that of normal mode. The output for this command is similar to the **show memory debug leaks** command, except that it displays only memory that was leaked after the **set memory debug incremental starting-time** command was entered. You can use this command when you already know that normal mode memory leak detection will fail (perhaps by an unsuccessful previous attempt to invoke normal mode memory leak detection).

The **show memory debug incremental leaks summary** command displays a summarized report of the memory that was leaked after the **set memory debug incremental starting-time** command was entered, ordered by allocator process call address (Alloc_pc) and by memory block size.

The **show memory debug incremental status** command displays whether a starting point for incremental analysis has been set and the elapsed time since then.

Note All **show memory debug** commands must be used on customer networks only to diagnose the router for memory leaks when memory depletion is observed. These CLI's will have high CPU utilization and might result in time sensitive protocols to flap. These CLI's are recommended for customer use, only in the maintenance window when the router is not in a scaled condition.

Note All memory leak detection commands invoke normal mode memory leak detection, except when the low memory option is specifically invoked by use of the **lowmem** keyword. In normal mode, if memory leak detection determines that there is insufficient memory to proceed in normal mode, it will display an appropriate message and switch to low memory mode.

Examples

show memory debug incremental allocations Command Example

The following example shows output from the **show memory debug incremental** command when entered with the **allocations** keyword:

```
Router# show memory debug incremental allocations

Address    Size   Alloc_pc  PID  Name
62DA4E98      176 608CDC7C  44   CDP Protocol
62DA4F48       88 608CCCC8  44   CDP Protocol
62DA4FA0       88 606224A0  3    Exec
62DA4FF8       96 606224A0  3    Exec
635BF040       96 606224A0  3    Exec
63905E50      200 606A4DA4  69   Process Events
```

show memory debug incremental leaks summary Command Example

The following example shows output from the **show memory debug incremental** command when entered with the **leaks** and **summary** keywords:

```
Router# show memory debug incremental leaks summary
Adding blocks for GD...

                PCI memory
Alloc PC     Size     Blocks      Bytes    What
                I/O memory
Alloc PC     Size     Blocks      Bytes    What
                Processor memory
Alloc PC     Size          Blocks       Bytes      What
0x60874198  0000000052  0000000001  0000000052    Exec
0x60874198  0000000060  0000000001  0000000060    Exec
0x60874198  0000000100  0000000001  0000000100    Exec
0x60874228  0000000052  0000000004  0000000208    Exec
0x60874228  0000000060  0000000002  0000000120    Exec
0x60874228  0000000100  0000000004  0000000400   Exec
```

show memory debug incremental status Command Example

The following example shows output from the **show memory debug incremental** command entered with the **status** keyword:

```
Router# show memory debug incremental status

Incremental debugging is enabled
Time elapsed since start of incremental debugging: 00:00:10
```

Related Commands

Command	Description
set memory debug incremental starting-time	Sets the current time as the starting time for incremental analysis.
show memory debug leaks	Displays detected memory leaks.

show memory debug leaks

To display detected memory leaks, use the **show memory debug leaks** command in privileged EXEC mode.

show memory debug leaks [**chunks** | **largest** | **lowmem** | **summary**]

Syntax Description

chunks	(Optional) Displays the memory leaks in chunks.
largest	(Optional) Displays the top ten leaking allocator_pcs based on size, and the total amount of memory they have leaked.
lowmem	(Optional) Forces the memory leak detector to work in low memory mode, making no memory allocations.
summary	(Optional) Reports summarized memory leaks based on allocator_pc and size of the memory block.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(8)T1	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If no optional keywords are specified, the **show memory debug leaks** command invokes normal mode memory leak detection and does not look for memory leaks in chunks.

The **show memory debug leaks chunks** command invokes normal mode memory leak detection and looks for leaks in chunks as well.

The **show memory debug leaks largest** command displays the top ten leaking allocator_pcs and the total amount of memory that they have leaked. Additionally, each time this command is invoked it remembers the previous invocation's report and compares it to the current invocation's report. If there are new entries in the current report they are tagged as “inconclusive.” If the same entry appears in the previous invocation's report and the current invocation's report, the inconclusive tag is not added. It would be beneficial to run memory leak detection more than once and to consider only the consistently reported leaks.

The **show memory debug leaks lowmem** command forces memory leak detection to work in low memory mode. The amount of time taken for analysis is considerably greater than that of normal mode. The output for this command is similar to the **show memory debug leaks** command. You can use this command when you already know that normal mode memory leak detection will fail (perhaps by an unsuccessful previous attempt to invoke normal mode memory leak detection).

The **show memory debug leaks summary** command reports memory leaks based on allocator_pc and then on the size of the block.

Note All show memory debug commands must be used on customer networks only to diagnose the router for memory leaks when memory depletion is observed. These CLI's will have high CPU utilization and might result in time sensitive protocols to flap. These CLI's are recommended for customer use, only in the maintenance window when the router is not in a scaled condition.

Note All memory leak detection commands invoke normal mode memory leak detection, except when the low memory option is specifically invoked by use of the **lowmem** keyword. In normal mode, if memory leak detection determines that there is insufficient memory to proceed in normal mode, it will display an appropriate message and switch to low memory mode.

Examples

show memory debug leaks Command Example

The following example shows output from the **show memory debug leaks** command:

```
Router# show memory debug leaks

Adding blocks for GD...

                PCI memory
Address    Size   Alloc_pc  PID  Name

                I/O memory
Address    Size   Alloc_pc  PID  Name

                Processor memory
Address    Size   Alloc_pc  PID  Name
62DABD28       80 60616750  -2   Init
62DABD78       80 606167A0  -2   Init
62DCF240       88 605B7E70  -2   Init
62DCF298       96 605B7E98  -2   Init
62DCF2F8       88 605B7EB4  -2   Init
62DCF350       96 605B7EDC  -2   Init
63336C28      104 60C67D74  -2   Init
63370D58       96 60C656AC  -2   Init
633710A0      304 60C656AC  -2   Init
63B2BF68       96 60C659D4  -2   Init
63BA3FE0    32832 608D2848  104  Audit Process
63BB4020    32832 608D2FD8  104  Audit Process
```

Table 108 describes the significant fields shown in the display.

Table 108 show memory debug leaks Field Descriptions

Field	Description
Address	Hexadecimal address of the leaked block.
Size	Size of the leaked block (in bytes).
Alloc_pc	Address of the system call that allocated the block.
PID	The process identifier of the process that allocated the block.
Name	The name of the process that allocated the block.

show memory debug leaks chunks Command Example

The following example shows output from the **show memory debug leaks chunks** command:

```
Router# show memory debug leaks chunks

Adding blocks for GD...

                PCI memory
Address    Size   Alloc_pc  PID  Name

Chunk Elements:
Address  Size  Parent   Name

                I/O memory
Address    Size   Alloc_pc  PID  Name

Chunk Elements:
Address  Size  Parent   Name

                Processor memory
Address    Size   Alloc_pc  PID  Name
62DABD28       80 60616750  -2   Init
62DABD78       80 606167A0  -2   Init
62DCF240       88 605B7E70  -2   Init
62DCF298       96 605B7E98  -2   Init
62DCF2F8       88 605B7EB4  -2   Init
62DCF350       96 605B7EDC  -2   Init
63336C28      104 60C67D74  -2   Init
63370D58       96 60C656AC  -2   Init
633710A0      304 60C656AC  -2   Init
63B2BF68       96 60C659D4  -2   Init
63BA3FE0    32832 608D2848  104  Audit Process
63BB4020    32832 608D2FD8  104  Audit Process

Chunk Elements:
Address  Size  Parent   Name
62D80DA8    16 62D7BFD0 (Managed Chunk )
62D80DB8    16 62D7BFD0 (Managed Chunk )
62D80DC8    16 62D7BFD0 (Managed Chunk )
62D80DD8    16 62D7BFD0 (Managed Chunk )
62D80DE8    16 62D7BFD0 (Managed Chunk )
62E8FD60   216 62E8F888 (IPC Message He)
```

Table 109 describes the significant fields shown in the display.

Table 109 show memory debug leaks chunks Field Descriptions

Field	Description
Address	Hexadecimal address of the leaked block.
Size	Size of the leaked block (in bytes).
Alloc_pc	Address of the system call that allocated the block.
PID	The process identifier of the process that allocated the block.
Name	The name of the process that allocated the block.
Size	(Chunk Elements) Size of the leaked element (bytes).
Parent	(Chunk Elements) Parent chunk of the leaked chunk.
Name	(Chunk Elements) The name of the leaked chunk.

show memory debug leaks largest Command Example

The following example shows output from the **show memory debug leaks largest** command:

```
Router# show memory debug leaks largest

Adding blocks for GD...

                PCI memory
Alloc_pc    total leak size

                I/O memory
Alloc_pc    total leak size

                Processor memory
Alloc_pc    total leak size
608D2848    32776     inconclusive
608D2FD8    32776     inconclusive
60C656AC    288       inconclusive
60C67D74    48        inconclusive
605B7E98    40        inconclusive
605B7EDC    40        inconclusive
60C659D4    40        inconclusive
605B7E70    32        inconclusive
605B7EB4    32        inconclusive
60616750    24        inconclusive
```

The following example shows output from the second invocation of the **show memory debug leaks largest** command:

```
Router# show memory debug leaks largest

Adding blocks for GD...

                PCI memory
Alloc_pc    total leak size

                I/O memory
Alloc_pc    total leak size

                Processor memory
Alloc_pc    total leak size
608D2848    32776
608D2FD8    32776
60C656AC    288
60C67D74    48
605B7E98    40
605B7EDC    40
60C659D4    40
605B7E70    32
605B7EB4    32
60616750    24
```

show memory debug leaks summary Command Example

The following example shows output from the **show memory debug leaks summary** command:

```
Router# show memory debug leaks summary

Adding blocks for GD...

                PCI memory

Alloc PC        Size     Blocks      Bytes    What
```

```
                 I/O memory

Alloc PC        Size     Blocks      Bytes    What

                 Processor memory

Alloc PC        Size     Blocks      Bytes    What

0x605B7E70 0000000032 0000000001 0000000032    Init
0x605B7E98 0000000040 0000000001 0000000040    Init
0x605B7EB4 0000000032 0000000001 0000000032    Init
0x605B7EDC 0000000040 0000000001 0000000040    Init
0x60616750 0000000024 0000000001 0000000024    Init
0x606167A0 0000000024 0000000001 0000000024    Init
0x608D2848 0000032776 0000000001 0000032776    Audit Process
0x608D2FD8 0000032776 0000000001 0000032776    Audit Process
0x60C656AC 0000000040 0000000001 0000000040    Init
0x60C656AC 0000000248 0000000001 0000000248    Init
0x60C659D4 0000000040 0000000001 0000000040    Init
0x60C67D74 0000000048 0000000001 0000000048    Init
```

Table 110 describes the significant fields shown in the display.

Table 110 show memory debug leaks summary Field Descriptions

Field	Description
Alloc_pc	Address of the system call that allocated the block.
Size	Size of the leaked block.
Blocks	Number of blocks leaked.
Bytes	Total amount of memory leaked.
What	Name of the process that owns the block.

Related Commands

Command	Description
set memory debug incremental starting-time	Sets the current time as the starting time for incremental analysis.
show memory debug incremental allocation	Displays all memory blocks that were allocated after the issue of the **set memory debug incremental starting-time** command.
show memory debug incremental leaks	Displays only memory that was leaked after the issue of the **set memory debug incremental starting-time** command.
show memory debug incremental leaks lowmem	Forces incremental memory leak detection to work in low memory mode. Displays only memory that was leaked after the issue of the **set memory debug incremental starting-time** command.
show memory debug incremental status	Displays if the starting point of incremental analysis has been defined and the time elapsed since then.

show memory debug references

To display debug information on references, use the **show memory debug references** command in user EXEC or privileged EXEC mode.

show memory debug references [**dangling** [*start-address start-address*]]

Syntax Description

dangling	(Optional) Displays the possible references to free memory.
start-address	(Optional) Address numbers <0-4294967295> that determine the address range.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Usage Guidelines

All **show memory debug** commands must be used on customer networks only to diagnose the router for memory leaks when memory depletion is observed. These CLI's will have high CPU utilization and might result in time sensitive protocols to flap. These CLI's are recommended for customer use, only in the maintenance window when the router is not in a scaled condition.

Examples

The following is sample output from the **show memory debug references** command:

```
Router# show memory debug references 2 3

Address  Reference Cont_block Cont_block_name
442850BC         2  44284960   bss
44285110         3  44284960   bss
4429C33C         2  44284960   bss
4429C34C         2  44284960   bss
4429C35C         3  44284960   bss
.
.
.
```

The following is sample output from the **show memory debug references dangling** command:

```
Router# show memory debug references dangling

Address  Reference Free_block Cont_block Cont_block_name
442D5774 458CE5EC  458CE5BC   44284960   bss
442D578C 46602998  46602958   44284960   bss
442D58A0 465F9BC4  465F9B94   44284960   bss
442D58B8 4656785C  4656781C   44284960   bss
442D5954 45901E7C  45901E4C   44284960   bss
.
.
.
```

Table 111 describes the significant fields shown in the displays.

Table 111 show memory debug references Field Descriptions

Field	Description
Address	Hexadecimal address of the block having the given or dangling reference.
Reference	Address which is given or dangling.
Free_block	Address of the free block which now contains the memory referenced by the dangling reference.
Cont_block	Address of the control block which contains the block having the reference.
Cont_block_name	Name of the control block.

show memory debug unused

To display debug information on leaks that are accessible, but are no longer needed, use the **show memory debug unused** command in user EXEC or privileged EXEC mode.

show memory debug unused

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory debug unused** command:

```
Router# show memory debug unused

Address  Alloc_pc PID  size     Name
654894B8 62BF31DC -2   44       *Init*
6549A074 601F7A84 -2   4464     XDI data
6549B218 601F7274 -2   4500     XDI data
6549DFB0 6089DDA4 42   84       Init
65509160 6089DDA4 1    84       *Init*
6550A260 6089DDA4 2    84       *Init*
6551FDB4 6089DDA4 4    84       *Init*
6551FF34 627EFA2C -2   24       *Init*
65520B3C 6078B1A4 -2   24       Parser Mode Q1
65520B88 6078B1C8 -2   24       Parser Mode Q2
65520C40 6078B1A4 -2   24       Parser Mode Q1
65520C8C 6078B1C8 -2   24       Parser Mode Q2
65520D44 6078B1A4 -2   24       Parser Mode Q1
65520D90 6078B1C8 -2   24       Parser Mode Q2
65520E48 6078B1A4 -2   24       Parser Mode Q1
65520E94 6078B1C8 -2   24       Parser Mode Q2
65520F4C 6078B1A4 -2   24       Parser Mode Q1
65520F98 6078B1C8 -2   24       Parser Mode Q2
65521050 6078B1A4 -2   24       Parser Mode Q1
6552109C 6078B1C8 -2   24       Parser Mode Q2
65521154 6078B1A4 -2   24       Parser Mode Q1
655211A0 6078B1C8 -2   24       Parser Mode Q2
.
.
.
```

Table 112 describes the significant fields shown in the display.

Table 112 show memory debug unused Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Alloc_pc	Address of the program counter that allocated the block.
PID	Process identifier of the process that allocated the block.
size	Size of the unused block (in bytes).
Name	Name of the process that owns the block.

show memory ecc

To display single-bit Error Code Correction (ECC) error logset data, use the **show memory ecc** command in privileged EXEC mode.

show memory ecc

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1(30)CC	This command was introduced in Cisco IOS Release 11.1(30)CC.
12.0(4)XE	This command was integrated into Cisco IOS Release 12.0(4)XE.
12.0(6)S	This command was integrated into Cisco IOS Release 12.0(6)S.
12.1(13)	This command was integrated into Cisco IOS Release 12.1(13).

Usage Guidelines

Use this command to determine if the router has experienced single-bit parity errors.

Examples

The following is sample output from the **show memory ecc** command from a 12000-series router running Cisco IOS Release 12.0(23)S:

```
Router# show memory ecc
ECC Single Bit error log
------------------------
Single Bit error detected and corrected at 0x574F3640
- Occured 1 time(s)
- Whether a scrub was attempted at this address: Yes
- Syndrome of the last error at this address: 0xE9
- Error detected on a read-modify-write cycle ? No
- Address region classification: Unknown
- Address media classification : Read/Write Single Bit error detected and corrected at
0x56AB3760
- Occured 1 time(s)
- Whether a scrub was attempted at this address: Yes
- Syndrome of the last error at this address: 0x68
- Error detected on a read-modify-write cycle ? No
- Address region classification: Unknown
- Address media classification : Read/Write

Total Single Bit error(s) thus far: 2
```

Table 113 describes the significant fields shown in the first section of the display.

Table 113 show memory ecc Field Descriptions

Field	Description
Occured *n* time(s)	Number of single-bit errors that has occurred.
Whether a scrub was attempted at this address:	Indicates whether a scrub has been performed.
Syndrome of the last error at this address:	Describes the syndrome of last error.
Error detected on a read-modify-write cycle ?	Indicates whether an error has occurred.
Address region classification: Unknown	Describes the region of the error.
Address media classification :	Describes the media of the error and correction.

Related Commands

Command	Description
show memory	Displays statistics about memory, including memory-free pool statistics.

show memory events

To display recorded memory events, use the **show memory events** command in privileged EXEC mode.

show memory events [**outstanding** [**summary**]]

Syntax Description

outstanding	(Optional) Displays the outstanding allocation events in the event buffer.
summary	(Optional) Displays a summary of outstanding allocation events in the event buffer.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced in a release earlier than Cisco IOS Release 15.0(1)M.

Usage Guidelines

Before you can enable the **show memory events** command, you must configure the **memory record events** command in global configuration mode.

Examples

The following is sample output from the **show memory events** command:

```
Router# configure terminal
Router(config)# memory record events

Memory event recording already enabled!

Router(config)# exit
Router# show memory events

Last recorded memory events:
When         Type Block/Chunk DataPtr Size PID What Traceback/PC
4d19h        FREE 695B3200 695B3230 3000   82 Iterator Hash Entry 615B75C4
```

Table 114 describes the significant fields shown in the display.

Table 114 show memory events Field Descriptions

Field	Description
When	Time when the memory event was last seen by the system (in hours and days).
Type	Allocation type.
Block/Chunk/DataPtr	Number of memory events allocated.
Size	Amount of memory, in bytes, used by the task.
PID	Packet identification number.

Table 114 show memory events Field Descriptions (continued)

Field	Description
What	Name of the process that owns a block or fragment.
Traceback/PC	Traceback error.

The following is sample output from the **show memory events** command using the **outstanding and summary** keywords:

```
Router# configure terminal
Router(config)# memory record events

Memory event recording already enabled!

Router(config)# exit
Router# show memory events outstanding summary

Last-Seen    Type   How-Many Size     PID What         Traceback/PC
5d16h        ALLOC    1        320    135 Exec                 61B399F4
```

Table 115 describes the significant fields shown in the display.

Table 115 show memory events Field Descriptions

Field	Description
Last-Seen	Time when the memory event was last seen by the system (in hours and days).
Type	Allocation type.
How-Many	Number of memory events allocated.
Size	Amount of memory, in bytes, used by the task.
PID	Packet identification number.
What	Name of the process that owns a block or fragment.
Traceback/PC	Traceback error.

Related Commands

Command	Description
show memory traceback	Displays memory traceback information.

show memory failures alloc

To display statistics about failed memory allocation requests, use the **show memory failures alloc** command in the privileged EXEC mode.

show memory failures alloc

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory failures alloc** command:

```
Router# show memory failures alloc

Caller       Pool          Size   Alignment   When
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:03
0x60394744  I/O             1684     32      00:10:04
0x60394744  I/O             1684     32      00:10:04
```

Table 116 describes the significant fields shown in the display.

Table 116 show memory failures alloc Field Descriptions

Field	Description
Caller	Address of the allocator function that issued memory allocation request that failed.
Pool	Pool from which the memory was requested.
Size	Size of the memory requested in bits.
Alignment	Memory alignment in bits.
When	Time of day at which the memory allocation request was issued.

show memory fast

To display fast memory details for the router, use the **show memory fast** command.

show memory fast [**allocating-process** [**totals**] | **dead** [**totals**] | **free** [**totals**]]

Syntax Description

allocating-process	(Optional) Include allocating process names with the standard output.
dead	(Optional) Display only memory owned by dead processes.
free	(Optional) Display only memory not allocated to a process.
totals	(Optional) Summarizes the statistics for allocating processes, dead memory, or free memory.

Command Modes

Exec

Command History

Release	Modification
12.1	This command was introduced in a release prior to 12.1. This command replaced the **show memory sram** command.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The show memory fast command displays the statistics for the fast memory. “Fast memory” is another name for “processor memory,” and is also known as “cache memory.” Cache memory is called fast memory because the processor can generally access the local cache (traditionally stored on SRAM positioned close to the processor) much more quickly than main memory or RAM.

Note The **show memory fast** command is a command alias for the **show memory processor** command. These commands will issue the same output.

Examples

The following example shows sample output from the **show memory fast** and the **show memory processor** commands:

```
Router>show memory fast

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
8404A580 0001493284 00000000 841B6ECC 000  0        84BADF88 815219D8  (coalesced)
841B6ECC 0000020004 8404A580 841BBD18 001  -------- -------- 815DB094  Managed Chunk Queue
Elements
841BBD18 0000001504 841B6ECC 841BC320 001  -------- -------- 8159EAC4  List Elements
841BC320 0000005004 841BBD18 841BD6D4 001  -------- -------- 8159EB04  List Headers
841BD6D4 0000000048 841BC320 841BD72C 001  -------- -------- 81F2A614  *Init*
841BD72C 0000001504 841BD6D4 841BDD34 001  -------- -------- 815A9514  messages
841BDD34 0000001504 841BD72C 841BE33C 001  -------- -------- 815A9540  Watched messages
841BE33C 0000001504 841BDD34 841BE944 001  -------- -------- 815A95E4  Watched Semaphore
```

```
841BE944 0000000504 841BE33C 841BEB64 001  -------- -------- 815A9630  Watched Message
Queue
841BEB64 0000001504 841BE944 841BF16C 001  -------- -------- 815A9658  Watcher Message
Queue
841BF16C 0000001036 841BEB64 841BF5A0 001  -------- -------- 815A2B24  Process Array
-- More --
<Ctrl+z>

Router>show memory processor

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
8404A580 0001493284 00000000 841B6ECC 000  0        84BADF88 815219D8  (coalesced)
841B6ECC 0000020004 8404A580 841BBD18 001  -------- -------- 815DB094  Managed Chunk Queue
Elements
841BBD18 0000001504 841B6ECC 841BC320 001  -------- -------- 8159EAC4  List Elements
841BC320 0000005004 841BBD18 841BD6D4 001  -------- -------- 8159EB04  List Headers
841BD6D4 0000000048 841BC320 841BD72C 001  -------- -------- 81F2A614  *Init*
841BD72C 0000001504 841BD6D4 841BDD34 001  -------- -------- 815A9514  messages
841BDD34 0000001504 841BD72C 841BE33C 001  -------- -------- 815A9540  Watched messages
841BE33C 0000001504 841BDD34 841BE944 001  -------- -------- 815A95E4  Watched Semaphore
841BE944 0000000504 841BE33C 841BEB64 001  -------- -------- 815A9630  Watched Message
Queue
841BEB64 0000001504 841BE944 841BF16C 001  -------- -------- 815A9658  Watcher Message
Queue
841BF16C 0000001036 841BEB64 841BF5A0 001  -------- -------- 815A2B24  Process Array
-- More --
<Ctrl+z>

Router>
```

The following example shows sample output from the **show memory fast allocating-process** command, followed by sample output from the **show memory fast allocating-process totals** command:

```
Router#show memory fast allocating-process

          Processor memory

 Address      Bytes     Prev     Next Ref   Alloc Proc     Alloc PC  What
8404A580 0001493284 00000000 841B6ECC 000                  815219D8  (coalesced)
841B6ECC 0000020004 8404A580 841BBD18 001  *Init*          815DB094  Managed Chunk Queue
Elements
841BBD18 0000001504 841B6ECC 841BC320 001  *Init*          8159EAC4  List Elements
841BC320 0000005004 841BBD18 841BD6D4 001  *Init*          8159EB04  List Headers
841BD6D4 0000000048 841BC320 841BD72C 001  *Init*          81F2A614  *Init*
841BD72C 0000001504 841BD6D4 841BDD34 001  *Init*          815A9514  messages
841BDD34 0000001504 841BD72C 841BE33C 001  *Init*          815A9540  Watched messages
841BE33C 0000001504 841BDD34 841BE944 001  *Init*          815A95E4  Watched Semaphore
841BE944 0000000504 841BE33C 841BEB64 001  *Init*          815A9630  Watched Message Queue
841BEB64 0000001504 841BE944 841BF16C 001  *Init*          815A9658  Watcher Message Queue
841BF16C 0000001036 841BEB64 841BF5A0 001  *Init*          815A2B24  Process Array
 --More--
<Ctrl+z>

c2600-1#show memory fast allocating-process totals

Allocator PC Summary for: Processor

    PC          Total   Count  Name
0x815C085C    1194600     150  Process Stack
0x815B6C28     948680       5  pak subblock chunk
```

```
0x819F1DE4     524640       8  BGP (0) update
0x815C4FD4     393480       6  MallocLite
0x815B5FDC     351528      30  TW Buckets
0x819F14DC     327900       5  connected
0x81A1E838     327900       5  IPv4 Unicast net-chunk(8)
0x8153DFB8     248136     294  *Packet Header*
0x82142438     133192       4  CEF: 16 path chunk pool
0x82151E0C     131116       1  Init
0x819F1C8C     118480       4  BGP (0) attr
0x815A4858     100048     148  Process
0x8083DA44      97248      17


 --More--
<Ctrl+z>
```

The following example shows sample output from the **show memory fast dead** command:

```
Router#show memory fast dead

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
8498FC20 0000000028 8498FB90 8498FC64 001  -------- -------- 81472B24  AAA MI SG NAME
        -------
             68
Router#show memory fast dead totals

Dead Proc Summary for: Processor

    PC          Total   Count  Name
0x81472B24         68       1  AAA MI SG NAME

Router#
```

show memory fragment

To display the block details of fragmented free blocks and allocated blocks, which is physically just before or after the blocks on the free list, use the **show memory fragment** command in user EXEC or privileged EXEC mode.

show memory [**processor** | **io**] **fragment** [**detail**]

Syntax Description

processor	(Optional) Displays the processor memory information.
io	(Optional) Displays the I/O memory information.
fragment	Displays the information of the free blocks and the blocks surrounding the free blocks.
detail	(Optional) Displays the detailed information of all the free blocks and the blocks surrounding the free blocks that are located between the allocated blocks.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.

Examples

The following is sample output from the **show memory processor fragment** command:

```
Router# show memory processor fragment

Processor memory
Free memory size : 65516944 Number of free blocks:      230
Allocator PC Summary for allocated blocks in pool: Processor

    PC          Total   Count  Name
0x6047DDCC     852020       1  atmdx_vc_table
0x6075DC30     544392       4  ATM1/0
0x61BDBA14     131176       2  eddri_self_event
0x61913BEC     131124       1  l2tp tnl table
0x602E9820     114832       1  AutoVC Msg Chunk
0x6071253C      98408       2  Exec
0x607DF5BC      96624      12  Process Stack
0x6118DDA0      77252       1  Spanning Tree Opt Port Block
0x61F13C30      67636       1  QOS_MODULE_MAIN
0x6047DD3C      65640       2  atmdx_tx_shadow
0x614B6624      65588       1  CEF: loadinfo chunk
0x614D1924      65588       1  IP mtrie node
0x614A58A0      65588       1  CEF: 16 path chunk pool
0x619241D4      65588       1  PPTP mgd timer chunk
0x606581CC      65588       1  AAA DB Chunk
0x607E5EAC      65588       1  MallocLite
0x6192420C      65588       1  PPTP: pptp_tunneltype chunk
0x6075DCB8      45924      10  FastEthernet2/
```

```
0x607CA400      36288       2  pak subblock chunk
0x6255648C      28948       1  CCPROXY_CT
0x6047DD7C      24628       1  atmdx_bfd_cache
0x6047DAA4      23500       1  atmdx_instance
0x6047DAE8      23500       1  atmdx_instance snap
0x60962DFC      21420      17  TCP CB
0x616F729C      20052       1  AC context chunks
0x616F72C8      20052       1  AC Mgr mgd timer chunk
0x60734010      16644      19  *Packet Header*
0x6047DE0C      16436       1  atmdx_abr_stats
0x6047DCFC      16112       2  atmdx_rx_pool_info
0x60A77E98      13060       1  DHCPD Message Workspace
0x61F50008      12852       1  CCVPM_HTSP
0x60D509BC      12580      17  Virtual Exec
0x60EFA1EC      12344       1  RSVP DB Handle Bin
.
.
.
0x6067AE44         76       1  AAA Secrettype encrypt
0x61C0EEC0         76       1  Init
0x60F76B1C         76       1  SNMP Trap
0x60BE2444         76       1  Init
0x62638F78         76       1  EEM ED Syslog
0x6077C574         76       1  Init
0x608F7030         76       1  IPC Name String
0x608EEAB8         76       1  IPC Name
0x620468A8         76       1  ivr: ccapAppEntry_t name
0x6066D084         76       1  gk process
0x6064824C         76       1  AAA MI SG NAME

Allocator PC Summary for free blocks in pool: Processor

    PC          Total   Count  Name
0x6071253C   67387912       2  (fragment)
0x60734010   63292440      11  *Packet Header*
0x60962DFC     105552      10  (coalesced)
0x60D509BC      98384      10  (coalesced)
0x60D4A0B4      70776       9  (coalesced)
0x60803260      21488       4  (fragment)
0x60B2E488      19704       2  (fragment)
0x606E0278      19272       1  (coalesced)
0x606DD8D8       9024     113  Init
0x60B27FE8       5740       3  (fragment)
0x60778AAC       3504       1  (coalesced)
0x607AC764       2212      11  Process Events
0x60F7FCD4       1556       9  (fragment)
0x6071F3FC       1316      12  (fragment)
0x606C5324       1176       6  (coalesced)
0x60D7C518       1148       1  (coalesced)
0x624E170C        876       1  (coalesced)
0x60A68164        588       3  (fragment)
0x60B302C0        408       5  (fragment)
0x60976574        272       2  AAA Event Data
0x60801E38        216       2  (fragment)
0x611DA23C        164       1  shelf_info
0x60A6A638        148       1  (fragment)
0x60801D2C        148       1  (fragment)
0x60D29DCC        148       1  (fragment)
0x62628CA0        144       1  (fragment)
0x60A68218        104       1  (fragment)
0x606B9614         88       1  NameDB String
0x6090A978         84       1  (fragment)
0x606C51D0         84       1  (fragment)
0x62647558         76       1  (fragment)
```

The following is sample output from the **show memory processor fragment detail** command:

```
Router# show memory processor fragment detail

Processor memory
Free memory size : 65566148 Number of free blocks:      230
 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
645A8148 0000000028 645A80F0 645A8194 001  -------- -------- 60695B20  Init
645A8194 0000000040 645A8148 645A81EC 000  0        200B4300 606B9614  NameDB String
645A81EC 0000000260 645A8194 645A8320 001  -------- -------- 607C2D20  Init
200B42B4 0000000028 200B4268 200B4300 001  -------- -------- 62366C80  Init
200B4300 0000000028 200B42B4 200B434C 000  645A8194 6490F7E8 60976574  AAA Event Data
200B434C 0000002004 200B4300 200B4B50 001  -------- -------- 6267D294  Coproc Request
Structures
6490F79C 0000000028 6490F748 6490F7E8 001  -------- -------- 606DDA04  Parser Linkage
6490F7E8 0000000028 6490F79C 6490F834 000  200B4300 6491120C 606DD8D8  Init
6490F834 0000006004 6490F7E8 64910FD8 001  -------- -------- 607DF5BC  Process Stack
649111A0 0000000060 64911154 6491120C 001  -------- -------- 606DE82C  Parser Mode
6491120C 0000000028 649111A0 64911258 000  6490F7E8 500770F0 606DD8D8  Init
64911258 0000000200 6491120C 64911350 001  -------- -------- 603F0E38  Init
.
.
.
504DCF54 0000001212 504DB2E4 504DD440 001  -------- -------- 60962DFC  TCP CB
2C41DCA4 0000000692 2C41BCC8 2C41DF88 001  -------- -------- 60D509BC  Virtual Exec
2C41DF88 0000005344 2C41DCA4 2C41F498 000  504DB2E4 6449A828 60D509BC  (coalesced)
2C41F498 0000000692 2C41DF88 2C41F77C 001  -------- -------- 60D509BC  Virtual Exec
6449A544 0000000692 64499794 6449A828 001  -------- -------- 60D509BC  Virtual Exec
6449A828 0000007760 6449A544 6449C6A8 000  2C41DF88 504D89D4 60D509BC  (coalesced)
6449C6A8 0000008044 6449A828 6449E644 001  -------- -------- 60D2AACC  Virtual Exec
504D8778 0000000556 504D754C 504D89D4 001  -------- -------- 60D4A0B4  Virtual Exec
504D89D4 0000009860 504D8778 504DB088 000  6449A828 504D1B78 60D4A0B4  (coalesced)
504DB088 0000000556 504D89D4 504DB2E4 001  -------- -------- 60D4A0B4  Virtual Exec
504D168C 0000001212 504C9658 504D1B78 001  -------- -------- 60962DFC  TCP CB
504D1B78 0000008328 504D168C 504D3C30 000  504D89D4 504C5B54 60962DFC  (coalesced)
504D3C30 0000001212 504D1B78 504D411C 001  -------- -------- 60962DFC  TCP CB
504C5870 0000000692 504C5504 504C5B54 001  -------- -------- 60D509BC  Virtual Exec
504C5B54 0000005344 504C5870 504C7064 000  504D1B78 2C423A88 60D509BC  (coalesced)
504C7064 0000000408 504C5B54 504C722C 001  -------- -------- 606E0E44  Chain Cache No
2C42359C 0000001212 2C41F77C 2C423A88 001  -------- -------- 60962DFC  TCP CB
2C423A88 0000008328 2C42359C 2C425B40 000  504C5B54 504D411C 60962DFC  (coalesced)
504E7DD8 0000000828 504E2660 504E8144 001  -------- -------- 60734010  *Packet Header*
65006A08 0000000408 65003834 65006BD0 001  -------- -------- 606E0E44  Chain Cache No
65006BD0 0000020520 65006A08 6500BC28 000  504E2660 0        60803260  (coalesced)
6500BC28 0000000828 65006BD0 6500BF94 001  -------- -------- 60734010  *Packet Header*
5C3AE7B8 0000000828 5C3AE614 5C3AEB24 001  -------- -------- 60734010  *Packet Header*
5C3AEB24 0063247532 5C3AE7B8 20000000 000  0        6500C300 60734010  (coalesced)
20000000 0000000828 5C3AEB24 2000036C 001  -------- -------- 60734010  *Packet Header*
6500BF94 0000000828 6500BC28 6500C300 001  -------- -------- 60734010  *Packet Header*
6500C300 0004760912 6500BF94 50000000 000  5C3AEB24 2C42E310 6071253C  (coalesced)
50000000 0000000828 6500C300 5000036C 001  -------- -------- 60734010  *Packet Header*
2C42E0B4 0000000556 2C429430 2C42E310 001  -------- -------- 60D4A0B4  Virtual Exec
2C42E310 0062725312 2C42E0B4 00000000 000  6500C300 0        6071253C  (coalesced
```

Related Commands

Command	Description
memory io	Configures thresholds for I/O memory.
memory processor	Configures thresholds for processor memory.

show memory multibus

To display statistics about multibus memory, including memory-free pool statistics, use the **show memory multibus** command in user EXEC or privileged EXEC mode.

show memory multibus [allocating-process [totals]| dead [totals]| free [totals]]

Syntax Description

allocating-process [totals]	(Optional) Displays allocating memory totals by name.
dead [totals]	(Optional) Displays memory totals on dead processes.
fragment **[detail]**	(Optional) Displays memory statistics for fragmented processes.
free [totals]	(Optional) Displays statistics on free memory.
statistics **[history]**	(Optional) Displays memory pool history statistics on all processes.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory multibus** command:

```
Router# show memory multibus

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
6540BBA0 0000016388 00000000 6540FBD4 001  -------- -------- 60883984  TW Buckes
6540FBD4 0000016388 6540BBA0 65413C08 001  -------- -------- 60883984  TW Buckes
65413C08 0000016388 6540FBD4 65417C3C 001  -------- -------- 60883984  TW Buckes
65417C3C 0000006004 65413C08 654193E0 001  -------- -------- 608A0D4C  Process k
654193E0 0000012004 65417C3C 6541C2F4 001  -------- -------- 608A0D4C  Process k
6541C2F4 0000411712 654193E0 65480B64 000  0        0        608A0D4C  (fragmen)
65480B64 0000020004 6541C2F4 654859B8 001  -------- -------- 608CF99C  Managed s
654859B8 0000010004 65480B64 654880FC 001  -------- -------- 6085C7F8  List Eles
654880FC 0000005004 654859B8 654894B8 001  -------- -------- 6085C83C  List Heas
654894B8 0000000048 654880FC 65489518 001  -------- -------- 62BF31DC  *Init*
.
.
.
```

Table 117 describes the significant fields shown in the display.

Table 117 show memory multibus Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).

Table 117 show memory multibus Field Descriptions (continued)

Field	Description
Prev	Address of the preceding block (should match the address on the preceding line).
Next	Address of the following block (should match the address on the following line).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of the preceding free block (if free).
NextF	Address of the following free block (if free).
Alloc PC	Address of the program counter that allocated the block.
What	Name of the process that owns the block, or "(fragmen)" if the block is a fragment, or "(coalesced)" if the block was coalesced from adjacent free blocks.

show memory pci

To display statistics about Peripheral Component Interconnect (PCI) memory, use the **show memory pci** command in user EXEC or privileged EXEC mode.

show memory pci

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory pci** command:

```
Router# show memory pci

          I/O memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
0E000000 0000000032 00000000 0E000050 000  64F5EBF4 0        00000000  (fragmen)
0E000050 0000000272 0E000000 0E000190 001  -------- -------- 607E2EC0  *Packet *
0E000190 0000000272 0E000050 0E0002D0 001  -------- -------- 607E2EC0  *Packet *
0E0002D0 0000000272 0E000190 0E000410 001  -------- -------- 607E2EC0  *Packet *
0E000410 0000000272 0E0002D0 0E000550 001  -------- -------- 607E2EC0  *Packet *
0E000550 0000000272 0E000410 0E000690 001  -------- -------- 607E2EC0  *Packet *
0E000690 0000000272 0E000550 0E0007D0 001  -------- -------- 607E2EC0  *Packet *
0E0007D0 0000000272 0E000690 0E000910 001  -------- -------- 607E2EC0  *Packet *
0E000910 0000000272 0E0007D0 0E000A50 001  -------- -------- 607E2EC0  *Packet *
0E000A50 0000000272 0E000910 0E000B90 001  -------- -------- 607E2EC0  *Packet *
0E000B90 0000000272 0E000A50 0E000CD0 001  -------- -------- 607E2EC0  *Packet *
 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
0E000CD0 0000000272 0E000B90 0E000E10 001  -------- -------- 607E2EC0  *Packet *
0E000E10 0000000272 0E000CD0 0E000F50 001  -------- -------- 607E2EC0  *Packet *
```

Table 118 describes the significant fields shown in the display.

Table 118 show memory pci Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).
Prev	Address of the preceding block (should match the address on the preceding line).
Next	Address of the following block (should match the address on the following line).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.

Table 118 show memory pci Field Descriptions (continued)

Field	Description
PrevF	Address of the preceding free block (if free).
NextF	Address of the following free block (if free).
Alloc PC	Address of the program counter that allocated the block.
what	Name of process that owns the blocks.

show memory processor

To display statistics on the Router Processor memory, use the **show memory processor** command in user EXEC or privileged EXEC mode.

show memory processor [**fragment** | **free** | **statistics** | **allocating-process** [**totals**] | **dead** [**totals**]]

Syntax Description

fragment	(Optional) Displays the block details of fragmented free blocks and allocated blocks, which are shown either preceding or following the blocks on the free list.
free	(Optional) Displays the number of free blocks.
statistics	(Optional) Displays memory processor statistics.
allocating-process	(Optional) Displays the allocated block name.
totals	(Optional) Displays the allocated memory total.
dead	(Optional) Displays information about memory owned by dead processes.
totals	(Optional) Displays the dead process memory total**.**

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.0	This command was introduced.
12.4(24)T	This command was modified in a release earlier than Cisco IOS Release 12.4(24)T. The **allocating-process** and **dead** keywords were added.

Examples

The following is sample output from the **show memory processor** command:

```
Router# show memory processor

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
6540BBA0 0000016388 00000000 6540FBD4 001  -------- -------- 60883984  TW Buckes
6540FBD4 0000016388 6540BBA0 65413C08 001  -------- -------- 60883984  TW Buckes
65413C08 0000016388 6540FBD4 65417C3C 001  -------- -------- 60883984  TW Buckes
65417C3C 0000006004 65413C08 654193E0 001  -------- -------- 608A0D4C  Process k
654193E0 0000012004 65417C3C 6541C2F4 001  -------- -------- 608A0D4C  Process k
6541C2F4 0000411712 654193E0 65480B64 000  0        0        608A0D4C  (fragmen)
65480B64 0000020004 6541C2F4 654859B8 001  -------- -------- 608CF99C  Managed s
654859B8 0000010004 65480B64 654880FC 001  -------- -------- 6085C7F8  List Eles
654880FC 0000005004 654859B8 654894B8 001  -------- -------- 6085C83C  List Heas
654894B8 0000000048 654880FC 65489518 001  -------- -------- 62BF31DC  *Init*
```

Table 119 describes the significant fields shown in the display.

Table 119 show memory processor Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).
Prev	Address of the preceding block (should match the address on the preceding line).
Next	Address of the following block (should match the address on the following line).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of the preceding free block (if free).
NextF	Address of the following free block (if free).
Alloc PC	Address of the program counter that allocated the block.
What	Name of the process that owns the blocks.

The following is sample output from the **show memory processor fragment** command:

```
Router# show memory processor fragment

          Processor memory

Free memory size :  3144348 Number of free blocks:       96

Allocator PC Summary for allocated blocks in pool: Processor

    PC          Total   Count  Name
0x6069A038     262196       1  TACL FLT
0x62224AA8     219188       1  QOS_MODULE_MAIN
0x61648840     131124       1  Init
0x6218DAA4      73780       1  CCSIP_UDP_SOCKET
0x61649288      65588       1  CEF: loadinfo chunk
0x61BFD4B8      65588       1  PPTP mgd timer chunk
0x61EE1050      65588       1  eddri_self_event
0x607C13C4      49204       1  Exec
0x608A0D4C      35208       4  Process Stack
0x6069D804      32052       1  TACL hist
0x61631A90      21444       2  CEF: IPv4 Unicast RPF subblock
0x62BA5DD8      20432       1  Init
0x6086F858      20052       1  RMI-RO_RU Chun
0x608CF99C      20052       1  Managed Chunk Queue Elements
```

Table 120 describes the significant fields shown in the display.

Table 120 show memory processor fragment Field Descriptions

Field	Description
PC	Program counter.
Total	Total memory allocated by the process (in bytes).
Count	Number of allocations.
Name	Name of the allocating process.

The following is sample output from the **show memory processor free** command:

```
Router# show memory processor free

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what

             24    Free list 1
66994680 0000000072 66994618 669946FC 000  0        6698FFC8 60699114  Turbo ACr
6698FFC8 0000000072 6698FF60 66990044 000  66994680 659CF6B0 60699114  Turbo ACr
659CF6B0 0000000024 659CF678 659CF6FC 000  6698FFC8 659CF86C 6078A2CC  Init
659CF86C 0000000024 659CF710 659CF8B8 000  659CF6B0 65ADB53C 6078A2CC  Init
65ADB53C 0000000024 65ADB504 65ADB588 000  659CF86C 65ADFC38 6078A2CC  Init
65ADFC38 0000000024 65ADFC00 65ADFC84 000  65ADB53C 65B6C504 6078A2CC  Init
65B6C504 0000000024 65B6C4B8 65B6C550 000  65ADFC38 6593E924 6078A2CC  Init
6593E924 0000000028 6593E8E8 6593E974 000  65B6C504 65CCB054 6078A2CC  Init
65CCB054 0000000024 65CCB01C 65CCB0A0 000  6593E924 65CCBD98 6078A2CC  Init
65CCBD98 0000000028 65CCBD60 65CCBDE8 000  65CCB054 65CCFB70 6078A2CC  Init
65CCFB70 0000000024 65CCFB38 65CCFBBC 000  65CCBD98 65D0BB58 6078A2CC  Init
65D0BB58 0000000024 65D0BB20 65D0BBA4 000  65CCFB70 65D0C5F0 6078A2CC  Init
65D0C5F0 0000000024 65D0C5B8 65D0C63C 000  65D0BB58 65CFF2F4 6078A2CC  Init
65CFF2F4 0000000024 65CFF2BC 65CFF340 000  65D0C5F0 6609B7B8 6078A2CC  Init
6609B7B8 0000000036 6609AFC8 6609B810 000  65CFF2F4 660A0BD4 6078A2CC  Init
```

Table 121 describes the significant fields shown in the display.

Table 121 show memory processor free Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).
Prev	Address of the preceding block (should match the address on the preceding row).
Next	Address of the following block (should match the address on the following row).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of the preceding free block (if free).
NextF	Address of the following free block (if free).
Alloc PC	Address of the program counter that allocated the block.
what	Name of the process that owns the block.

The following is sample output from the **show memory processor statistics** command:

```
Router# show memory processor statistics

               Head    Total(b)     Used(b)     Free(b)   Lowest(b)  Largest(b)
Processor   6540BBA0   415187836    27216968   387970868   385755044   381633404
      I/O    E000000    33554432     6226336    27328096    27328096    27317852
.
.
.
```

Table 122 describes the significant fields shown in the display.

Table 122 show memory processor statistics Field Descriptions

Field	Description
Head	Hexadecimal address of the head of the memory allocation chain.
Total(b)	Sum of the used bytes plus free bytes.
Used(b)	Amount of memory in use (in bytes).
Free(b)	Amount of memory not in use (in bytes).
Lowest(b)	Smallest amount of free memory since the last boot (in bytes).
Largest(b)	Size of the largest available free block (in bytes).

The following is sample output from the **show memory processor allocating-process** command:

```
Router# show memory processor allocating-process

PC              Total    Count      Name
0x6013A948    3719220        1  atmdx_setup_vc_table
0x6064EB28    2581132      291  Process Stack
0x627E2420    2569476       78  CCE dp subbloc
0x62A098C8    1637116       24  regex
0x62EAF010     979876       77  TW Buckets
0x602439EC     935064      962  *Packet Header*
0x614B3A4C     916724       13  Init
0x6013A89C     852020        1  atmdx_vc_table
0x61A54AEC     786292        1  Init
0x62D7BDD0     702336      160  TCL Chunks
0x62EB0458     666988       14  pak subblock chunk
0x60767C38     641076        1  CCPROXY_CT
0x607439C4     524340        1  L2X Hash Table
0x60271864     434328       28  Normal
0x602718F8     407592      148  Normal
0x600CE0C0     393528        6  Init
```

The following is sample output from the **show memory processor dead** command:

```
Router# show memory processor dead

PC              Total      Count    Name
0x61E4EB70      65588        1  IP Static Rout
0x62332A2C      65588        1  MFI: Clnt SMsg
0x6268DFE4      32820        1  PPP Context Ch
0x62660CCC      32820        1  PPP HANDLE IDs
0x61B9B350      12052        1  IP Addresses
0x614246F8       4148        1  AAA Unique Id Hash Table
0x61BA93CC       3688        1  IPAD DIT chunk
0x63B630A4       2544       12  Autoinstall
0x61824BFC       2084        2  CEF: fib GSB
0x62E82CEC       2052        1  Reg Function 1
0x62E8A028       1824       24  Autoinstall
0x617DE354       1744        2  CEF: paths
0x6149E638       1552        1  String-DB owne
0x6149E490       1552        1  String-DB entr
0x60191180       1216        8  AF entry
0x617EB5AC       1176        2  CEF: pathl
0x62EAE860       1156        1  Event Manager Table
0x6149E4BC        920       12  NameDB String
0x6176BCF4        884        2  Ether OAM subblock
```

show memory scan

To monitor the number and type of parity (memory) errors on your system, use the **show memory scan** command in EXEC mode.

show memory scan

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
12.0(4)XE	This command was introduced.
12.0(7)T	This command was implemented in Cisco IOS Release 12.0(7) T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

The following example shows a result with no memory errors:

```
Router# show memory scan

Memory scan is on.
No parity error has been detected.
```

If errors are detected in the system, the **show memory scan** command generates an error report. In the following example, memory scan detected a parity error:

```
Router# show memory scan

Memory scan is on.
Total Parity Errors 1.
Address   BlockPtr   BlckSize  Disposit  Region Timestamp
6115ABCD  60D5D090   9517A4    Scrubed   Local 16:57:09 UTC Thu  Mar 18
```

Table 123 describes the fields contained in the error report.

Table 123 show memory scan Field Descriptions

Field	Description
Address	The byte address where the error occurred.
BlockPtr	The pointer to the block that contains the error.
BlckSize	The size of the memory block

Table 123 show memory scan Field Descriptions (continued)

Field	Description
Disposit	The action taken in response to the error: • BlockInUse—An error was detected in a busy block. • InFieldPrev—An error was detected in the previous field of a block header. • InHeader—An error was detected in a block header. • Linked—A block was linked to a bad list. • MScrubed—The same address was "scrubbed" more than once, and the block was linked to a bad list. • MultiError—Multiple errors have been found in one block. • NoBlkHdr—No block header was found. • NotYet—An error was found; no action has been taken at this time. • Scrubed—An error was "scrubbed." • SplitLinked—A block was split, and only a small portion was linked to a bad list.
Region	The memory region in which the error was found: • IBSS—image BSS • IData—imagedata • IText—imagetext • local—heap
Timestamp	The time the error occurred.

show memory statistics history table

To display the history of memory consumption, use the **show memory statistics history table** command in user EXEC or privileged EXEC mode.

show memory statistics history table

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.

Examples

The following is sample output from the **show memory statistics history table** command:

```
Router# show memory statistics history table

History for Processor memory

Time: 15:48:56.806
Used(b): 422748036 Largest(b): 381064952 Free blocks :291
Maximum memory users for this period
Process Name           Holding   Num Alloc
Virtual Exec             26992          37
TCP Protocols            14460           6
IP Input                  1212           1

Time: 14:42:54.506
Used(b): 422705876 Largest(b): 381064952 Free blocks :296
Maximum memory users for this period
Process Name           Holding   Num Alloc
Exec                  400012740          24
Dead                   1753456          90
Pool Manager            212796         257

Time: 13:37:26.918
Used(b): 20700520 Largest(b): 381064952 Free blocks :196
Maximum memory users for this period
Process Name           Holding   Num Alloc
Exec                      8372           5

Time: 12:39:44.422
Used(b): 20701436 Largest(b): 381064952 Free blocks :193

Time: 11:46:25.135
Used(b): 20701436 Largest(b): 381064952 Free blocks :193
Maximum memory users for this period
Process Name           Holding   Num Alloc
CDP Protocol              3752          25
```

```
Time: 10:44:24.342
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 09:38:53.038
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 08:33:35.154
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 07:28:05.987
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 06:35:22.878
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 05:42:14.286
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 04:41:53.486
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 03:48:47.891
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 02:46:32.391
Used(b): 20701400 Largest(b): 381064952 Free blocks :194

Time: 01:54:27.931
Used(b): 20717804 Largest(b): 381064952 Free blocks :189

Time: 01:02:05.535
Used(b): 20717804 Largest(b): 381064952 Free blocks :189
Maximum memory users for this period
Process Name           Holding   Num Alloc
Entity MIB API           67784          16
TTY Background           12928           4
Exec                      7704           3

Time: 00:00:17.936
Used(b): 21011192 Largest(b): 381064952 Free blocks :186
Maximum memory users for this period
Process Name           Holding   Num Alloc
Init                  18653520        6600
CCPROXY_CT              599068          57
Proxy Session Applic    275424          21

History for I/O memory

Time: 15:48:56.809
Used(b):  7455520 Largest(b): 59370080 Free blocks :164

Time: 14:42:54.508
Used(b):  7458064 Largest(b): 59370080 Free blocks :165
Maximum memory users for this period
Process Name           Holding   Num Alloc
Pool Manager            141584         257

Time: 13:37:26.920
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 12:39:44.424
Used(b):  7297744 Largest(b): 59797664 Free blocks :25
```

```
Time: 11:46:25.137
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 10:44:24.344
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 09:38:53.040
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 08:33:35.156
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 07:28:05.985
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 06:35:22.877
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 05:42:14.285
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 04:41:53.485
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 03:48:47.889
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 02:46:32.389
Used(b):  7297744 Largest(b): 59797664 Free blocks :25

Time: 01:54:27.929
Used(b):  7308336 Largest(b): 59797664 Free blocks :23

Time: 01:02:05.533
Used(b):  7308336 Largest(b): 59797664 Free blocks :23

Time: 00:00:17.937
Used(b):  7308336 Largest(b): 59797664 Free blocks :23
Maximum memory users for this period
Process Name           Holding   Num Alloc
Init                   7296000         214
Pool Manager               816           3
```

Related Commands

Command	Description
memory statistics history table	Changes the memory log time.

show memory traceback

To display memory traceback information, use the **show memory traceback** command in privileged EXEC mode.

show memory traceback [*id* | **exclusive** | **totals**]

Syntax Description

id	(Optional) Traceback ID.
exclusive	(Optional) Displays the memory blocks that have traceback information.
totals	(Optional) Displays information about memory usage of blocks having tracebacks.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced in a release earlier than Cisco IOS Release 15.0(1)M.

Usage Guidelines

Before you can enable the **show memory traceback** command, you must configure the **memory record events** command in global configuration mode.

Examples

The following is sample output from the **show memory traceback** command for traceback ID 100:

```
Router# configure terminal
Router(config)# memory record events

Memory event recording already enabled!

Router(config)# exit
Router# show memory traceback 100

Traceback: [100] 0x60630D9Cz  0x60632B50z  0x6063426Cz  0x6063483Cz  0x61AE4910)
```

The following is sample output from the **show memory traceback** command using the **exclusive** keyword:

```
Router# configure terminal
Router(config)# memory record events

Memory event recording already enabled!

Router(config)# exit
Router# show memory traceback exclusive

Address   Size      refcount tid         What
682E53F4 0005206856 000      T43       (coalesced)
68D2739C 0000002212 000      T85       (coalesced)
```

Table 124 describes the significant fields shown in the display.

Table 124 show memory traceback Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Size	Amount of memory, in bytes, used by the task.
refcount	Reference count for the memory block, indicating how many different processes are using that block of memory.
tid	Task ID.
What	Name of the process that owns the block or fragment. Specifies if the block is a fragment or coalesced.

Related Commands

Command	Description
show memory events	Displays recorded memory events.

show memory transient

To display statistics about transient memory, use the **show memory transient** command in user EXEC or privileged EXEC mode.

show memory transient [**allocating-process [totals]** | **dead [totals]** | **fragment [detail]** | **free [totals]** | **statistics [history]**]

Syntax Description

allocating-process	(Optional) Displays allocating memory totals by name.
dead [totals]	(Optional) Displays memory totals on dead processes.
fragment [detail]	(Optional) Displays memory statistics for fragmented processes.
free [totals]	(Optional) Displays statistics on free memory.
statistics [history]	(Optional) Displays memory pool history statistics on all processes.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Examples

The following is sample output from the **show memory transient** command:

```
Router# show memory transient

          Processor memory

 Address      Bytes     Prev     Next Ref     PrevF    NextF Alloc PC  what
81F99C00 0002236408 00000000 821BBC28 000  829C8104 82776FD0 8060B6D0  (coalesc)
821BBC28 0000020004 81F99C00 821C0A7C 001  -------- -------- 8002D5C0  Managed s
821C0A7C 0000010004 821BBC28 821C31C0 001  -------- -------- 811604C0  List Eles
821C31C0 0000005004 821C0A7C 821C457C 001  -------- -------- 81160500  List Heas
```

Table 125 describes the significant fields shown in the display.

Table 125 show memory transient Field Descriptions

Field	Description
Address	Hexadecimal address of the block.
Bytes	Size of the block (in bytes).
Prev	Address of the preceding block (should match the address on preceding line).
Next	Address of the following block (should match the address on following line).
Ref	Reference count for that memory block, indicating how many different processes are using that block of memory.
PrevF	Address of the preceding free block (if free).

Table 125 show memory transient Field Descriptions (continued)

Field	Description
NextF	Address of the following free block (if free).
Alloc PC	Address of the system call that allocated the block.
what	Name of the process that owns the block, or "(fragment)" if the block is a fragment, or "(coalesced)" if the block was coalesced from adjacent free blocks.

show microcode

To display microcode image information available on line cards, use the **show microcode** command in EXEC mode.

show microcode

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

The following is sample output from the **show microcode** command:

```
Router# show microcode

Microcode bundled in system

Card    Microcode    Target Hardware    Description
Type    Version      Version
----    ---------    ---------------    -----------
SP         2.3            11.x          SP version 2.3
EIP        1.1             1.x          EIP version 1.1
TRIP       1.2             1.x          TRIP version 1.2
FIP        1.4             2.x          FIP version 1.4
HIP        1.1             1.x          HIP version 1.1
SIP        1.1             1.x          SIP version 1.1
FSIP       1.1             1.x          FSIP version 1.1
```

In the following example for the Cisco 7200 series router, the output from the **show microcode** command lists the hardware types that support microcode download. For each type, the default microcode image name is displayed. If there is a configured default override, that name also is displayed.

```
router# show microcode

Microcode images for downloadable hardware
HW Type             Microcode image names
-----------------------------------------
ecpa     default    slot0:xcpa26-0
         configured slot0:xcpa26-2
pcpa     default    slot0:xcpa26-4
```

Related Commands

Command	Description
microcode (7000/7500)	Specifies where microcode should be loaded from on Cisco 7500/7000RSP routers.
microcode (7200)	Configures a default override for the microcode that is downloaded to the hardware on a Cisco 7200 series router.

show mls statistics

To display the Multilayer Switching (MLS) statistics for the Internet Protocol (IP), Internetwork Packet Exchange (IPX), multicast, Layer 2 protocol, and quality of service (QoS), use the **show mls statistics** command in user EXEC or privileged EXEC mode.

show mls statistics [**module** *num*]

Syntax Description

module *num*	(Optional) Displays the MLS statistics for a specific module.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17b)SXA	This command was changed to include the **module** *num* keyword and argument.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(17d)SXB1	The output was changed to include total packets switched information.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The total packets switched performance displayed is the rate calculated as the average rate in a period within the last 30 seconds.

The ingress ACL denied packet count is displayed in the Total packets L3 Switched field and in the Total packets dropped by ACL field.

The RPF failed packet count is displayed in the Total packets L3 Switched field.

If the IP multicast source sends traffic to any multicast group that does not have an (*,G) entry present in the mroute table, the **show mls statistics** command displays these packets as incrementing in the Total Mcast Packets Switched/Routed field. These packets are dropped in the hardware because there are no receivers for that group and no entry in the mroute table.

Examples

This example shows how to display the MLS statistics for all modules:

```
Router# show mls statistics

Statistics for Earl in Module 2

L2 Forwarding Engine
  Total packets Switched                : 20273@ 22552 pps
```

```
L3 Forwarding Engine
  Total Packets Bridged                 : 20273
  Total Packets FIB Switched            : 7864
  Total Packets ACL Routed              : 0
  Total Packets Netflow Switched        : 0
  Total Mcast Packets Switched/Routed   : 220598
  Total ip packets with TOS changed     : 0
  Total ip packets with COS changed     : 0
  Total non ip packets COS changed      : 0
  Total packets dropped by ACL          : 0
  Total packets dropped by Policing     : 705757744

Statistics for Earl in Module 9

L2 Forwarding Engine
  Total packets Switched                : 16683@ 1 pps

L3 Forwarding Engine
  Total Packets Bridged                 : 0
  Total Packets FIB Switched            : 0
  Total Packets ACL Routed              : 0
  Total Packets Netflow Switched        : 0
  Total Mcast Packets Switched/Routed   : 0
  Total ip packets with TOS changed     : 0
  Total ip packets with COS changed     : 0
  Total non ip packets COS changed      : 0
  Total packets dropped by ACL          : 0
  Total packets dropped by Policing     : 277949053
Router#
```

This example shows how to display the MLS statistics for a specific module:

```
Router# show mls statistics module 1

Statistics for Earl in Module 1

L2 Forwarding Engine
  Total packets Switched                : 2748166@ 22332 pps
>>
L3 Forwarding Engine
  Total Packets Bridged                 : 92750@ 34 pps
  Total Packets FIB Switched            : 7
  Total Packets ACL Routed              : 0
  Total Packets Netflow Switched        : 0
  Total Mcast Packets Switched/Routed   : 3079200
  Total ip packets with TOS changed     : 0
  Total ip packets with COS changed     : 0
  Total non ip packets COS changed      : 0
  Total packets dropped by ACL          : 0
  Total packets dropped by Policing     : 0
  Total Unicast RPF failed packets      : 0

Errors
  MAC/IP length inconsistencies         : 0
  Short IP packets received             : 0
  IP header checksum errors             : 0
  MAC/IPX length inconsistencies        : 0
  Short IPX packets received            : 0
Router#
```

Related Commands

Command	Description
show mls asic	display the application-specific integrated circuit (ASIC) version
show mls df-table	Displays information about the DF table.
show mls ip	Displays the Multilayer Switching (MLS) IP information.
show mls ipx	Displays the Multilayer Switching (MLS) IPX information.
show mls qos	Displays Multilayer Switching (MLS) quality of service (QoS) information
show mls statistics	Displays the Multilayer Switching (MLS) statistics for the Internet Protocol (IP)

show module

To display the module status and information, use the **show module** command in user EXEC or privileged EXEC mode.

show module [*mod-num* | **all** | **provision** | **version**]

Syntax Description

mod-num	(Optional) Number of the module.
all	(Optional) Displays the information for all modules.
provision	(Optional) Displays the status about the module provisioning.
version	(Optional) Displays the version information.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

In the Mod Sub-Module fields, the **show module** command displays the supervisor engine number but appends the uplink daughter card's module type and information.

Entering the **show module** command with no arguments is the same as entering the **show module all** command.

Examples

This example shows how to display information for all modules on a Cisco 7600 series router that is configured with a Supervisor Engine 720:

```
Router# show module

Mod Ports Card Type                                  Model              Serial No.
--- ----- ---------------------------------------- ------------------ -----------
  5     2 Supervisor Engine 720 (Active)           WS-SUP720-BASE     SAD0644030K
  8    48 aCEF720 48 port 10/100/1000 Ethernet     WS-X6748-GE-TX     SAD07010045
  9    32 dCEF720 32 port Gigabit Ethernet         WS-X6832-SFP       SAD07010045

Mod MAC addresses                       Hw     Fw           Sw           Status
--- ----------------------------------- ------ ------------ ------------ -------
  5 00e0.aabb.cc00 to 00e0.aabb.cc3f   1.0    12.2(2003012 12.2(2003012 Ok
  8 0005.9a3b.d8c4 to 0005.9a3b.d8c7   0.705  7.1(0.12-Eng 12.2(2003012 Ok
  9 00e0.b0ff.f0f4 to 00e0.b0ff.f0f5   0.207  12.2(2002082 12.2(2003012 Ok
```

```
Mod Sub-Module                  Model           Serial           Hw     Status
--- --------------------------- --------------- ---------------- ------- -------
  5 Policy Feature Card 3       WS-F6K-PFC3     SAD0644031P      0.302   Ok
  5 MSFC3 Daughtercard          WS-SUP720       SAD06460172      0.701

Mod Online Diag Status
--- -------------------
  5 Not Available
  7 Bypass
  8 Bypass
  9 Bypass
Router#
```

This example shows how to display information for a specific module:

```
Router# show module 2

Mod Ports Card Type                              Model              Serial No.
--- ----- -------------------------------------- ------------------ -----------
  5     2 Supervisor Engine 720 (Active)         WS-SUP720-BASE     SAD0644030K

Mod MAC addresses                       Hw    Fw           Sw           Status
--- ----------------------------------- ------ ------------ ------------ -------
  5 00e0.aabb.cc00 to 00e0.aabb.cc3f   1.0    12.2(2003012 12.2(2003012 Ok

Mod Sub-Module                  Model           Serial           Hw     Status
--- --------------------------- --------------- ---------------- ------- -------
  5 Policy Feature Card 3       WS-F6K-PFC3     SAD0644031P      0.302   Ok
  5 MSFC3 Daughtercard          WS-SUP720       SAD06460172      0.701

Mod Online Diag Status
--- -------------------
  5 Not Available
Router#
```

This example shows how to display version information:

```
Router# show module version

Mod Port Model              Serial #    Versions
--- ---- ------------------ ----------- -------------------------------------
  2 0    WS-X6182-2PA                   Hw : 1.0
                    Fw : 12.2(20030125:231135)
                    Sw : 12.2(20030125:231135)
  4 16   WS-X6816-GBIC      SAD04400CEE Hw : 0.205
         WS-F6K-DFC3A       SAD0641029Y Hw : 0.501
                    Fw : 12.2(20020828:202911)
                    Sw : 12.2(20030125:231135)
  6 2    WS-X6K-SUP3-BASE   SAD064300GU Hw : 0.705
                    Fw : 7.1(0.12-Eng-02)TAM
                    Sw : 12.2(20030125:231135)
                    Sw1: 8.1(0.45)KIS
         WS-X6K-SUP3-PFC3   SAD064200VR Hw : 0.701
                    Fw : 12.2(20021016:001154)
                    Sw : 12.2(20030125:231135)
         WS-F6K-PFC3        SAD064300M7 Hw : 0.301
  9 48   WS-X6548-RJ-45     SAD04490BAC Hw : 0.301
                    Fw : 6.3(1)
                    Sw : 7.5(0.30)CFW11
Router#
```

This example shows how to display module provisioning information:

```
Router# show module provision
```

```
Module Provision
  1    dynamic
  2    dynamic
  3    dynamic
  4    dynamic
  5    dynamic
  6    dynamic
  7    dynamic
  8    dynamic
  9    dynamic
 10    dynamic
 11    dynamic
 12    dynamic
 13    dynamic
Router#
```

Related Commands

Command	Description
show interfaces	Displays the status and statistics for the interfaces in the chassis.
show environment alarm	Displays the information about the environmental alarm.
show fm summary	Displays a summary of FM Information.
show environment status	Displays the information about the operational FRU status.

show monitor event-trace

To display event trace messages for Cisco IOS software subsystem components, use the **show monitor event-trace** command in privileged EXEC mode.

show monitor event-trace [**all-traces**] [*component* {**all** | **back** *hour:minute* | **clock** *hour:minute* | **from-boot** *seconds* | **latest** | **parameters**}]

Syntax Description

all-traces	(Optional) Displays all event trace messages in memory to the console.
component	(Optional) Name of the Cisco IOS software subsystem component that is the object of the event trace. To get a list of components that support event tracing in this release, use the **monitor event-trace ?** command.
all	Displays all event trace messages currently in memory for the specified component.
back *hour:minute*	Specifies how far back from the current time you want to view messages. For example, you can gather messages from the last 30 minutes. The time argument is specified in hours and minutes format (hh:mm).
clock *hour:minute*	Displays event trace messages starting from a specific clock time in hours and minutes format (hh:mm).
from-boot *seconds*	Displays event trace messages starting from a specified number of seconds after booting (uptime). To display the uptime, in seconds, enter the **show monitor event-trace** *component* **from-boot ?** command.
latest	Displays only the event trace messages since the last **show monitor event-trace** command was entered.
parameters	Displays the trace parameters. The only parameter displayed is the size (number of trace messages) of the trace file.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(18)S	This command was introduced.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S. The **show monitor event-trace cef** comand replaced the **show cef events** and **show ip cef events** commands.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE. The **spa** component keyword was added to support online insertion and removal (OIR) event messages for shared port adapters (SPAs). The **bfd** keyword was added for the *component* argument to display trace messages relating to the Bidirectional Forwarding Detection (BFD) feature.
12.4(4)T	Support for the **bfd** keyword was added for Cisco IOS Release 12.4(4)T.
12.0(31)S	Support for the **bfd** keyword was added for Cisco IOS Release 12.0(31)S.

Release	Modification
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
12.4(9)T	The **cfd** keyword was added as an entry for the *component* argument to display trace messages relating to crypto fault detection.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Usage Guidelines

Use the **show monitor event-trace** command to display trace message information.

The trace function is not locked while information is being displayed to the console, which means that new trace messages can accumulate in memory. If entries accumulate faster than they can be displayed, some messages can be lost. If this happens, the **show monitor event-trace** command will generate a message indicating that some messages might be lost; however, messages will continue to display on the console. If the number of lost messages is excessive, the **show monitor event-trace** command will stop displaying messages.

Use the **bfd** keyword for the *component* argument to display trace messages relating to the BFD feature.

Use the **cfd** keyword for the *component* argument to display trace messages relating to the crypto fault detection feature. This keyword displays the contents of the error trace buffers in an encryption data path.

Examples

IPC Component Example

The following is sample output from the **show monitor event-trace** *component* command for the interprocess communication (IPC) component. Notice that each trace message is numbered and is followed by a time stamp (derived from the device uptime). Following the time stamp is the component-specific message data.

```
Router# show monitor event-trace ipc

3667:  6840.016:Message type:3 Data=0123456789
3668:  6840.016:Message type:4 Data=0123456789
3669:  6841.016:Message type:5 Data=0123456789
3670:  6841.016:Message type:6 Data=0123456
```

BFD Component for Cisco IOS Release 12.2(18)SXE, 12.0(31)S, and 12.4(4)T

Use the **show monitor event-trace bfd all** command to display logged messages for important BFD events in the recent past. The following trace messages show BFD session state changes:

```
Router# show monitor event-trace bfd all

    3d03h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,1], event Session
           create, state Unknown -> Fail
    3d03h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,1], state Fail -> Down
            (from LC)
    3d03h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,1], state Down -> Init
            (from LC)
    3d03h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,1], state Init -> Up
           (from LC)
    3d07h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,2], event Session
```

```
       create, state Unknown -> Fail
3d07h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,2], state Fail -> Down
        (from LC)
3d07h: EVENT: Session [172.16.10.2,172.16.10.1,Fa6/0,2], state Down -> Up
       (from LC)
```

To display trace information for all components configured for event tracing on the networking device, enter the **show monitor event-trace all-traces** command. In this example, separate output is provided for each event, and message numbers are interleaved between the events.

```
Router# show monitor event-trace all-traces

Test1 event trace:
3667: 6840.016:Message type:3 Data=0123456789
3669: 6841.016:Message type:4 Data=0123456789
3671: 6842.016:Message type:5 Data=0123456789
3673: 6843.016:Message type:6 Data=0123456789

Test2 event trace:
3668: 6840.016:Message type:3 Data=0123456789
3670: 6841.016:Message type:4 Data=0123456789
3672: 6842.016:Message type:5 Data=0123456789
3674: 6843.016:Message type:6 Data=0123456789
```

SPA Component Example

The following is sample output from the **show monitor event-trace** *component* **latest** command for the **spa** component:

```
Router# show monitor event-trace spa latest

00:01:15.364: subslot 2/3: 4xOC3 POS SPA, TSM Event:inserted  New state:wait_psm
_ready
     spa type 0x440
00:02:02.308: subslot 2/0: not present, TSM Event:empty  New state:remove
     spa type 0x0, fail code 0x0(none)
00:02:02.308: subslot 2/0: not present, TSM Event:remove_complete  New state:idle
00:02:02.308: subslot 2/1: not present, TSM Event:empty  New state:remove
     spa type 0x0, fail code 0x0(none)
00:02:02.308: subslot 2/1: not present, TSM Event:remove_complete  New state:idle
00:02:02.308: subslot 2/2: not present, TSM Event:empty  New state:remove
     spa type 0x0, fail code 0x0(none)
00:02:02.308: subslot 2/2: not present, TSM Event:remove_complete  New state:idle
00:02:02.312: subslot 2/3: not present(plugin 4xOC3 POS SPA), TSM Event:empty  New
state:remove
     spa type 0x0, fail code 0x0(none)
00:02:02.312: subslot 2/3: not present, TSM Event:remove_complete  New state:idle
```

Cisco Express Forwarding Component Examples

If you select Cisco Express Forwarding as the component for which to display event messages, you can use the following additional arguments and keywords: **show monitor event-trace cef** [**events** | **interface | ipv6** | **ipv4**][**all**].

The following example shows the IPv6 or IPv4 events related to the Cisco Express Forwarding component. Each trace message is numbered and is followed by a time stamp (derived from the device uptime). Following the time stamp is the component-specific message data.

```
Router# show monitor event-trace cef ipv6 all

00:00:24.612:  [Default] *::*/*'00             New FIB table          [OK]

Router# show monitor event-trace cef ipv4 all
```

```
00:00:24.244:  [Default] 127.0.0.81/32'01       FIB insert              [OK]
```

In the following example, all event trace messages for the Cisco Express Forwarding component are displayed:

```
Router# show monitor event-trace cef events all

00:00:18.884: SubSys  fib_ios_chain init
00:00:18.884: Inst    unknown -> RP
00:00:24.584: SubSys  fib init
00:00:24.592: SubSys  fib_ios init
00:00:24.592: SubSys  fib_ios_if init
00:00:24.596: SubSys  ipv4fib init
00:00:24.608: SubSys  ipv4fib_ios init
00:00:24.612: SubSys  ipv6fib_ios init
00:00:24.620: Flag    IPv4 CEF enabled set to yes
00:00:24.620: Flag    0x7BF6B62C set to yes
00:00:24.620: Flag    IPv4 CEF switching enabled set to yes
00:00:24.624: GState  CEF enabled
00:00:24.628: SubSys  ipv4fib_les init
00:00:24.628: SubSys  ipv4fib_pas init
00:00:24.632: SubSys  ipv4fib_util init
00:00:25.304: Process Background created
00:00:25.304: Flag    IPv4 CEF running set to yes
00:00:25.304: Process Background event loop enter
00:00:25.308: Flag    IPv4 CEF switching running set to yes
```

The following example shows Cisco Express Forwarding interface events:

```
Router# show monitor event-trace cef interface all

00:00:24.624: <empty>      (sw  4) Create   new
00:00:24.624: <empty>      (sw  4) SWIDBLnk FastEthernet0/0(4)
00:00:24.624: Fa0/0        (sw  4) NameSet
00:00:24.624: <empty>      (hw  1) Create   new
00:00:24.624: <empty>      (hw  1) HWIDBLnk FastEthernet0/0(1)
00:00:24.624: Fa0/0        (hw  1) NameSet
00:00:24.624: <empty>      (sw  3) Create   new
00:00:24.624: <empty>      (sw  3) SWIDBLnk FastEthernet0/1(3)
00:00:24.624: Fa0/1        (sw  3) NameSet
00:00:24.624: <empty>      (hw  2) Create   new
```

Cisco Express Forwarding Component Examples for Cisco 10000 Series Routers Only

The following example shows the IPv4 events related to the Cisco Express Forwarding component. Each trace message is numbered and is followed by a time stamp (derived from the device uptime). Following the time stamp is the component-specific message data.

```
Router# show monitor event-trace cef ipv4 all

00:00:48.244:  [Default] 127.0.0.81/32'01      FIB insert               [OK]
```

In the following example, all event trace message for the Cisco Express Forwarding component are displayed:

```
Router# show monitor event-trace cef events all

00:00:18.884: SubSys  fib_ios_chain init
00:00:18.884: Inst    unknown -> RP
00:00:24.584: SubSys  fib init
00:00:24.592: SubSys  fib_ios init
00:00:24.592: SubSys  fib_ios_if init
00:00:24.596: SubSys  ipv4fib init
00:00:24.608: SubSys  ipv4fib_ios init
```

```
00:00:24.620: Flag    IPv4 CEF enabled set to yes
00:00:24.620: Flag    0x7BF6B62C set to yes
00:00:24.620: Flag    IPv4 CEF switching enabled set to yes
00:00:24.624: GState  CEF enabled
00:00:24.628: SubSys  ipv4fib_les init
00:00:24.628: SubSys  ipv4fib_pas init
00:00:24.632: SubSys  ipv4fib_util init
00:00:25.304: Process Background created
00:00:25.304: Flag    IPv4 CEF running set to yes
00:00:25.304: Process Background event loop enter
00:00:25.308: Flag    IPv4 CEF switching running set to yes
```

The following examples show Cisco Express Forwarding interface events:

```
Router# show monitor event-trace cef interface all

00:00:24.624: <empty>      (sw  4) Create   new
00:00:24.624: <empty>      (sw  4) SWIDBLnk FastEthernet1/0/0(4)
00:00:24.624: Fa0/0        (sw  4) NameSet
00:00:24.624: <empty>      (hw  1) Create   new
00:00:24.624: <empty>      (hw  1) HWIDBLnk FastEthernet1/0/0(1)
00:00:24.624: Fa0/0        (hw  1) NameSet
00:00:24.624: <empty>      (sw  3) Create   new
00:00:24.624: <empty>      (sw  3) SWIDBLnk FastEthernet1/1/0(3)
00:00:24.624: Fa0/1        (sw  3) NameSet
00:00:24.624: <empty>      (hw  2) Create   new
```

CFD Component for Cisco IOS Release 12.4(9)T

To troubleshoot errors in an encryption datapath, enter the **show monitor event-trace cfd all** command. In this example, events are shown separately, each beginning with a time stamp, followed by data from the error trace buffer. Cisco Technical Assistence Center (TAC) engineers can use this information to diagnose the cause of the errors.

Note If no packets have been dropped, this command does not display any output.

```
Router# show monitor event-trace cfd all

00:00:42.452: 450000B4 00060000 FF33B306 02020203 02020204 32040000 F672999C
        00000001 7A7690C2 A0A4F8BC E732985C D6FFDCC8 00000001 C0902BD0
        A99127AE 8EAA22D4

00:00:44.452: 450000B4 00070000 FF33B305 02020203 02020204 32040000 F672999C
        00000002 93C01218 2325B697 3C384CF1 D6FFDCC8 00000002 BFA13E8A
        D21053ED 0F62AB0E

00:00:46.452: 450000B4 00080000 FF33B304 02020203 02020204 32040000 F672999C
        00000003 7D2E11B7 A0BA4110 CC62F91E D6FFDCC8 00000003 7236B930
        3240CA8C 9EBB44FF

00:00:48.452: 450000B4 00090000 FF33B303 02020203 02020204 32040000 F672999C
        00000004 FB6C80D9 1AADF938 CDE57ABA D6FFDCC8 00000004 E10D8028
        6BBD748F 87F5E253

00:00:50.452: 450000B4 000A0000 FF33B302 02020203 02020204 32040000 F672999C
        00000005 697C8D9D 35A8799A 2A67E97B D6FFDCC8 00000005 BC21669D
        98B29FFF F32670F6

00:00:52.452: 450000B4 000B0000 FF33B301 02020203 02020204 32040000 F672999C
```

```
00000006 CA18CBC4 0F387FE0 9095C27C D6FFDCC8 00000006 87A54811
AE3A0517 F8AC4E64
```

Related Commands

Command	Description
monitor event-trace (EXEC)	Controls event trace functions for a specified Cisco IOS software subsystem component.
monitor event-trace (global)	Configures event tracing for a specified Cisco IOS software subsystem component.
monitor event-trace dump-traces	Saves trace messages for all event traces currently enabled on the networking device.

show monitor permit-list

To display the permit-list state and interfaces configured, use the **show monitor permit-list** command in user EXEC or privileged EXEC mode.

show monitor permit-list

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(18)SXE	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to display the permit-list state and interfaces configured:

```
Router# show monitor permit-list

SPAN Permit-list      :Admin Enabled
 Permit-list ports     :Gi5/1-4,Gi6/1
Router(config)#
```

Related Commands

Command	Description
monitor permit-list	Configures a destination port permit list or adds to an existing destination port permit list.

show monitor session

To display information about the ERSPAN, SPAN and RSPAN sessions, use the **show monitor session** command in user EXEC mode.

show monitor session [**range** *session-range* | **local** | **remote** | **all** | *session*]

show monitor session [**erspan-destination** | **erspan-source** | **egress replication-mode capability**| **detail**]

Syntax Description

range *session-range*	(Optional) Displays a range of sessions; valid values are from 1 to 66.
local	(Optional) Displays only local SPAN sessions.
remote	(Optional) Displays both RSPAN source and destination sessions.
all	(Optional) Displays all sessions.
session	(Optional) Number of the session; valid values are from 1 to 66.
erspan-destination	(Optional) Displays information about the destination ERSPAN sessions only. This keyword is not supported on the Supervisor Engine 2.
erspan-source	(Optional) Displays information about the source ERSPAN sessions only. This keyword is not supported on the Supervisor Engine 2.
egress replication-mode capability	(Optional) Displays the operational mode and configured mode of the session and module session capabilities.
detail	(Optional) Displays detailed session information.

Defaults

This command has no default settings.

Command Modes

User EXEC (>)

Command History

Release	Modification
12.2(14)SX	This command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support was added for the Supervisor Engine 2.
12.2(18)SXE	Support was added for the **erspan-destination** and **erspan-source** keywords on the Supervisor Engine 720 only.
12.2(18)SXF	This command was updated as follows: • Support was added for the Supervisor Engine 32. • ERSPAN is supported in any switch fabric module functionality switching mode.
12.2(33)SXH	The **egress replication-mode capability** keywords were added.

Usage Guidelines

The **erspan-destination** and **erspan-source** keywords are not supported on Catalyst 6500 series switches that are configured with a Supervisor Engine 2.

In releases prior to Release 12.2(18)SXF, ERSPAN is supported on Catalyst 6500 series switches that are operating in compact switch fabric module functionality switching mode only.

Release 12.2(18)SXF and later releases support ERSPAN in any switch fabric module functionality switching mode.

If the switch fabric module functionality switching mode is set to compact, the output of the **show** commands display "dcef mode" for fabric-enabled modules with DFC3 installed and display "fabric mode" for other fabric-enabled modules.

If the switch fabric module functionality switching mode is set to truncated, the output of the **show** commands display "fabric mode" for all fabric-enabled modules.

When entering a range of sessions, use a dash (-) to specify a range and separate multiple entries with a comma (,). Do not enter spaces before or after the comma or the dash.

You can enter multiple ranges by separating the ranges with a comma.

If you enter the **show monitor session** command without specifying a session, the information for all sessions is displayed.

Examples

This example shows how to display the saved version of the monitor configuration for a specific session:

```
Router# show monitor session 2
Session 2
------------
Type : Remote Source Session

Source Ports:
    RX Only:       Fa1/1-3
Dest RSPAN VLAN:   901
Router#
```

This example shows how to display the detailed information from a saved version of the monitor configuration for a specific session:

```
Router# show monitor session 2 detail
Session 2
------------
Type : Remote Source Session

Source Ports:
    RX Only:       Fa1/1-3
    TX Only:       None
    Both:          None
Source VLANs:
    RX Only:       None
    TX Only:       None
    Both:          None
Source RSPAN VLAN: None
Destination Ports: None
Filter VLANs:      None
Dest RSPAN VLAN:   901
Router#
```

This example shows how to display information about the egress replication mode only:

```
Router# show monitor session egress replication-mode capability
 No SPAN configuration is present in the system.
```

```
-----------------------------------------------------
Global Egress SPAN Replication Mode Capability:

Slot          Egress Replication Capability
 No       LSPAN           RSPAN             ERSPAN
-----------------------------------------------------
 3     Distributed      Distributed        Distributed
 5     Distributed      Distributed        Distributed
Router#
```

This example shows how to display information about the destination ERSPAN sessions only:

```
Router# show monitor session erspan-destination
Session 2
---------
Type            : ERSPAN Destination Session
Status         : Admin Disabled
Router#
```

This example shows how to display detailed information about the destination ERSPAN sessions only:

```
Router# show monitor session erspan-destination detail
Session 2
---------
Type                   : ERSPAN Destination Session
Status                 : Admin Disabled
Description            : -
Source Ports           :
    RX Only            : None
    TX Only            : None
    Both               : None
Source VLANs           :
    RX Only            : None
    TX Only            : None
    Both               : None
Source RSPAN VLAN      : None
Destination Ports      : None
Filter VLANs           : None
Destination RSPAN VLAN : None
Source IP Address      : None
Source IP VRF          : None
Source ERSPAN ID       : None
Destination IP Address : None
Destination IP VRF     : None
Destination ERSPAN ID  : None
Origin IP Address      : None
IP QOS PREC            : 0
IP TTL                 : 255
Router#
```

This example shows how to display information about the source ERSPAN sessions only:

```
Router# show monitor session erspan-source
Session 1
---------
Type                   : ERSPAN Source Session
Status                : Admin Disabled
Session 3
---------
Type                   : ERSPAN Source Session
Status                : Admin Disabled
Router#
```

This example shows how to display detailed information about the source ERSPAN sessions only:

```
Router# show monitor session erspan-source detail
Session 1
---------
Type                  : ERSPAN Source Session
Status                : Admin Disabled
Description           : -
Source Ports          :
    RX Only           : None
    TX Only           : None
    Both              : None
Source VLANs          :
    RX Only           : None
    TX Only           : None
    Both              : None
Source RSPAN VLAN     : None
Destination Ports     : None
Filter VLANs          : None
Destination RSPAN VLAN : None
Source IP Address     : None
Source IP VRF         : None
Source ERSPAN ID      : None
Destination IP Address : None
Destination IP VRF    : None
Destination ERSPAN ID  : None
Origin IP Address     : None
IP QOS PREC           : 0
IP TTL                : 255

Session 3
---------
Type                  : ERSPAN Source Session
Status                : Admin Disabled
Description           : -
Source Ports          :
    RX Only           : None
    TX Only           : None
    Both              : None
Source VLANs          :
    RX Only           : None
    TX Only           : None
    Both              : None
Source RSPAN VLAN     : None
Destination Ports     : None
Filter VLANs          : None
Destination RSPAN VLAN : None
Source IP Address     : None
Source IP VRF         : None
Source ERSPAN ID      : None
Destination IP Address : None
Destination IP VRF    : None
Destination ERSPAN ID  : None
Origin IP Address     : None
IP QOS PREC           : 0
IP TTL                : 255
Router#
```

This example shows how to display the operational mode and configured mode of the session and module session capabilities:

```
Router# show monitor session egress replication-mode capability
Session 65 Type Local Session
-----------------------------------------------
```

```
Operational mode of egress span replication    : Centralized
Configured mode of egress span replication     : Distributed/Default

 Slot            Egress Replication Capability
-------------------------------------------------
  1                   Centralized
  3                   Centralized
  5                   Centralized
Router#
```

Related Commands

Command	Description
monitor session	Starts a new ERSPAN, SPAN, or RSPAN session, adds or deletes interfaces or VLANs to or from an existing session, filters ERSPAN, SPAN, or RSPAN traffic to specific VLANs, or deletes a session.
monitor session type	Creates an ERSPAN source session number or enters the ERSPAN session configuration mode for the session.
remote-span	Configures a VLAN as an RSPAN VLAN.

show msfc

To display Multilayer Switching Feature Card (MSFC) information, use the **show msfc** command in user EXEC or privileged EXEC mode.

show msfc {**buffers** | **eeprom** | **fault** | **netint** | **tlb**}

Syntax Description

buffers	Displays buffer-allocation information.
eeprom	Displays the internal information.
fault	Displays fault information.
netint	Displays network-interrupt information.
tlb	Displays information about the TLB registers.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

These examples display the **show msfc** command output:

```
Router# show msfc buffers

Reg. set    Min    Max
  TX               640
 ABQ         640  16384
   0           0     40
   1        6715   8192
   2           0      0
   3           0      0
   4           0      0
   5           0      0
   6           0      0
   7           0      0
Threshold = 8192

Vlan  Sel  Min  Max  Cnt  Rsvd
1016    1 6715 8192    0     0
Router#

Router# show msfc eeprom
```

```
RSFC CPU IDPROM:
IDPROM image:

  (FRU is 'Cat6k MSFC 2 daughterboard')

IDPROM image block #0:
  hexadecimal contents of block:
  00: AB AB 01 90 13 22 01 00 00 02 60 03 00 EA 43 69    ....."....`...Ci
  10: 73 63 6F 20 53 79 73 74 65 6D 73 00 00 00 00 00    sco Systems.....
  20: 00 00 57 53 2D 46 36 4B 2D 4D 53 46 43 32 00 00    ..WS-F6K-MSFC2..
  30: 00 00 00 00 00 00 53 41 44 30 36 32 31 30 30 36    ......SAD0621006
  40: 37 00 00 00 00 00 00 00 00 00 37 33 2D 37 32 33    7.........73-723
  50: 37 2D 30 33 00 00 00 00 00 00 41 30 00 00 00 00    7-03......A0....
  60: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00    ................
  70: 00 00 00 02 00 03 00 00 00 00 00 09 00 05 00 01    ................
  80: 00 03 00 01 00 01 00 02 00 EA FF DF 00 00 00 00    ................

  block-signature = 0xABAB, block-version = 1,
  block-length = 144, block-checksum = 4898

  *** common-block ***
  IDPROM capacity (bytes) = 256  IDPROM block-count = 2
  FRU type = (0x6003,234)
  OEM String = 'Cisco Systems'
  Product Number = 'WS-F6K-MSFC2'
  Serial Number = 'SAD06210067'
  Manufacturing Assembly Number = '73-7237-03'
  Manufacturing Assembly Revision = 'A0'
  Hardware Revision = 2.3
  Manufacturing bits = 0x0  Engineering bits = 0x0
  SNMP OID = 9.5.1.3.1.1.2.234
  Power Consumption = -33 centiamperes    RMA failure code = 0-0-0-0
  *** end of common block ***

IDPROM image block #1:
  hexadecimal contents of block:
  00: 60 03 01 62 0A C2 00 00 00 00 00 00 00 00 00 00    `..b............
  10: 00 00 00 00 00 00 01 00 23 00 08 7C A4 CE 80 00 40    .......#..|....@
  20: 01 01 00 01 00 00 00 00 00 00 00 00 00 00 00 00    ................
  30: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00    ................
  40: 14 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00    ................
  50: 10 00 4B 3C 41 32 80 80 80 80 80 80 80 80 80 80    ..K<A2..........
  60: 80 80                                              ..

  block-signature = 0x6003, block-version = 1,
  block-length = 98, block-checksum = 2754

  *** linecard specific block ***
  feature-bits =   00000000 00000000
  hardware-changes-bits =   00000000 00000001
  card index = 35
  mac base = 0008.7CA4.CE80
  mac_len = 64
  num_processors = 1
  epld_num = 1
  epld_versions = 0001 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 00
00 0000 0000
  port numbers:
    pair #0: type=14, count=01
    pair #1: type=00, count=00
    pair #2: type=00, count=00
    pair #3: type=00, count=00
    pair #4: type=00, count=00
    pair #5: type=00, count=00
```

```
    pair #6: type=00, count=00
    pair #7: type=00, count=00
  sram_size = 4096
  sensor_thresholds =
    sensor #0: critical = 75 oC, warning = 60 oC
    sensor #1: critical = 65 oC, warning = 50 oC
    sensor #2: critical = -128 oC (sensor not present), warning = -128 oC (senso
r not present)
    sensor #3: critical = -128 oC (sensor not present), warning = -128 oC (senso
r not present)
    sensor #4: critical = -128 oC (sensor not present), warning = -128 oC (senso
r not present)
    sensor #5: critical = -128 oC (sensor not present), warning = -128 oC (senso
r not present)
    sensor #6: critical = -128 oC (sensor not present), warning = -128 oC (senso
r not present)
    sensor #7: critical = -128 oC (sensor not present), warning = -128 oC (senso
r not present)
  *** end of linecard specific block ***

End of IDPROM image
Router#

Router# show msfc fault

 Reg. set    Min    Max
  TX               640
 ABQ        640  16384
   0          0     40
   1       6715   8192
   2          0      0
   3          0      0
   4          0      0
   5          0      0
   6          0      0
   7          0      0
Threshold = 8192

Vlan  Sel  Min  Max  Cnt  Rsvd
1016    1 6715 8192    0     0
Router#

Router# show msfc netint

Network IO Interrupt Throttling:
 throttle count=0, timer count=0
 active=0, configured=1
 netint usec=3999, netint mask usec=400

Router#

Router# show msfc tlb

Mistral revision 3
TLB entries : 37
Virt Address range      Phy Address range      Attributes
0x10000000:0x1001FFFF   0x010000000:0x01001FFFF   CacheMode=2, RW, Valid
0x10020000:0x1003FFFF   0x010020000:0x01003FFFF   CacheMode=2, RW, Valid
0x10040000:0x1005FFFF   0x010040000:0x01005FFFF   CacheMode=2, RW, Valid
0x10060000:0x1007FFFF   0x010060000:0x01007FFFF   CacheMode=2, RW, Valid
0x10080000:0x10087FFF   0x010080000:0x010087FFF   CacheMode=2, RW, Valid
0x10088000:0x1008FFFF   0x010088000:0x01008FFFF   CacheMode=2, RW, Valid
0x18000000:0x1801FFFF   0x010000000:0x01001FFFF   CacheMode=0, RW, Valid
0x19000000:0x1901FFFF   0x010000000:0x01001FFFF   CacheMode=7, RW, Valid
```

```
0x1E000000:0x1E1FFFFF   0x01E000000:0x01E1FFFFF   CacheMode=2, RW, Valid
0x1E880000:0x1E881FFF   0x01E880000:0x01E881FFF   CacheMode=2, RW, Valid
0x1FC00000:0x1FC7FFFF   0x01FC00000:0x01FC7FFFF   CacheMode=2, RO, Valid
0x30000000:0x3001FFFF   0x070000000:0x07001FFFF   CacheMode=2, RW, Valid
0x40000000:0x407FFFFF   0x000000000:0x0007FFFFF   CacheMode=3, RO, Valid
0x40800000:0x40FFFFFF   0x000800000:0x000FFFFFF   CacheMode=3, RO, Valid
0x41000000:0x417FFFFF   0x001000000:0x0017FFFFF   CacheMode=3, RO, Valid
0x41800000:0x419FFFFF   0x001800000:0x0019FFFFF   CacheMode=3, RO, Valid
0x41A00000:0x41A7FFFF   0x001A00000:0x001A7FFFF   CacheMode=3, RO, Valid
0x41A80000:0x41A9FFFF   0x001A80000:0x001A9FFFF   CacheMode=3, RO, Valid
0x41AA0000:0x41ABFFFF   0x001AA0000:0x001ABFFFF   CacheMode=3, RO, Valid
0x41AC0000:0x41AC7FFF   0x001AC0000:0x001AC7FFF   CacheMode=3, RO, Valid
0x41AC8000:0x41ACFFFF   0x001AC8000:0x001ACFFFF   CacheMode=3, RO, Valid
0x41AD0000:0x41AD7FFF   0x001AD0000:0x001AD7FFF   CacheMode=3, RO, Valid
0x41AD8000:0x41AD9FFF   0x001AD8000:0x001AD9FFF   CacheMode=3, RO, Valid
0x41ADA000:0x41ADBFFF   0x001ADA000:0x001ADBFFF   CacheMode=3, RW, Valid
0x41ADC000:0x41ADDFFF   0x001ADC000:0x001ADDFFF   CacheMode=3, RW, Valid
0x41ADE000:0x41ADFFFF   0x001ADE000:0x001ADFFFF   CacheMode=3, RW, Valid
0x41AE0000:0x41AFFFFF   0x001AE0000:0x001AFFFFF   CacheMode=3, RW, Valid
0x41B00000:0x41B7FFFF   0x001B00000:0x001B7FFFF   CacheMode=3, RW, Valid
0x41B80000:0x41BFFFFF   0x001B80000:0x001BFFFFF   CacheMode=3, RW, Valid
0x41C00000:0x41DFFFFF   0x001C00000:0x001DFFFFF   CacheMode=3, RW, Valid
0x41E00000:0x41FFFFFF   0x001E00000:0x001FFFFFF   CacheMode=3, RW, Valid
0x42000000:0x43FFFFFF   0x002000000:0x003FFFFFF   CacheMode=3, RW, Valid
0x44000000:0x45FFFFFF   0x004000000:0x005FFFFFF   CacheMode=3, RW, Valid
0x46000000:0x47FFFFFF   0x006000000:0x007FFFFFF   CacheMode=3, RW, Valid
0x06E00000:0x06FFFFFF   0x006E00000:0x006FFFFFF   CacheMode=2, RW, Valid
0x07000000:0x077FFFFF   0x007000000:0x0077FFFFF   CacheMode=2, RW, Valid
0x07800000:0x07FFFFFF   0x007800000:0x007FFFFFF   CacheMode=2, RW, Valid

Router#
```

Related Commands

Command	Description
show environment alarm	Displays the information about the environmental alarm.
show fm summary	Displays a summary of FM Information.
show environment status	Displays the information about the operational FRU status.

show pagp

To display port-channel information, use the **show pagp** command in user EXEC or privileged EXEC mode.

show pagp [*group-number*] {**counters** | **internal** | **neighbor** | **pgroup**}

Syntax Description

group-number	(Optional) Channel-group number; valid values are a maximum of 64 values from 1 to 282.
counters	Displays the traffic information.
internal	Displays the internal information.
neighbor	Displays the neighbor information.
pgroup	Displays the active port channels.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can enter any **show pagp** command to display the active port-channel information. To display the nonactive information, enter the **show pagp** command with a group.

The **port-channel** *number* values from 257 to 282 are supported on the CSM and the FWSM only.

Examples

This example shows how to display information about the PAgP counters:

```
Router# show pagp counters

          Information        Flush
Port      Sent   Recv     Sent   Recv
---------------------------------------
Channel group: 1
  Fa5/4    2660   2452     0      0
  Fa5/5    2676   2453     0      0
Channel group: 2
  Fa5/6    289    261      0      0
  Fa5/7    290    261      0      0
Channel group: 1023
  Fa5/9    0      0        0      0
```

```
Channel group: 1024
  Fa5/8    0      0        0      0
Router#
```

This example shows how to display internal PAgP information:

```
Router# show pagp 1 internal

Flags:  S - Device is sending Slow hello.  C - Device is in Consistent state.
        A - Device is in Auto mode.
Timers: H - Hello timer is running.        Q - Quit timer is running.
        S - Switching timer is running.    I - Interface timer is running.

Channel group 1
                             Hello    Partner  PAgP     Learning
Port      Flags State   Timers  Interval Count   Priority  Method
Fa5/4     SC    U6/S7           30s      1        128       Any
Fa5/5     SC    U6/S7           30s      1        128       Any
Router#
```

This example shows how to display PAgP-neighbor information for all neighbors:

```
Router# show pagp neighbor

Flags:  S - Device is sending Slow hello.  C - Device is in Consistent state.
        A - Device is in Auto mode.        P - Device learns on physical port.

Channel group 1 neighbors
          Partner              Partner          Partner          Partner Group
Port      Name                 Device ID        Port       Age   Flags   Cap.
Fa5/4     JAB031301            0050.0f10.230c   2/45         2s  SAC     2D
Fa5/5     JAB031301            0050.0f10.230c   2/46        27s  SAC     2D

Channel group 2 neighbors
          Partner              Partner          Partner          Partner Group
Port      Name                 Device ID        Port       Age   Flags   Cap.
Fa5/6     JAB031301            0050.0f10.230c   2/47        10s  SAC     2F
Fa5/7     JAB031301            0050.0f10.230c   2/48        11s  SAC     2F

Channel group 1023 neighbors
          Partner              Partner          Partner          Partner Group
Port      Name                 Device ID        Port       Age   Flags   Cap.

Channel group 1024 neighbors
          Partner              Partner          Partner          Partner Group
Port      Name                 Device ID        Port       Age   Flags   Cap.
Router#
```

Related Commands

Command	Description
pagp learn-method	Learns the input interface of the incoming packets.
pagp port-priority	Selects a port in hot standby mode.

show parser dump

Note Effective with Cisco IOS Release 15.0(1)M, the **show parser dump** command is not available in Cisco IOS software.

To display the command-line interface (CLI) syntax options for all command modes or for a specified command mode, use the **show parser dump** command in user EXEC or privileged EXEC mode.

show parser dump {*command-mode* | **all**} [**privilege-level** *level*] [**extend**] [**breakage**]

Syntax Description

command-mode	A keyword indicating the command mode. The output will include the syntax for commands only in the specified command mode. The list of command mode keywords will vary depending on your software image. Use the **show parser dump ?** command to display the list of command mode keyword options. For further assistance in determining the proper command mode, see the "Cisco IOS Command Modes" Release 12.2 document, available on Cisco.com.
all	Indicates that all commands in all modes should be displayed in the output. **Caution** This keyword generates a very large amount of output, which may exceed your system or buffer memory.
privilege-level *level*	(Optional) Lists CLI commands only with the privilege level specified in the *level* argument.
extend	(Optional) Enables the extended display mode. The extended parser display shows the keyword and argument descriptions typically shown with the command-line help (**?** command). **Note** This keyword can produce a large amount of output.
breakage	(Optional) Enables detection of potential parser chain syntax breakage. This keyword is intended for internal use.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.2(4)T	This command was introduced.
12.2(13)T	This command was enhanced to resolve certain execution errors.
12.0(23)S	This command was enhanced to resolve certain execution errors.
15.0(1)M	This command was removed.

Usage Guidelines

This command was developed to allow the exploration of the CLI command syntax without requiring the user to actually enter a specific mode and use the **?** command-line help.

Caution Use caution when entering this command with the **all** keyword. A large amount of output can be generated by this command, which may easily exceed buffer or system memory on smaller platforms. Also, some configuration modes have hundreds of valid commands. For large dumps, use of the redirection to a file using the **| redirect** *URL* syntax at the end of the command is highly recommended. (See the documentation for the **show** *command* **redirect** command for more information on using this command extension.)

Output for this command will show the syntax options for all commands available in the specified mode. The number preceding the command shows the privilege level associated with that command. For example, the line

```
15 type dhcp
```

indicates that the **type dhcp** command has a privilege level of 15 assigned to it. For information about privilege levels, see the "Configuring Passwords and Privileges" chapter in the *Cisco IOS Security Configuration Guide*.

Any given command-line string should indicate the full syntax needed to make the command complete and valid. In other words, the command-line string ends where the carriage return (Enter) could be entered, as indicated in command-line help by the <cr> syntax. You will typically see multiple forms of a command, each showing a valid syntax combination. For example, each of the following syntax combinations, as seen in the output of the **show parser dump rtr | include dhcp** command, is a valid command:

```
type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82> circuit-id <string>
type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82> remote-id <string>
type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82> subnet-mask
<ipmask>
type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82>
type dhcp dest-ipaddr <address> source-ipaddr <address>
type dhcp dest-ipaddr <address>
type dhcp
```

Use of the **show** command extensions **| begin**, **| include**, and **| exclude** is recommended for this command because these extensions allow you to filter the output to display only the commands you are interested in. The redirection extensions | **redirect**, | **append**, and | **tee** allow you to redirect the output of this command to local or remote storage as a file.

As with most **show** commands, you can typically exit from the --More-- prompt back to EXEC mode using Ctrl-Z. For some connections, Ctrl-Shift-6 (Ctrl^) or Ctrl-Shift-6-X should be used instead.

Examples

The following example shows a typical list of command mode keywords. The fields are self-explanatory.

```
Router# show parser dump ?

  aaa-attr-list           AAA attribute list config mode
  aaa-user                 AAA user definition
  accept-dialin            VPDN group accept dialin configuration mode
  accept-dialout           VPDN group accept dialout configuration mode
  acct_mlist               AAA accounting methodlist definitions
  address-family           Address Family configuration mode
  aic                      Alarm Interface Card configuration mode
  all                      For all modes
  alps-ascu                ALPS ASCU configuration mode
```

```
alps-circuit              ALPS circuit configuration mode
appfw-application-aim     Appfw for AIM Configuration Mode
appfw-application-msnmsgr Appfw for MSN Messenger Configuration Mode
appfw-application-ymsgr   Appfw for Yahoo! Messenger Configuration Mode
appfw-policy              Application FW Policy Configuration Mode
application-http          Appfw for HTTP Configuration Mode
archive                   Archive the router configuration mode
atalk-test                Appletalk test mode
atm-bm-config             ATM bundle member configuration mode
atm-bundle-config         ATM bundle configuration mode
atm-l2trans-pvc-config    ATM L2transport PVC configuration mode
atm-l2trans-pvp-config    ATM L2transport PVP configuration mode
atm-pvc-range-config      ATM PVC Range configuration mode
atm-range-pvc-config      ATM PVC in Range configuration mode
atm-svc-bm-config         ATM SVC bundle member configuration mode
atm-svc-bundle-config     ATM SVC bundle configuration mode
atm-vc-config             ATM virtual circuit configuration mode
atmsig_e164_table_mode    ATMSIG E164 Table
auto-ip-sla-mpls          Auto IP SLA MPLS LSP Monitor configs
auto-ip-sla-mpls-lpd-params Auto IP SLA MPLS LPD params configs
auto-ip-sla-mpls-params   Auto IP SLA MPLS LSP Monitor Params configs
banner                    Banner Input mode
bba-group                 BBA Group configuration mode
boomerang                 Boomerang configuration mode
bsm-cfg                   BSM config definition
bulkstat-objlist          Bulk-stat Object list configuration mode
bulkstat-schemadef        Bulk-stat schema configuration mode
bulkstat-transfer         Bulk Stat configuration mode
cascustom                 Cas custom configuration mode
call-filter-matchlist    Call Filter matchlist configuration mode
call-home                 call-home config mode
call-home-profile         call-home profile config mode
call-router               AnnexG configuration mode
cascustom                 Cas custom configuration mode
cause-code-list           Voice Cause Code List configuration mode
cfg-path                  IP Host backup configuration mode
cfg-pt-ruleset            Protocol Translation ruleset configuration mode
cip-vadp                  Virtual Adapter configuration mode
cip-vlan                  Virtual Lan configuration mode
clid-group                CLID group configuration mode
cm-ac                     AC-AC connect configuration mode
cm-fallback               cm-fallback configuration mode
cns-connect-intf-config   CNS Connect Intf Info Mode
cns-connect-config        CNS Connect Info Mode
cns-tmpl-connect-config   CNS Template Connect Info Mode
cns_inventory_submode     CNS Inventory SubMode
codec-profile             Codec Profile configuration mode
conf-dia-attr-list        Diameter attribute list config mode
conf-dia-peer             Diameter peer config mode
conf-dia-sg               Diameter peer group config mode
config-ip-sla-http-rr     IP SLAs HTTP raw request Configuration
config-l2tp-class         l2tp-class configuration mode
config-tgrep             TRIP-Lite configuration mode
config-rtr-http-rr        RTR HTTP raw request Configuration
config-x25-huntgroup      X.25 hunt group configuration mode
config_app_global         Configure global settings
config_app_map            Configure application mapping
config_app_monitor        Configure application monitoring
config_app_session        Define script processes
config_voice              Define application services, modules, groups
config_voice_app          Define application parameters
configure                 Global configuration mode
congestion                Frame Relay congestion configuration mode
control-plane             Control Plane configuration mode
```

```
control-plane-cef-exception-mode Control Plane cef-exception configuration mode
control-plane-host-mode  Control Plane host configuration mode
control-plane-transit-mode Control Plane transit configuration mode
controller               Controller configuration mode
cpf-classmap             Class-map configuration mode
cpf-policyclass          Class-in-Policy configuration mode
cpf-policymap            Policy-map configuration mode
cpu                      config-owner-cpu
crypto-ca-cert-chain     Crypto certificate entry mode
crypto-ca-cert-comm      Certificate query  mode
crypto-ca-cert-map       Certificate map entry mode
crypto-ca-profile-enroll Certificate enrollment profile entry mode
crypto-ca-root           Certificate authority trusted root entry mode
crypto-ca-trustpoint     Certificate authority trustpoint entry mode
crypto-cs-server         Certificate Server entry mode
crypto-gdoi-group        Crypto GDOI group policy config mode
crypto-identity          Crypto identity config mode
crypto-ikmp              Crypto ISAKMP config mode
crypto-ikmp-browser-proxy Crypto ISAKMP browser proxy config mode
crypto-ikmp-client-fw    Crypto ISAKMP client firewall policy config mode
crypto-ikmp-group        Crypto ISAKMP group policy config mode
crypto-ikmp-peer         Crypto ISAKMP peer policy configuration mode
crypto-ipsec-profile     IPSec policy profile mode
crypto-keyring           Crypto Keyring command mode
crypto-map               Crypto map config mode
crypto-map-fail-close    Crypto map fail close mode
crypto-pubkey            Crypto subsystem public key entry mode
crypto-transform         Crypto transform config mode
crypto-tti-petitioner    TTI Petitioner entry mode
crypto-tti-registrar     TTI Registrar entry mode
decnet-map               DECnet map configuration mode
dfp-submode              DFP config mode
dhcp                     DHCP pool configuration mode
dhcp-class               DHCP class configuration mode
dhcp-pool-class          Per DHCP pool class configuration mode
dhcp-relay-info          DHCP class relay agent info configuration mode
dhcp-subnet-secondary    Per DHCP secondary subnet configuration mode
dnis-group               DNIS group configuration mode
dns-view                 DNS View configuration mode
dns-view-list            DNS View-list configuration mode
dns-view-list-member     DNS View-list member configuration mode
dspfarm                  DSP farm configuration mode
dspfarmprofile           Profile configuration mode
dynupd-http              Dynamic DNS update HTTP configuration mode
dynupd-method            Dynamic DNS update method configuration mode
emergency-response-location voice emergency response location configuration mode
emergency-response-settings voice emergency response settings configuration mode
emergency-response-zone  voice emergency response zone configuration mode
enum_rule                enum configuration mode
ephone                   ephone configuration mode
ephone-dn                ephone-dn configuration mode
ephone-dn-template       ephone-dn-template configuration mode
ephone-hunt              ephone-hunt configuration mode
ephone-template          ephone-template configuration mode
ephone-type              ephone-type configuration mode
ether_cfm                Ethernet CFM configuration mode
event                    Event MIB event configuration mode
event-action-notification Event MIB event action notification configuration mode
event-action-set         Event MIB event action set configuration mode
event-objlist            Event MIB object list configuration mode
event-trigger            Event MIB event trigger configuration mode
event-trigger-boolean    Event MIB event trigger boolean configuration mode
event-trigger-existence  Event MIB event trigger existence configuration mode
event-trigger-object-id  Event MIB trigger object id configuration mode
```

```
event-trigger-threshold  Event MIB event trigger threshold configuration mode
exec                     Exec mode
expr-expression          Expression configuration mode
expr-object              Expression Object configuration mode
extcomm-list             IP Extended community-list configuration mode
fh_applet                FH Applet Entry Configuration
fh_applet_trigger        FH Applet Trigger Configuration
filter                   Output filter mode
filterserver             AAA filter server definitions
flow-cache               Flow aggregation cache config mode
flow-sampler-map         Flow sampler map config mode
flowexp                  Flow Exporter configuration mode
flowmon                  Flow Monitor configuration mode
flowrec                  Flow Record configuration mode
fr-fr                    FR/FR connection configuration mode
fr-pw                    FR/PW connection configuration mode
fr-vcb-bmode             FR VC Bundle mode
fr-vcb-mmode             FR VC Bundle Member mode
frf5                     FR/ATM Network IWF configuration mode
frf8                     FR/ATM Service IWF configuration mode
funi-vc-config           FUNI virtual circuit configuration mode
gatekeeper               Gatekeeper config mode
gateway                  Gateway configuration mode
gdoi-coop-ks-config      Crypto GDOI server redundancy config mode
gdoi-local-server        Crypto GDOI local server policy config mode
gdoi-sa-ipsec            Crypto GDOI local server IPsec SA policy config mode
gg_fcpa-config           FC tunnel configuration mode
gk_altgk_cluster         GK Commands for Cluster defn
gk_be_annexg             GK Commands for H.323 AnnexG configuration
gk_srv_trigger_arq       GK Server ARQ Trigger config mode
gk_srv_trigger_brq       GK Server BRQ Trigger config mode
gk_srv_trigger_drq       GK Server DRQ Trigger config mode
gk_srv_trigger_irr       GK Server IRR Trigger config mode
gk_srv_trigger_lcf       GK Server LCF Trigger config mode
gk_srv_trigger_lrj       GK Server LRJ Trigger config mode
gk_srv_trigger_lrq       GK Server LRQ Trigger config mode
gk_srv_trigger_rai       GK Server RAI Trigger config mode
gk_srv_trigger_rrq       GK Server RRQ Trigger config mode
gk_srv_trigger_urq       GK Server URQ Trigger config mode
gw                       Webvpn virtual gateway configuration
gw-accounting-aaa        Gateway accounting aaa configuration mode
gw-accounting-file       Gateway accounting file configuration mode
hostlist                 Host list configuration mode
identity-policy-mode     identity policy configuration mode
identity-profile-mode    identity profile configuration mode
interface                Interface configuration mode
interface range          Interface range configuration mode
interface-dlci           Frame Relay dlci configuration mode
ip-explicit-path         IP explicit path configuration mode
ip-sla                   IP SLAs entry configuration
ip-sla-am-grp            IP SLAs auto group config
ip-sla-am-grp-auto       IP SLAs auto group dest-auto config
ip-sla-am-schedule       IP SLAs auto schedule config
ip-sla-dhcp              IP SLAs dhcp configuration
ip-sla-dns               IP SLAs dns configuration
ip-sla-echo              IP SLAs echo configuration
ip-sla-ethernet-echo     IP SLAs Ethernet Echo configuration
ip-sla-ethernet-jitter   IP SLAs Ethernet Jitter configuration
ip-sla-ethernet-monitor  IP SLAs Ethernet configs
ip-sla-ethernet-monitor-params IP SLAs Ethernet Params configs
ip-sla-frameRelay        IP SLAs FrameRelay configuration
ip-sla-ftp               IP SLAs ftp configuration
ip-sla-http              IP SLAs http configuration
ip-sla-icmp-ech-params   IP SLAs icmpEcho Parameters
```

```
ip-sla-icmp-jtr-params   IP SLAs icmpJitter Parameters
ip-sla-icmpjitter        IP SLAs icmpjitter configuration
ip-sla-jitter            IP SLAs jitter configuration
ip-sla-pathEcho          IP SLAs pathEcho configuration
ip-sla-pathJitter        IP SLAs pathJitter configuration
ip-sla-tcp-conn-params   IP SLAs tcpConnect Parameters
ip-sla-tcpConnect        IP SLAs tcpConnect configuration
ip-sla-tplt-dest         IP SLAs auto destination submode
ip-sla-tplt-icmp-ech     IP SLAs auto template icmpEcho
ip-sla-tplt-icmp-jtr     IP SLAs auto template icmpJitter
ip-sla-tplt-tcp-conn     IP SLAs auto template tcpConnect
ip-sla-tplt-udp-ech      IP SLAs auto template udpEcho
ip-sla-tplt-udp-jtr      IP SLAs auto template udpJitter
ip-sla-udp-ech-params    IP SLAs udpEcho Parameters
ip-sla-udp-jtr-params    IP SLAs udpJitter Parameters
ip-sla-udpEcho           IP SLAs udpEcho configuration
ip-sla-voip              IP SLA voip configuration
ip-sla-voip-rtp          IP SLAs rtp configuration
ip-vrf                   Configure IP VRF parameters
ipc-zone-assoc-protocol-sctp ipc protocol sctp mode
ipczone                  IPC Zone config mode
ipczone-assoc            IPC Association config mode
ipenacl                  IP named extended access-list configuration mode
iphc-profile-mode        IPHC Profile configuration mode
ipmobile-test            IP Mobility test mode
ipnat-pool               IP NAT pool configuration mode
ipnat-portmap            IP NAT portmap configuration mode
ipnat-sbc                IP NAT SIP-SBC config mode
ipnat-sbc-vrf            IP NAT SIP-SBC vrf config mode
ipnat-snat               IP SNAT configuration mode
ipnat-snat-backup        IP SNAT Backup configuration mode
ipnat-snat-primary       IP SNAT Primary configuration mode
ipnat-snat-redundancy    IP SNAT Redundancy configuration mode
ips-seap-rules           IPS event action rules configuration mode
ips-sigdef-sig           IPS signature number name configuration mode
ipscataction             IPS Category name configuration mode
ipsnacl                  IP named simple access-list configuration mode
ipssigau                 IPS Auto Update configuration mode
ipssigcat                IPS signature category configuration mode
ipssigdef-action         IPS Signature actions configuration mode
ipssigdef-engine         IPS signature def Engine configuration mode
ipssigdef-status         IPS signature def Status mode
ipv6-mobile-router       MIPv6 router configuration mode
ipv6-router              IPv6 router configuration mode
ipv6acl                  IPv6 access-list configuration mode
ipv6dhcp                 IPv6 DHCP configuration mode
ipv6dhcpvs               IPv6 DHCP Vendor-specific configuration mode
ipx-router               IPX router configuration mode
ipxenacl                 IPX named extended access-list configuration mode
ipxsapnacl               IPX named SAP access-list configuration mode
ipxsnacl                 IPX named standard access-list configuration mode
ipxsumnacl               IPX named Summary access-list configuration mode
isakmp-profile           Crypto ISAKMP profile command mode
iua-cfg                  ISDN user adaptation layer configuration
key-chain                Key-chain configuration mode
key-chain-key            Key-chain key configuration mode
kron-occurrence          Kron Occurrence SubMode
kron-policy              Kron Policy SubMode
l2                       vfi configuration mode
line                     Line configuration mode
lw-vlan-id               VLAN-id configuration mode
lw-vlan-range            VLAN-range configuration mode
local-prof               Local profile configuration mode
log_config               Log configuration changes made via the CLI
```

```
lsp-attribute-list       LSP attribute list configuration mode
map-class                Map class configuration mode
map-list                 Map list configuration mode
memory                  config-owner-memory
mgcpprofile              MGCP Profile configuration mode
mipv6-config-ha          Mobile IPv6 HA mode
mipv6-config-ha-host     Mobile IPv6 Home Agent Host config mode
mobile-map               Mobile Map mode
mobile-networks          Mobile Networks mode
mobile-router            Mobile Router mode
mplsmfistaticifrewrite   MPLS MFI static if rewrite configuration mode
mplsmfistaticrewrite     MPLS MFI static rewrite configuration mode
mripv6-config-ha-host    Mobile IPv6 Home Agent Host config mode
mrm-manager              IP Multicast Routing Monitor config mode
neighbor                 Neighbor configuration mode
network-object-group     ACL Object Group configuration
null-interface           Null interface configuration mode
null-interface           Null interface configuration mode
nxg-service-relationship Service Relationship configuration mode
nxg-usage-indication     Usage Indication configuration mode
oam                      LSP Verification configuration mode
oer_br                   OER border router configuration submode
oer_mc                   OER master controller configuration submode
oer_mc_api_provider      OER MC API Provider configuration submode
oer_mc_br                OER managed border router configuration submode
oer_mc_br_if             OER Border Exit configuration submode
oer_mc_learn             OER Top Talker and Delay learning configuration submode
oer_mc_learn_list        OER learn list configuration submode
oer_mc_map               oer-map config mode
parameter_map_cfg        parameter-map configuration mode
policy-list              IP Policy List configuration mode
preauth                  AAA Preauth definitions
profile                  Subscriber profile configuration mode
pseudowire-class        Pseudowire-class configuration mode
public-key-chain        Crypto public key identification mode
public-key-chain-key    Crypto public key entry mode
public-key-chain-key-ring Crypto public key entry mode
qosclassmap              QoS Class Map configuration mode
qosclasspolice           QoS Class Police configuration mode
qospolicymap             QoS Policy Map configuration mode
qospolicymapclass        QoS Policy Map class configuration mode
radius-attrl             Radius Attribute-List Definition
radius-locsvr            Radius Application configuration
red-group                random-detect group configuration mode
redundancy               redundancy config mode
regex-translation-rule   voip translation-rule configuration mode
request-dialin           VPDN group request dialin configuration mode
request-dialout          VPDN group request dialout configuration mode
rf-mode-interdev-local ipc sctp local config mode
rf-mode-interdev-remote ipc sctp remote config mode
rf-mode-interdevice     redundancy config mode
rlm-group               RLM Group configuration mode
rlm-group-sc            RLM server/client link configuration mode
roles                    Role configuration mode
route-map                Route map config mode
router                   Router configuration mode
rsvp-local-if-policy     RSVP local policy interface configuration mode
rsvp-local-policy        RSVP local policy configuration mode
rsvp-local-subif-policy RSVP local policy sub-interface configuration mode
rtr                      SAA entry configuration
saa-dhcp                 SAA dhcp configuration
saa-dns                  SAA dns configuration
saa-echo                 SAA echo configuration
saa-frameRelay           SAA FrameRelay configuration
```

```
saa-ftp                   SAA ftp configuration
saa-http                  SAA http configuration
saa-jitter                SAA jitter configuration
saa-pathEcho              SAA pathEcho configuration
saa-pathJitter            SAA pathJitter configuration
saa-slm-ctrlr-if          SAA SLM controller/interface configuration
saa-slmFrIf               SAA SLM FrameRelay Interface configuration
saa-slmfr                 SAA SLM Frame Relay configuration
saa-tcpConnect            SAA tcpConnect configuration
saa-udpEcho               SAA udpEcho configuration
sg-radius                 Radius Server-group Definition
sampler                  Sampler configuration mode
sccpccmgroup             SCCP CCM group configuration mode
sccpplar                 SCCP PLAR configuration mode
sctp-export              SCTP export configuration commands
seczonecfg                Security Zone Configuration Mode
seczonepaircfg            Security Zone Pair Configuration Mode
sep-init-config           WSMA Initiator profile Mode
sep-listen-config         WSMA Listener profile Mode
service-object-group      ACL Object Group configuration
serviceflow               Service Flow configuration mode
sg-tacacs+                Tacacs+ Server-group Definition
signaling-class           Signaling class configuration mode
sip-ua                    SIP UA configuration mode
sla-lspPing               IP SLAs lsp ping configuration
sla-lspTrace              IP SLAs lsp trace configuration
slb-mode-dfp              SLB DFP configuration mode
slb-mode-real             SLB real server configuration mode
slb-mode-sfarm            SLB server farm configuration mode
slb-mode-vserver          SLB virtual server configuration mode
source-group              Voice Source Group configuration mode
srst-video                cm-fallback video configuration mode
sss-subscriber            SSS subscriber configuration mode
subinterface              Subinterface configuration mode
subscriber-policy         Subscriber policy configuration mode
tablemap                  Table Map configuration mode
tcl                       Tcl mode
tdm-conn                  TDM connection configuration mode
telephony-service         telephony-service configuration mode
telephony-service-group   Telephony service group configuration mode
telephony-service-video   Telephony service video configuration mode
template                  Template configuration mode
template peer-policy      peer-policy configuration mode
template peer-session     peer-session configuration mode
test_cpu                  config-owner-test_cpu
test_mem                  config-owner-test_mem
tidp-group                TIDP Group configuration mode
tidp-keyset               TIDP key-set configuration mode
tn3270s-dlur              tn3270 server DLUR configuration mode
tn3270s-dlur-pu           tn3270 server DLUR PU configuration mode
tn3270s-dlur-sap          tn3270 server DLUR SAP configuration mode
tn3270s-listen-point      tn3270 server Listen-Point configuration mode
tn3270s-listen-point-pu   tn3270 server Listen-Point PU configuration mode
tn3270s-pu                tn3270 server PU configuration mode
tn3270s-resp-time         tn3270 server response time client group configuration mode
tn3270s-security          tn3270 server Security Configuration mode
tn3270s-security-profile  tn3270 server Security Profile Configuration mode
tn3270s-svr               tn3270 server configuration mode
top-talkers               Netflow top talkers config mode
tracking-config           Tracking configuration mode
trange                    time-range configuration mode
translation-profile       Voice Translation Profile configuration mode
translation-rule          Translation Rule configuration mode
trunk-group               Trunk group configuration mode
```

```
  vc-class                VC class configuration mode
  vc-group                VC group configuration mode
  view                    View configuration mode
  vlan                    VLAN database editing buffer
  vm-integration          voicemail integration configuration mode
  voice-cause-code        Voice Cause Code configuration mode
  voice-gateway           voice gateway configuration mode
  voice-mlpp              voice mlpp configuration mode
  voice-service           Voice service configuration mode
  voice-service-h323      Voice service h323 configuration mode
  voice-service-session   Voice service session configuration mode
  voice-service-sip       Voice service sip configuration mode
  voice-service-stun      Voice service stun configuration mode
  voice-uri-class         Voice URI Class configuration mode
  voicecl-cptone          Voice Class CPTone configuration mode
  voicecl-cptone-dt       CPtone dualtone configuration mode
  voicecl-dt-detect       Voice Class Dualtone Detect configuration mode
  voiceclass              Voice Class configuration mode
  voicednismaps           Dnis Map Configuration
  voiceport               Voice configuration mode
  voipdialpeer            Dial Peer configuration mode
  voipdpcor               Dial Peer Class of Restriction configuration mode
  voipdpcorlist           Dial Peer Class of Restriction List configuration mode
  vpdn-group              VPDN group configuration mode
  vpdn-template           VPDN template configuration mode
  vrf                     Configure VRF parameters
  webvpn                  Webvpn virtual context configuration
  webvpn-acl              Webvpn ACL configuration
  webvpn-cifs-url         Webvpn CIFS URL list configuration
  webvpn-group-policy     Webvpn group policy configuration
  webvpn-nbnslist         Webvpn VW ctxt NBNS list configuration
  webvpn-port-fwd         Webvpn port-forward list configuration
  webvpn-sso-server       SSO Server configuration
  webvpn-time-range       Webvpn time range configuration
  webvpn-url              Webvpn URL list configuration
  webvpn-url-rewrite      Webvpn url-rewrite list configuration
  x25-profile             X.25 profile configuration mode
  xconnect-conn-config    Xconnect connect configuration submode
  xconnect-dlci-config    Xconnect FR DLCI configuration submode
  xconnect-if-config      Xconnect interface configuration submode
  xconnect-pvc-config     Xconnect atm l2transport PVC configuration submode
  xconnect-pvp-config     Xconnect atm l2transport PVP configuration submode
  xconnect-subif-config   Xconnect sub-interface configuration submode
  xml-app                 XML Application configuration mode
  xml-transport           XML Transport configuration mode
```

In the following example, only commands in RTR configuration mode are shown:

```
Router# show parser dump rtr

 Mode Name :rtr
15 type udpEcho dest-ipaddr <address> dest-port <1-65535> source-ipaddr <address>
source-port <1-65535> control enable
15 type udpEcho dest-ipaddr <address> dest-port <1-65535> source-ipaddr <address>
source-port <1-65535> control disable
15 type udpEcho dest-ipaddr <address> dest-port <1-65535> source-ipaddr <address>
source-port <1-65535>
15 type udpEcho dest-ipaddr <address> dest-port <1-65535> source-ipaddr <address>
15 type udpEcho dest-ipaddr <address> dest-port <1-65535>
15 type tcpConnect dest-ipaddr <address> dest-port <1-65535> source-ipaddr <address>
source-port <1-65535> control enable
15 type tcpConnect dest-ipaddr <address> dest-port <1-65535> source-ipaddr <address>
source-port <1-65535> control disable
```

```
15 type tcpConnect dest-ipaddr <address> dest-port <1-65535> source-ipaddr <address>
source-port <1-65535>
15 type tcpConnect dest-ipaddr <address> dest-port <1-65535> source-ipaddr <address>
15 type tcpConnect dest-ipaddr <address> dest-port <1-65535>
15 type jitter dest-ipaddr <address> dest-port <1-65535> source-ipaddr <address>
15 type jitter dest-ipaddr <address> dest-port <1-65535> source-port <1-65535>
15 type jitter dest-ipaddr <address> dest-port <1-65535> control enable
15 type jitter dest-ipaddr <address> dest-port <1-65535> control disable
15 type jitter dest-ipaddr <address> dest-port <1-65535> num-packets <1-60000>
15 type jitter dest-ipaddr <address> dest-port <1-65535> interval <1-60000>
15 type jitter dest-ipaddr <address> dest-port <1-65535>
15 type echo protocol ipIcmpEcho <address> source-ipaddr <address>
15 type echo protocol ipIcmpEcho <address>
15 type ftp operation get url <string> source-ipaddr <address> mode active
15 type ftp operation get url <string> source-ipaddr <address> mode passive
15 type ftp operation get url <string> source-ipaddr <address>
15 type ftp operation get url <string>
15 type http operation get url <string> name-server <address> version <string>
source-ipaddr <address> source-port <1-65535> cache
15 type http operation get url <string> name-server <address> version <string>
source-ipaddr <address> source-port <1-65535> cache
15 type http operation get url <string> name-server <address> version <string>
source-ipaddr <address> source-port <1-65535> cache
15 type http operation get url <string> name-server <address> version <string>
source-ipaddr <address> source-port <1-65535>
15 type http operation get url <string> name-server <address> version <string>
source-ipaddr <address>
15 type http operation get url <string> name-server <address> version <string>
15 type http operation get url <string> name-server <address>
15 type http operation get url <string>
15 type http operation raw
15 type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82> circuit-id
<string>
15 type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82> remote-id
<string>
15 type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82> subnet-mask
<ipmask>
15 type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82>
15 type dhcp dest-ipaddr <address> source-ipaddr <address>
15 type dhcp dest-ipaddr <address>
15 type dhcp
15 type dns target-addr <string> name-server <address> source-ipaddr <address> source-port
<1-65535>
15 type dns target-addr <string> name-server <address> source-ipaddr <address>
15 type dns target-addr <string> name-server <address>
15 type pathEcho protocol ipIcmpEcho <address> source-ipaddr <address>
15 type pathEcho protocol ipIcmpEcho <address>
15 type pathJitter dest-ipaddr <address> source-ipaddr <address>
15 type pathJitter dest-ipaddr <address> num-packets <1-100>
15 type pathJitter dest-ipaddr <address> interval <1-1000>
15 type pathJitter dest-ipaddr <address> targetOnly
15 type pathJitter dest-ipaddr <address>
15 type slm frame-relay pvc
15 type slm controller T1 <controller>
15 type slm controller E1 <controller>
15 type slm controller T3 <controller>
15 type slm controller E3 <controller>
15 exit
```

In the following example, only those commands in RTR configuration mode containing the keyword **dhcp** are shown:

```
Router# show parser dump rtr | include dhcp
```

```
15 type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82> circuit-id
<string>
15 type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82> remote-id
<string>
15 type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82> subnet-mask
<ipmask>
15 type dhcp dest-ipaddr <address> source-ipaddr <address> option <82-82>
15 type dhcp dest-ipaddr <address> source-ipaddr <address>
15 type dhcp dest-ipaddr <address>
15 type dhcp
Router#
```

The following example shows how the **extend** keyword displays the syntax descriptions that match those shown using the ? command-line help:

```
Router# show parser dump rtr extend

 Mode Name :rtr
15 type udpEcho dest-ipaddr <address> dest-port <1-65535> source-ipaddr <address>
source-port <1-65535> control enable
type : Type of entry
udpEcho : UDP Echo Operation
dest-ipaddr : Destination address
<address> : IP address or hostname
dest-port : Destination Port
<1-65535> : Port Number
source-ipaddr : Source address
<address> : IP address or hostname
source-port : Source Port
<1-65535> : Port Number
control : Enable or disable control packets
enable : Enable control packets exchange (default)
 .
 .
 .
! Ctrl-Z used here to interrupt output and return to CLI prompt.

Router# config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# rtr 1
Router(config-rtr)# type udpEcho ?
  dest-ipaddr  Destination address

Router(config-rtr)# type udpEcho dest-ipaddr ?
  Hostname or A.B.C.D  IP address or hostname

Router(config-rtr)# type udpEcho dest-ipaddr HOSTNAME ?
  dest-port  Destination Port

Router(config-rtr)# type udpEcho dest-ipaddr HOSTNAME dest-port ?
  <1-65535>  Port Number

Router(config-rtr)# type udpEcho dest-ipaddr HOSTNAME dest-port 1 ?
  control        Enable or disable control packets
  source-ipaddr  Source address
  source-port    Source Port
  <cr>

Router(config-rtr)# type udpEcho dest-ipaddr HOSTNAME dest-port 1 control ?
  disable  Disable control packets exchange
  enable   Enable control packets exchange (default)
```

In the following example, show parser dump output is redirected to a file on a remote TFTP server:

```
show parser dump exec extend | redirect
tftp://209.165.200.225/userdirectory/123-exec-commands.txt
```

In the following example, the **show parser dump** command is not available in Cisco IOS software because this command was removed in Cisco IOS 15.0(1)M:

```
Router# show parser dump all
Command accepted, but obsolete, parser dumper has been deprecated
```

Related Commands

Command	Description
show append	Redirects and adds the output of any **show** command to an existing file.
show begin	Filters the output of any **show** command to display the output from the first instance of a specified string.
show exclude	Filters **show** command output so that it excludes lines that contain a particular regular expression.
show include	Filters **show** command output so that only lines that containing the specified string are displayed.
show redirect	Redirects the output of any **show** command to a file.
show tee	Copies the output of any **show** command to a file while displaying it on the terminal.

show parser macro

To display the smart port macros, use the **show parser macro** command in privileged EXEC mode.

show parser macro [**name** *macro-name* | **brief** | **description** [**interface** *interface*]]

Syntax Description

name *macro-name*	(Optional) Displays a specific macro.
brief	(Optional) Displays the configured macro names.
description	(Optional) Displays the macro description for all interfaces.
interface *interface*	(Optional) Displays the macro description for the specified interface.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SXH	This command was introduced.

Examples

The following example shows how to display the macro description:

```
Router# show parser macro description

Interface    Macro Description

---------------------------------------------------------------

Fa1/2      desktop-config

---------------------------------------------------------------
```

The following example shows how to display the contents of the cisco-router smart port macro:

```
Router# show parser macro name cisco-router

Macro name : cisco-router
Macro type : default interface
# macro keywords $NVID
# Do not apply to EtherChannel/Port Group
# Access Uplink to Distribution
 switchport
# Define unique Native VLAN on trunk ports
# Recommended value for native vlan (NVID) should not be 1
 switchport trunk native vlan $NVID
# Update the allowed VLAN range (VRANGE) such that it
# includes data, voice and native VLANs
# switchport trunk allowed vlan VRANGE
# Hardcode trunk and disable negotiation to
# speed up convergence
 switchport trunk encapsulation dot1q
```

```
 switchport mode trunk
 switchport nonegotiate
# Configure qos to trust this interface
 auto qos voip trust
 mls qos trust dscp
# Ensure fast access to the network when enabling the interface.
# Ensure that switch devices cannot become active on the interface.
 spanning-tree portfast
 spanning-tree bpduguard enable
```

The following example shows how to list the Cisco-provided smart port macros:

```
Router# show parser macro brief | include default

    default global   :  cisco-global
    default interface:  cisco-desktop
    default interface:  cisco-phone
    default interface:  cisco-switch
    default interface:  cisco-router
```

Related Commands

Command	Description
macro (global configuration)	Creates a command macro.
macro (interface configuration)	Creates an interface-specific command macro.

show parser statistics

To displays statistics about the last configuration file parsed and the status of the Parser Cache feature, use the **show parser statistics** command in privileged EXEC mode.

show parser statistics

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1(5)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **show parser statistics** command displays two sets of data:

- The number of commands in the configuration file that was last copied into the running configuration, and the time it took for the system to parse them (a configuration file can be loaded into the running configuration at system startup, or by issuing commands such as the **copy** *source* **running-config** command).
- The status of the Parser Cache feature (enabled or disabled) and the number of command matches (indicated by hits/misses) since the system was started or since the parser cache was cleared.

The Parser Cache feature optimizes the parsing (translation and execution) of Cisco IOS software configuration command lines by remembering how to parse recently encountered command lines, decreasing the time required to process large configuration files.

Examples

The following example shows sample output from the **show parser statistics** command:

```
Router# show parser statistics

Last configuration file parsed:Number of Commands:1484, Time:1272 ms

Parser cache:disabled, 0 hits, 2 misses
```

In this example, the Parser Cache feature is disabled, but shows the hit/miss statistics for the two commands issued while the parser cache was last enabled.

Table 126 describes the key output fields.

Table 126 show parser statistics Output Fields

Last configuration file parsed:	Displays statistics on the last configuration file copied into the running configuration (at startup or using the **copy** command).
Number of commands:	The number of command lines in the last configuration file parsed.
Time:	Time (in milliseconds) taken for the system to load the last configuration file.
Parser cache:	Displays whether the Parser Cache feature is enabled or disabled, and the hit/miss statistics related to the feature. Statistics are stored since the initialization of the system, or since the last time the parser cache was cleared.
hits	Number of commands the parser cache was able to parse more efficiently by matching them to similar commands executed previously.
misses	Number of commands the parser cache was unable to match to previously executed commands. The performance enhancement provided by the Parser Cache feature cannot be applied to unmatched commands.

In the following example the **show parser statistics** command is used to compare the parse-time of a large configuration file with the Parser Cache feature disabled and enabled. In this example, a configuration file with 1484 access list commands is loaded into the running configuration.

```
Router# configure terminal
!parser cache is disabled
Router(config)# no parser cache
!configuration file is loaded into the running configuration
Router# copy slot0:acl_list running-config
.
.
.
Router# show parser statistics
Last configuration file parsed:Number of Commands:1484, Time:1272 ms

Parser cache:disabled, 0 hits, 2 misses

!the parser cache is reenabled
Router(config)# parser cache
!configuration file is loaded into the running configuration
Router# copy slot0:acl_list running-config
.
.
.
Router# show parser statistics
Last configuration file parsed:Number of Commands:1484, Time:820 ms

Parser cache:enabled, 1460 hits, 26 misses
```

These results show an improvement to the load time for the same configuration file from 1272 milliseconds (ms) to 820 ms when the Parser Cache feature was enabled. As indicated in the “hits” field of the **show** command output, 1460 commands were able to be parsed more efficiently by the parser cache.

Related Commands

Command	Description
clear parser cache	Clears the parse cache entries and hit/miss statistics stored for the Parser Cache feature.
parser cache	Enables or disables the Parser Cache feature.

show pci

To display information about the peripheral component interconnect (PCI) hardware registers or bridge registers for the Cisco 7200 series routers, use the **show pci** command in EXEC mode.

show pci {**hardware** | **bridge** [*register*]}

Syntax Description

hardware	Displays PCI hardware registers.
bridge	Displays PCI bridge registers.
register	(Optional) Number of a specific bridge register in the range from 0 to 7. If not specified, this command displays information about all registers.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The output of this command is generally useful for diagnostic tasks performed by technical support only.

Note The **show pci hardware** EXEC command displays a substantial amount of information.

Examples

The following is sample output for the PCI bridge register 1 on a Cisco 7200 series router:

```
Router# show pci bridge 1

Bridge 4, Port Adaptor 1, Handle=1
DEC21050 bridge chip, config=0x0
(0x00): cfid   = 0x00011011
(0x04): cfcs   = 0x02800147
(0x08): cfccid = 0x06040002
(0x0C): cfpmlt = 0x00010010

(0x18): cfsmlt = 0x18050504
(0x1C): cfsis  = 0x22805050
(0x20): cfmla  = 0x48F04880
(0x24): cfpmla = 0x00004880

(0x3C): cfbc   = 0x00000000
(0x40): cfseed = 0x00100000
(0x44): cfstwt = 0x00008020
```

The following is partial sample output for the PCI hardware register, which also includes information on all the PCI bridge registers on a Cisco 7200 series router:

```
Router# show pci hardware
```

```
GT64010 External PCI Configuration registers:
 Vendor / Device ID   : 0xAB114601 (b/s 0x014611AB)
 Status / Command     : 0x17018002 (b/s 0x02800117)
 Class / Revision     : 0x00000006 (b/s 0x06000000)
 Latency              : 0x0F000000 (b/s 0x0000000F)
 RAS[1:0] Base        : 0x00000000 (b/s 0x00000000)
 RAS[3:2] Base        : 0x00000001 (b/s 0x01000000)
 CS[2:0] Base         : 0x00000000 (b/s 0x00000000)
 CS[3] Base           : 0x00000000 (b/s 0x00000000)
 Mem Map Base         : 0x00000014 (b/s 0x14000000)
 IO Map Base          : 0x01000014 (b/s 0x14000001)
 Int Pin / Line       : 0x00010000 (b/s 0x00000100)

Bridge 0, Downstream MB0 to MB1, Handle=0
DEC21050 bridge chip, config=0x0
(0x00): cfid   = 0x00011011
(0x04): cfcs   = 0x02800143
(0x08): cfccid = 0x06040002
(0x0C): cfpmlt = 0x00011810

(0x18): cfsmlt = 0x18000100
(0x1C): cfsis  = 0x02809050
(0x20): cfmla  = 0x4AF04880
(0x24): cfpmla = 0x4BF04B00

(0x3C): cfbc   = 0x00000000
(0x40): cfseed = 0x00100000
(0x44): cfstwt = 0x00008020
.
.
.
```

show pci hardware

To display information about the Host-PCI bridge, use the **show pci hardware** command in EXEC mode.

show pci hardware

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The output of this command is generally useful for diagnostic tasks performed by technical support only:

```
Router# show pci hardware

hardware PCI hardware registers

Each device on the PCI bus is assigned a PCI device number.  For the
C2600, device numbers are as follows:

Device    Device number
0         First LAN device
1         Second LAN device
2         AIM device (if present)
3         Not presently used
4         Port module - first PCI device
5         Port module - second PCI device
6         Port module - third PCI device
7         Port module - fourth PCI device
8-14      Not presently used
15        Xilinx PCI bridge
```

Examples

The following is partial sample output for the PCI hardware register, which also includes information on all the PCI bridge registers.

```
router# show pci hardware

XILINX Host-PCI Bridge Registers:
Vendor / Device ID: 0x401310EE
Status / Command: 0x040001C6
PCI Slave Base Reg 0: 0x00000000
PCI Slave Base Reg 1: 0x04000000
```

Table 127 describes the significant fields shown in the display.

Table 127 show pci hardware Field Descriptions

Field	Description
Device/Vendor ID	Identifies the PCI vendor and device. The value 0x401310EE identifies the device as the Xilinx-based Host-PCI bridge for the Cisco 2600 router.
Status/Command	Provides status of the Host-PCI bridge. Refer to the PCI Specification for more information.
PCI Slave Base Reg 0	The base address of PCI Target Region 0 for the Host-PCI bridge. This region is used for Big-Endian transfers between PCI devices and memory.
PCI Slave Base Reg 1	The base address of PCI Target Region 1 for the Host-PCI bridge. This region is used for Little-Endian transfers between PCI devices and memory.

show perf-meas

To display the performance measurement of the router, use the **show perf-meas** command in user EXEC or privileged EXEC mode.

show perf-meas [*report-types* | **all**]

Syntax Description

report-types	(optional) Reports type. The values are: • 2t-to-hdlc - Display 2t-to-hdlc report2t-to-modem Display 2t-to-modem report • all - Display all reports • fe-to-hdlc- Displays fe-to-hdlc report • fe-to-modem- Displays fe-to-modem report • hdlc-to-2t- Display hdlc-to-2t report • hdlc-to-fe- Display hdlc-to-fe report • modem-to-2t - Display modem-to-2t report • modem-to-fe- Displays modem-to-fe report
all	(Optional) Display all reports.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced in a release earlier than Cisco IOS Release 15.0(1)M.

Usage Guidelines

Use the **show perf-meas** command to display the performance measurement of the router.

Examples

The following is sample output from the **show perf-meas** command. The field descriptions are self-explanatory.

```
Router# show perf-meas

******  P E R F O R M A N C E    M E A S U R E M E N T ******
             ---------------------------------------------
Fastswitch packets from: Fast-Ethernet to Fast-Ethernet
- Min Time: 0 micro seconds
     - Avg Time: 0 micro seconds
     - Max Time: 0 micro seconds
     - Total number Fastswitch-packets: 0
     - Number of packets from output queue (non-Fastswitch): 0
-------------------------------------------------------------------------------|
                                  | Perf Ctr Min | Perf Ctr Avg | Perf Ctr Max |
```

```
-------------------------------------------------------------------------------|
Clock Cycles                        |  0           |  0           |  0          |
Total-Issued Instructions           |  0           |  0           |  0          |
Floating Point Instructions Issued  |  0           |  0           |  0          |
Integer Instructions Issued         |  0           |  0           |  0          |
Load Instructions Issued            |  0           |  0           |  0          |
Store Instructions Issued           |  0           |  0           |  0          |
Dual-Issued Instruction Pairs       |  0           |  0           |  0          |
Branch Pre-Fetches                  |  0           |  0           |  0          |
Slip Cycles                         |  0           |  0           |  0          |
Stall Cycles                        |  0           |  0           |  0          |
On-Chip Secondary Cache Misses      |  0           |  0           |  0          |
Primary Instruction Cache Misses    |  0           |  0           |  0          |
Primary Data Cache Misses           |  0           |  0           |  0          |
DTLB Misses                         |  0           |  0           |  0          |
ITLB Misses                         |  0           |  0           |  0          |
Joint TLB Instruction Misses        |  0           |  0           |  0          |
Joint TLB Data Misses               |  0           |  0           |  0          |
Taken Branch Instructions           |  0           |  0           |  0          |
Branch Instructions Issued          |  0           |  0           |  0          |
OCS Cache Write-Backs               |  0           |  0           |  0          |
Data Cache Write-Backs              |  0           |  0           |  0          |
Pending Load Stall Cycles           |  0           |  0           |  0          |
Number of Re-Misses                 |  0           |  0           |  0          |
FP Possible Exception Stall Cycle   |  0           |  0           |  0          |
-------------------------------------------------------------------------------|
```

show platform

To display platform information, use the **show platform** command in privileged EXEC mode.

show platform {**buffers** | **copp rate-limit** {**arp** | **dhcp** | **atm-oam** | **ethernet-oam** | **icmp** | **igmp** | **pppoe-discovery** | **atom ether-vc** | **all**} | **np copp** [*ifnum*] [**detail**] | **dma** | **eeprom** | **fault** | **hardware capacity** | **hardware pfc mode** | **internal-vlan** | **interrupts** | **netint** | **software ipv6-multicast connected** | **stats** | **tech-support** {**ipmulticast** [**vrf** *vrf-name*] *group-ip-addr src-ip-addr* | **unicast** [**vrf** *vrf-name*] *destination-ip-addr destination-mask* [**global**]} | **tlb | vfi dot1q-transparency | vlans**}

Cisco ASR 1000 Series Aggregation Services Routers

show platform

Syntax Description

buffers	Displays buffer-allocation information.
copp rate-limit	Displays Cisco Control Plane Policing (CoPP) rate-limit information on the Cisco 7600 SIP-400.
arp	Specifies Address Resolution Protocol (ARP) packet traffic.
dhcp	Specifies Dynamic Host Configuration Protocol (DHCP) packet traffic.
atm-oam	Specifies ATM Operation, Administration, and Maintenance (OAM) packet traffic.
ethernet-oam	Specifies Ethernet OAM packet traffic.
icmp	Specifies Internet Connection Management Protoocol Rate limiter.
igmp	Specifies Internet Group Management Potocol Rate limiter.
pppoe-discovery	Specifies Point-to-Point Protocol over Ethernet (PPPoE) discovery packet information.
atom ether-vc	Shows whether IP or routed mode interworking is configured.
all	Displays rate-limit information for all protocols.
np copp	Displays debug information for a given CoPP session ID or for all CoPP sessions.
ifnum	(Optional) A session ID.
detail	(Optional) Shows full rate-limited values.
dma	Displays Direct Memory Access (DMA) channel information.
eeprom	Displays CPU EEPROM information.
fault	Displays the fault date.
hardware capacity	Displays the capacities and utilizations for hardware resources; see the **show platform hardware capacity** command.
hardware pfc mode	Displays the type of installed Policy Feature Card (PFC).
internal-vlan	Displays the internal VLAN.
interrupts	Displays m8500 interrupt counters.
netint	Displays the platform network-interrupt information.
software ipv6-multicast connected	Displays all the IPv6 subnet Access Control List (ACL) entries on the Route Processor (RP); see the **show platform software ipv6-multicast** command.

stats	Displays Constellation WAN (CWAN) statistics.
tech-support ipmulticast	Displays IP multicast-related information for Technical Assistance Center (TAC).
vrf *vrf-name*	(Optional) Displays the Virtual Private Network (VPN) routing and forwarding (VRF) instance.
group-ip-addr	Group IP address.
src-ip-addr	Source IP address.
unicast	Displays IP unicast-related information for TAC.
destination-ip-addr	Destination IP address.
destination-mask	Destination mask.
global	(Optional) Displays global output.
tlb	Displays information about the translation look-aside buffer (TLB) register.
vfi	Displays CWAN virtual forwarding instance (VFI) commands.
dot1q-transparency	Displays the dot1q transparency setting.
vlans	Displays hidden VLAN-to-WAN interface mapping.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Cisco IOS Release 12.2(17d)SXB. This command was changed to include the **hardware pfc mode** keywords.
12.2(18)SXD	This command was modified to include the **software ipv6-multicast connected** keywords.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC	This command was modified to include additional keywords to support CoPP enhancements on the Cisco 7600 SIP-400 on the Cisco 7600 series router.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
12.2(33)SRD	This command was modified. The **atom ether-vc** keyword was added.

Usage Guidelines

This command is similar to the **show msfc** command.

This command can be used to verify the existence of a second Cisco IOS process on a single Cisco ASR 1000 RP on a Cisco ASR 1002 router or Cisco ASR 1004 router.

When this command is used with the **atom ether-vc** keyword, it is used on the line-card console.

Examples

The following sample output from the **show platform buffers** command displays buffer-allocation information:

```
Router# show platform buffers

Reg. set    Min    Max
  TX               640
 ABQ         640  16384
   0           0     40
   1        6715   8192
   2           0      0
   3           0      0
   4           0      0
   5           0      0
   6           0      0
   7           0      0
Threshold = 8192

Vlan  Sel  Min  Max  Cnt  Rsvd
1019    1 6715 8192    0     0
Router#
```

Cisco ASR 1000 Series Routers

The following example displays online status information for the shared port adapters (SPAs), Cisco ASR 1000 SPA Interface Processor (SIP), Cisco ASR 1000 Embedded Services Processor (ESP), Cisco ASR 1000 RP, power supplies, and fans. The ESPs are shown as F0 and F1. The RPs are shown as R0 and R1.

The State column should display “ok” for SIPs, SPAs, power supplies, and fans. For RPs and ESPs, the State column should display “ok, active” or “ok, standby.”

```
Router# show platform

Chassis type: ASR1006

Slot      Type                State                   Insert time (ago)
--------- ------------------- --------------------- -----------------
0         ASR1000-SIP10       ok                      18:23:58
 0/0      SPA-5X1GE-V2        ok                      18:22:38
 0/1      SPA-8X1FE-TX-V2     ok                      18:22:33
 0/2      SPA-2XCT3/DS0       ok                      18:22:38
1         ASR1000-SIP10       ok                      18:23:58
 1/0      SPA-2XOC3-POS       ok                      18:22:38
 1/1      SPA-8XCHT1/E1       ok                      18:22:38
 1/2      SPA-2XT3/E3         ok                      18:22:38
R0        ASR1000-RP1         ok, active        18:23:58
R1        ASR1000-RP1         ok, standby             18:23:58
F0        ASR1000-ESP10       ok, active              18:23:58
F1        ASR1000-ESP10       ok, standby             18:23:58
P0        ASR1006-PWR-AC      ok                      18:23:09
P1        ASR1006-FAN         ok                      18:23:09

Slot      CPLD Version        Firmware Version
--------- ------------------- ---------------------------------------
0         06120701            12.2(33r)XN2
1         06120701            12.2(33r)XN2
R0        07082312            12.2(33r)XN2
R1        07082312            12.2(33r)XN2
F0        07051680            12.2(33r)XN2
F1        07051680            12.2(33r)XN2
```

Cisco ASR 1000 Series Routers—Verifying Dual Cisco IOS Processes on Single RP

In the following example, a second Cisco IOS process is enabled on a Cisco ASR 1004 router using stateful switchover (SSO). The output of the **show platform** command is provided before and after the SSO configuration to verify that the second Cisco IOS process is enabled and active.

```
Router# show platform

Chassis type: ASR1004

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
0         ASR1000-SIP10       ok                    00:04:39
 0/0      SPA-5X1GE-V2        ok                    00:03:23
 0/1      SPA-2XT3/E3         ok                    00:03:18
R0        ASR1000-RP1         ok, active            00:04:39
F0        ASR1000-ESP10       ok, active            00:04:39
P0        ASR1004-PWR-AC      ok                    00:03:52
P1        ASR1004-PWR-AC      ok                    00:03:52

Slot      CPLD Version        Firmware Version
--------- ------------------- ---------------------------------------
0         07091401            12.2(33r)XN2
R0        07062111            12.2(33r)XN2
F0        07051680            12.2(33r)XN2

Router# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# redundancy
Router(config-red)# mode sso
*May 27 19:43:43.539: %CMRP-6-DUAL_IOS_REBOOT_REQUIRED: R0/0: cmand:  Configuration must
be saved and the chassis must be rebooted for IOS redundancy changes to take effect
Router(config-red)# exit
Router(config)# exit
Router#
*May 27 19:44:04.173: %SYS-5-CONFIG_I: Configured from console by user on console


Router# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

Router# reload
Proceed with reload? [confirm]

*May 27 19:45:16.917: %SYS-5-RELOAD: Reload requested by user on console. Reload Reason:
Reload command.

<reload output omitted for brevity>

Router# show platform
Chassis type: ASR1004

Slot      Type                State                 Insert time (ago)
--------- ------------------- --------------------- -----------------
0         ASR1000-SIP10       ok                    00:29:34
 0/0      SPA-5X1GE-V2        ok                    00:28:13
 0/1      SPA-2XT3/E3         ok                    00:28:18
R0        ASR1000-RP1         ok                    00:29:34
 R0/0                         ok, active            00:29:34
 R0/1                         ok, standby           00:27:49
F0        ASR1000-ESP10       ok, active            00:29:34
P0        ASR1004-PWR-AC      ok                    00:28:47
```

```
P1         ASR1004-PWR-AC      ok                    00:28:47

Slot       CPLD Version        Firmware Version
---------- ------------------- ----------------------------------------
0          07091401            12.2(33r)XN2
R0         07062111            12.2(33r)XN2
F0         07051680            12.2(33r)XN2
```

Table 128 describes the significant fields shown in the display.

Table 128 show platform Field Descriptions

Field	Description
Slot	Chassis slot.
Type	Hardware type.

Table 128 show platform Field Descriptions (continued)

Field	Description
State	Online state of the hardware. One of the following values: **All Hardware** • booting—Hardware is initializing and software is booting. • disabled—Hardware is not operational. • init—Hardware or Cisco IOS process is initializing. • ok—Hardware is operational. • shutdown—Hardware was administratively shut down using the **no shutdown** command. • unknown—Hardware is not operational; state is unknown. **RP or ESP** • init, standby—Standby RP or ESP is operational but is not yet in a high availability (HA) state. An RP or ESP switchover is not yet possible. • ok, active—Active RP or ESP is operational. • ok, standby—Standby RP or ESP is operational. The standby RP or ESP is ready to become active in the event of a switchover. **SPA** • admin down—SPA was disabled using the **shutdown** command. • inserted—SPA is being inserted. • missing—SPA was removed. • out of service—SPA is not operational. • retrieval error—An error occurred while retrieving the SPA state; state is unknown. • stopped—SPA was gracefully deactivated using the **hw-module subslot stop** command. **Fan or Power Supply** • fan, fail—Fan is failing. • ps, fail—Power supply is failing.
Insert time (ago)	Amount of time (hh:mm:ss format) the hardware has been online.
CPLD Version	Complex programmable logic device version number.
Firmware Version	Firmware (ROMmon) version number.

Cisco 7600 Series Routers with Cisco 7600 SIP-400

The following sample output from the **show platform copp rate-limit arp** command displays the list of interfaces on which a rate limiter is active for ARP, along with the count of confirmed and exceeded packets for the rate limiter:

```
Router# show platform copp rate-limit arp

Rate limiter Information for Protocol arp:

  Rate Limiter Status: Enabled
  Rate : 20 pps
  Max Observation Period : 60 seconds
Per Interface Rate Limiter Information
  Interface              Conformed Pkts  Exceeded Pkts  Enabled  Obs Period (Mts)
  GigabitEthernet5/1         0               0          No        -
  GigabitEhternet5/1.1       14              0          No        -
  GigabitEthernet5/1.2       28              2          No        -
  GigabitEthernet5/2         0               0          No        -
  GigabitEthernet5/2.1       180             4          Yes       35
  GigabitEthernet5/2.2       200             16         Yes       Max
```

Table 129 describes the significant fields shown in the display.

Table 129 show platform copp rate-limit Field Descriptions

Field	Description
Rate Limiter Status	Indicates if a rate limiter has been enabled on the interface.
Rate	Indicates the configured rate in packets per second (pps) or bits per second (bps).
Max Observation Period	Indicates the configured observation period, in seconds, before the per-interface rate limiter is automatically turned off.
Per Interface Rate Limiter Information	Displays the list of interfaces on which the rate limiter is active. In this example: • GigabitEthernet5/1.1 is free from attack. • GigabitEthernet5/2.1 has an exceed count of 4, and has a rate limiter enabled. The observation period is 35 minutes, which indicates that currently the interface is free from attack and is being kept under observation. The interface will remain under observation for an additional 35 minutes. If it remains free from attack after that time, the rate limiter is automatically removed. • GigabitEthernet5/2.2 has an exceed count of 16 and has a rate limiter enabled. The observation period has been designated as Max. This indicates that the interface is still under attack and has not yet entered the observation time window.

The following sample from the **show platform eeprom** command displays CPU EEPROM information:

```
Router# show platform eeprom

MSFC CPU IDPROM:
IDPROM image:
```

```
IDPROM image block #0:
  hexadecimal contents of block:
  00: AB AB 02 9C 13 5B 02 00 00 02 60 03 03 E9 43 69    .....[....`...Ci
  10: 73 63 6F 20 53 79 73 74 65 6D 73 00 00 00 00 00    sco Systems.....
  20: 00 00 57 53 2D 58 36 4B 2D 53 55 50 33 2D 50 46    ..WS-X6K-SUP3-PF
  30: 43 33 00 00 00 00 53 41 44 30 36 34 34 30 31 57    C3....SAD064401W
  40: 4C 00 00 00 00 00 00 00 00 00 37 33 2D 37 34 30    L.........73-740
  50: 34 2D 30 37 00 00 00 00 00 00 30 35 00 00 00 00    4-07......05....
  60: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00    ................
  70: 00 00 00 00 02 BD 00 00 00 00 00 09 00 05 00 01    ................
  80: 00 03 00 01 00 01 00 02 03 E9 00 00 00 00 00 00    ................
  90: 00 00 00 00 00 00 00 00 00 00 00 00                ............

  block-signature = 0xABAB, block-version = 2,
  block-length = 156, block-checksum = 4955

  *** common-block ***
  IDPROM capacity (bytes) = 512  IDPROM block-count = 2
  FRU type = (0x6003,1001)
  OEM String = 'Cisco Systems'
  Product Number = 'WS-X6K-SUP3-PFC3'
  Serial Number = 'SAD064401WL'
  Manufacturing Assembly Number = '73-7404-07'
  Manufacturing Assembly Revision = '05'
  Hardware Revision = 0.701
  Manufacturing bits = 0x0  Engineering bits = 0x0
  SNMP OID = 9.5.1.3.1.1.2.1001
  Power Consumption = 0 centiamperes    RMA failure code = 0-0-0-0
  CLEI =
  *** end of common block ***

IDPROM image block #1:
  hexadecimal contents of block:
  00: 60 03 02 67 0C 24 00 00 00 00 00 00 00 00 00 00    `..g.$..........
  10: 00 00 00 00 00 00 00 51 00 05 9A 3A 7E 9C 00 00    .......Q...:~...
  20: 02 02 00 01 00 01 00 00 00 00 00 00 00 00 00 00    ................
  30: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00    ................
  40: 14 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00    ................
  50: 00 00 81 81 81 81 80 80 80 80 80 80 80 80 80 80    ................
  60: 80 80 06 72 00 46 37                               ...r.F7

  block-signature = 0x6003, block-version = 2,
  block-length = 103, block-checksum = 3108

  *** linecard specific block ***
  feature-bits =   00000000 00000000
  hardware-changes-bits =   00000000 00000000
  card index = 81
  mac base = 0005.9A3A.7E9C
  mac_len = 0
  num_processors = 2
  epld_num = 2
  epld_versions = 0001 0001 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000
  port numbers:
    pair #0: type=14, count=01
    pair #1: type=00, count=00
    pair #2: type=00, count=00
    pair #3: type=00, count=00
    pair #4: type=00, count=00
    pair #5: type=00, count=00
    pair #6: type=00, count=00
    pair #7: type=00, count=00
  sram_size = 0
```

```
  sensor_thresholds =
    sensor #0: critical = -127 oC (sensor present but ignored), warning = -127 oC (sensor
present but ignored)
    sensor #1: critical = -127 oC (sensor present but ignored), warning = -127 oC (sensor
present but ignored)
    sensor #2: critical = -128 oC (sensor not present), warning = -128 oC (sensor not
present)
    sensor #3: critical = -128 oC (sensor not present), warning = -128 oC (sensor not
present)
    sensor #4: critical = -128 oC (sensor not present), warning = -128 oC (sensor not
present)
    sensor #5: critical = -128 oC (sensor not present), warning = -128 oC (sensor not
present)
    sensor #6: critical = -128 oC (sensor not present), warning = -128 oC (sensor not
present)
    sensor #7: critical = -128 oC (sensor not present), warning = -128 oC (sensor not
present)
  max_connector_power = 1650
  cooling_requirement = 70
  ambient_temp = 55
  *** end of linecard specific block ***
```

The following sample output from the **show platform fault** command displays fault-date information:

```
Router# show platform fault

Fault History Buffer:
rsp72043_rp Software (rsp72043_rp-ADVENTERPRISEK9_DBG-M), Version 12.2(32.8.1)RE
C186 ENGINEERING WEEKLY BUILD, synced to V122_32_8_11_SR186
Compiled Wed 08-Apr-09 09:22 by abcd
Uptime 2w3d
Exception Vector: 0x1500 PC 0x0B13DD4C MSR 0x00029200 LR 0x0B13DD10

r0  0x0B13DD10 r1  0x1C58A1C8 r2  0xFFFCFFFC r3  0x189EDEF4
r4  0x00000000 r5  0x00000000 r6  0x1C58A1B0 r7  0x00029200
r8  0x00029200 r9  0x00000000 r10 0x00000001 r11 0x189EDEF0
r12 0x0000001B r13 0x04044000 r14 0x08736008 r15 0x115C0000
r16 0x00000000 r17 0x00000000 r18 0x00000000 r19 0x1B751358
r20 0x00000000 r21 0x00000000 r22 0x00000000 r23 0x00000000
r24 0x00000000 r25 0x00000000 r26 0x00000000 r27 0x00000001
r28 0x13255EC0 r29 0x1C59BD00 r30 0x13255EC0 r31 0x00000000

dec  0x00007333 tbu   0x00004660 tbl   0x594BBFC4 pvr   0x80210020
dear 0x00000000 dbcr0 0x41000000 dbcr1 0x00000000 dbcr2 0x00000000
iac1 0x00000000 iac2  0x00000000 dac1  0x00000000 dac2  0x00000000
```

The following sample output from the **show platform hardware pfc** mode command displays the PFC-operating mode:

```
Router# show platform hardware pfc mode

PFC operating mode : PFC3A
```

This example shows how to display platform network-interrupt information:

```
Router# show platform netint

Network IO Interrupt Throttling:
 throttle count=0, timer count=0
 active=0, configured=1
 netint usec=3999, netint mask usec=800
inband_throttle_mask_hi = 0x0
inband_throttle_mask_lo = 0x800000
```

This following sample output from the **show platform tlb** command displays the TLB-register information:

```
Router# show platform tlb

Mistral revision 5
TLB entries : 42
Virt Address range      Phy Address range      Attributes
0x10000000:0x1001FFFF   0x010000000:0x01001FFFF   CacheMode=2, RW, Valid
0x10020000:0x1003FFFF   0x010020000:0x01003FFFF   CacheMode=2, RW, Valid
0x10040000:0x1005FFFF   0x010040000:0x01005FFFF   CacheMode=2, RW, Valid
0x10060000:0x1007FFFF   0x010060000:0x01007FFFF   CacheMode=2, RW, Valid
0x10080000:0x10087FFF   0x010080000:0x010087FFF   CacheMode=2, RW, Valid
0x10088000:0x1008FFFF   0x010088000:0x01008FFFF   CacheMode=2, RW, Valid
0x18000000:0x1801FFFF   0x010000000:0x01001FFFF   CacheMode=0, RW, Valid
0x19000000:0x1901FFFF   0x010000000:0x01001FFFF   CacheMode=7, RW, Valid
0x1E000000:0x1E1FFFFF   0x01E000000:0x01E1FFFFF   CacheMode=2, RW, Valid
0x1E880000:0x1E899FFF   0x01E880000:0x01E899FFF   CacheMode=2, RW, Valid
0x1FC00000:0x1FC7FFFF   0x01FC00000:0x01FC7FFFF   CacheMode=2, RO, Valid
0x30000000:0x3001FFFF   0x070000000:0x07001FFFF   CacheMode=2, RW, Valid
0x40000000:0x407FFFFF   0x000000000:0x0007FFFFF   CacheMode=3, RO, Valid
.
.
.
0x58000000:0x59FFFFFF   0x088000000:0x089FFFFFF   CacheMode=3, RW, Valid
0x5A000000:0x5BFFFFFF   0x08A000000:0x08BFFFFFF   CacheMode=3, RW, Valid
0x5C000000:0x5DFFFFFF   0x08C000000:0x08DFFFFFF   CacheMode=3, RW, Valid
0x5E000000:0x5FFFFFFF   0x08E000000:0x08FFFFFFF   CacheMode=3, RW, Valid
```

This example shows how use the **atom ether-vc** keyword to display line-card information for an ES20 line card in slot 3.

```
Router# show platform copp rate-limit atom ether-vc

 AToM Ether VC Index(12902): segtype(3) seghandle(0x5ECF7F34)
  Disposition : flags(97) vlanid(502) local_vc_label(22691)
   ForwardingTable: oper(12) flags(0x2100) vlan(502) dest_index(0x9ED)
  Imposition: flags(0x21) egress_idx(0x0) ifnum(28)
   tx_tvc(0x7D83) rvclbl[0](3356) rigplbl[1](1011) label[2](0)
   label[3](0) ltl(0x9ED) mac(0014.1c80.f600) qos_info(0x0)
  Platform Data:
   loc_lbl acif_num fw_idx cword    eg_ifnum ckt_idx  vlan ac_hdl     vc_hash
   22691   615      0x0    0x3      28       0x8003   502  0x5ECF7F34 0x3266
  Platform Index(0x81F68003) is_sw(1) is_vfi(0) vlan(502) pseudo_port_offset(3)
tx_tvc(0x7D83)
  Statistics :  Packets    Bytes      Drop Pkts  Drop Bytes ID
   Disposition: 0          0          0          0          0
   Imposition : 0          0          0          0          0
     Vlan func[1]: 502 (0x1F6) func(0:invalid) feat  (0x0 )
    Tx TVC Table
            idx   ltl h pt cw vt efp  adj  v imp
            x---- x-- d d- d- d- x--- x--- d x---
  SIP10G EoMPLS disp detailed info:
    t vclbl    VLAN       Type    disp-idx
    - d------- x---(d---) ------- x-------
    0 00022691 01F6(0502) ether   00001692
  SIP10G EoMPLS ipiw disp detailed info:
    ipiw mac valid CE-MAC Address
    b--- b-------- --------------
    0001 000000001 0016.9c6e.7480
  VC Summary: vlan(502) VC count(1)
```

Related Commands

Command	Description
platform copp	Turns on or off rate-limiting for an interface on the Cisco 7600 SIP-400.
platform copp observation period	Sets the observation period before automatically turning off the per-interface rate limiter on the Cisco 7600 SIP-400.
pseudowire class	Specifies the name of a Layer 2 pseudowire class.
show msfc	Displays MSFC information.

show platform bridge

To display distributed or hardware-based bridging information, use the **show platform bridge** command in privileged EXEC mode.

show platform bridge [*interface-type interface-number*] [**vlan** *vlan-id*] [**summary**]

Syntax Description

interface-type interface-number	(Optional) Interface type and number.
vlan *vlan-id*	(Optional) Displays VLAN bridging information.
summary	(Optional) Displays a summary of bridging information.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRA	This command was introduced.

Examples

The following is sample output from the **show platform bridge** command:

```
Router# show platform bridge

VLAN Interface            CircuitId  LTL  PseudoPort State Options
  12 PO1/1/3.1               102    0xC3F    1/256   up    dot1q
  13 PO1/1/3.1               103    0xC3F    1/256   up    dot1q
  14 PO1/1/3.2               104    0xC3F    1/256   up    default
  15 PO1/1/3.2               105    0xC3F    1/256   up    default
  16 PO1/1/3.3               106    0xC3F    1/256   up    dot1q-tunnel
  17 PO1/1/3.3               107    0xC3F    1/256   up    dot1q-tunnel
  41 Gi8/0/17               1201    0xDE2    8/227   up    access
  41 Gi8/0/17               1202    0xDE3    8/228   up    access
  41 Gi8/0/17               1203    0xDE4    8/229   up    access
  41 Gi8/0/17               1204    0xDE5    8/230   up    access
  41 Gi8/0/17               1205    0xDE6    8/231   up    access
  41 Gi8/0/17               1206    0xDE7    8/232   up    access
  41 Gi8/0/17               1207    0xDE8    8/233   up    access
  41 Gi8/0/17               1208    0xDE9    8/234   up    access
  41 Gi8/0/17               1209    0xDEA    8/235   up    access
  41 Gi8/0/17               1210    0xDEB    8/236   up    access
  41 Gi8/0/17               1211    0xDEC    8/237   up    access
  41 Gi8/0/17               1212    0xDED    8/238   up    access
  41 Gi8/0/17               1213    0xDEE    8/239   up    access
  41 Gi8/0/17               1214    0xDEF    8/240   up    access
  41 Gi8/0/17               1215    0xDF0    8/241   up    access
```

Table 128 describes the significant fields shown in the display.

Table 130 show platform bridge Field Descriptions

Field	Description
VLAN	The VLAN for which bridging is configured.
Interface	The WAN interface on which bridging is configured. This can be an ATM, Gigabit Ethernet, POS, or Serial interface.
CircuitId	The circuit ID. The range is from 0 to 65536.
LTL	The local target logic (LTL) of the interface. LTL is 13 bits long. The format is eee ssss pppppp (e: extended port bits, s: slot bits, p: port bits). Extended bits along with port bits identify the pseudoport and slot bits identifies the slot.
PseudoPort	In the case of flexwan, the port numbering is from 133 to 192 for Bay 0 and 197 to 256 for Bay 1. There are 60 ports per packet processing engine (PPE). For the SIP200, the pseudoports are in the range of 137 to 256.
State	State indicates the status of the physical interface on which bridging is configured. The state is either up or down. If the state is down, then there is a problem and debugging needs to be done.
Options	Options specify whether split-horizon is enabled on the WAN interface. This can be access, default, dot1q, or dot1q-tunnel.

Related Commands

Command	Description
show platform	Displays platform information.

show platform cfm

To display connectivity fault management (CFM) commands, use the **show platform cfm** command in privileged EXEC mode.

show platform cfm {**epl** | **info** | **interface** {**fastethernet** | **gigabitethernet** | **port-channel**} *number* {**fwd_vlan** *vlan-number* | **level** | **vlan_list**}}

Syntax Description

epl	Displays CFM Ethernet private line (EPL) details.
info	Displays the CFM Platform Adaptation Layer (PAL) information.
interface	Specifies the interface type.
fastethernet	Specifies the FastEthernet interface.
gigabitethernet	Specifies the GigabitEthernet interface.
port-channel	Specifies the port-channel interface.
number	Interface number.
fwd_vlan	Displays the CFM forward VLAN list.
vlan-number	VLAN number.
level	Displays the CFM level for the interface.
vlan_list	Specifies CFM VLAN list.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRA	This command was introduced.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Examples

The following is sample output from the **show platform cfm info** command. The field descriptions are self-explanatory.

```
Router# show platform cfm info

CFM is disabled
 CFM unicast MAC 00d0.2b6c.b103, CFM multicast MAC 0180.c200.0030, AEB multicast MAC
0100.0ccc.ccc0
 CFM Ingress Control Packet System Statistics:
     Current software Rate Limit Setting: 1100 pkts/sec
     Statistics are collected in intervals of 3 seconds.
     Allow the first 3300 packets to pass each interval, drop thereafter
       Current Ingress Count in this interval: 0 pkts
       In this interval have we Exceeded Rate and Dropped pkts: NO
       For the last 3 intervals the maximum sample had 0 packets in one interval.
```

Related Commands

Command	Description
show platform	Displays platform information.

show platform diag

To display diagnostic and debug information for individual platform components, use the **show platform diag** command in privileged EXEC mode.

show platform diag

Syntax Description

diag	Displays diagnostic and debug information for the platform components.

Command Default

This command has no default settings.

Command Modes

privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE Release 2.2	This command was introduced on the Cisco ASR 1000 Series Aggregation Services Routers.

Usage Guidelines

This command can be used to display debug and diagnostic information and indicate the status of field replaceable unit (FRU) components in any Cisco ASR 1000 Series Router.

Examples

The following example displays diagnostic information for the Cisco ASR 1000 SPA Interface Processor (SIP), shared port adapters (SPAs), Cisco ASR 1000 Embedded Services Processor (ESP), Cisco ASR 1000 Route Processors (RP), and power supplies. The ESP is shown as F0 or F1. The RPs are shown as R0 or R1. The power supplies are shown as P0 and P1

```
Router#show platform diag

Chassis type: ASR1004
Slot: 0, ASR1000-SIP10
Running state               : ok
Internal state              : online
Internal operational state  : ok
Physical insert detect time : 00:00:48 (4d22h ago)
Software declared up time   : 00:01:40 (4d22h ago)
CPLD version                : 07091401
Firmware version            : 12.2(33r)XNB

Sub-slot: 0/0, SPA-5X1GE-V2
Operational status          : ok
Internal state              : inserted
Physical insert detect time : 00:00:36 (4d22h ago)
Logical insert detect time  : 00:02:23 (4d22h ago)

Sub-slot: 0/1, SPA-2XT3/E3
Operational status          : ok
Internal state              : inserted
```

```
  Physical insert detect time : 00:00:36 (4d22h ago)
  Logical insert detect time  : 00:02:23 (4d22h ago)

Slot: R0, ASR1000-RP1
  Running state               : ok
  Internal state              : online
  Internal operational state  : ok
  Physical insert detect time : 00:00:48 (4d22h ago)
  Software declared up time   : 00:00:48 (4d22h ago)
  CPLD version                : 07062111
  Firmware version            : 12.2(33r)XNB

Sub-slot: R0/0,
  Running state               : ok, active
  Logical insert detect time  : 00:00:48 (4d22h ago)
  Became HA Active time       : 00:04:56 (4d22h ago)

Sub-slot: R0/1,
  Running state               : ok, standby
  Logical insert detect time  : 00:02:50 (4d22h ago)

Slot: F0, ASR1000-ESP10
  Running state               : ok, active
  Internal state              : online
  Internal operational state  : ok
  Physical insert detect time : 00:00:48 (4d22h ago)
  Software declared up time   : 00:01:40 (4d22h ago)
  Hardware ready signal time  : 00:00:49 (4d22h ago)
  Packet ready signal time    : 00:01:49 (4d22h ago)
  CPLD version                : 07051680
  Firmware version            : 12.2(33r)XNB

Slot: P0, ASR1004-PWR-AC
  State                       : ok
  Physical insert detect time : 00:01:40 (4d22h ago)

Slot: P1, ASR1004-PWR-AC
  State                       : ok
  Physical insert detect time : 00:01:40 (4d22h ago)
```

Table 131 describes the significant fields shown in the display.

Table 131 show platform diag Field Descriptions

Field	Description
Running state	The current online running state of the FRU component.
Internal state	The internal debug state of the FRU component for diagnostic purposes.
Internal operational state	The internal operational state of the FRU component for diagnostic purposes.
Physical insert detect time	The time of the most recent physical insertion of the FRU component detected by the platform code.
Software declared up time	The time that the software on the FRU component was declared running by the platform code.
Hardware ready signal time	The time that the hardware ready signal was detected by the platform code.

Table 131 show platform diag Field Descriptions (continued)

Field	Description
Packet ready signal time	The time that the Embedded Service Processor (ESP) packet ready signal was detected by the platform code.
CPLD version	The Complex Programmable Logic Device version number.
Firmware version	The Firmware (ROMmon) version number.
Logical insert detect time	The time that the SPA was logically detected by the platform code.
Became HA Active time	The time that this FRU became High Availability (HA) active status.

Related Commands

Command	Description
show platform	Displays platform information.
show platform hardware	Displays platform hardware information.
show platform software	Displays platform software information

show platform hardware capacity

To display the capacities and utilizations for the hardware resources, use the **show platform hardware capacity** command in privileged EXEC mode.

show platform hardware capacity [*resource-type*]

Syntax Description		
	resource-type	(Optional) Hardware resource type; see the "Usage Guidelines" section for the valid values.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(18)SXF	Support for this command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The valid values for *resource-type* are as follows:

- **acl**—Displays the capacities and utilizations for ACL/QoS TCAM resources.
- **cpu**—Displays the capacities and utilizations for CPU resources.
- **eobc**—Displays the capacities and utilizations for Ethernet out-of-band channel resources.
- **fabric**—Displays the capacities and utilizations for Switch Fabric resources.
- **flash**—Displays the capacities and utilizations for Flash/NVRAM resources.
- **forwarding**—Displays the capacities and utilizations for Layer 2 and Layer 3 forwarding resources.
- **ibc**—Displays the capacities and utilizations for interboard communication resources.
- **interface**—Displays the capacities and utilizations for interface resources.
- **monitor**—Displays the capacities and utilizations for SPAN resources.
- **multicast**—Displays the capacities and utilizations for Layer 3 multicast resources.
- **netflow**—Displays the capacities and utilizations for NetFlow resources.
- **pfc**—Displays the capacities and utilizations for all the PFC resources including Layer 2 and Layer 3 forwarding, NetFlow, CPU rate limiters, and ACL/QoS TCAM resources.
- **power**—Displays the capacities and utilizations for power resources.
- **qos**—Displays the capacities and utilizations for QoS policer resources.
- **rate-limiter**—Displays the capacities and utilizations for CPU rate limiter resources.

- **rewrite-engine**—Displays the packet drop and performance counters of the central rewrite engine on supervisors and line cards. For detailed information, see the **show platform hardware capacity rewrite-engine** command documentation.
- **system**—Displays the capacities and utilizations for system resources.
- **vlan**—Displays the capacities and utilizations for VLAN resources.

The **show platform hardware capacity cpu** command displays the following information:

- CPU utilization for the last 5 seconds (busy time and interrupt time), the percentage of the last 1-minute average busy time, and the percentage of the last 5-minute average busy time.
- Processor memory total available bytes, used bytes, and percentage used.
- I/O memory total available bytes, used bytes, and percentage used.

The **show platform hardware capacity eobc** command displays the following information:

- Transmit and receive rate
- Packets received and packets sent
- Dropped received packets and dropped transmitted packets

The **show platform hardware capacity forwarding** command displays the following information:

- The total available entries, used entries, and used percentage for the MAC tables.
- The total available entries, used entries, and used percentage for the FIB TCAM tables. The display is done per protocol base.
- The total available entries, used entries, and used percentage for the adjacency tables. The display is done for each region in which the adjacency table is divided.
- The created entries, failures, and resource usage percentage for the NetFlow TCAM and ICAM tables.
- The total available entries and mask, used entries and mask, reserved entries and mask, and entries and mask used percentage for the ACL/QoS TCAM tables. The output displays the available, used, reserved, and used percentage of the labels. The output displays the resource of other hardware resources that are related to the ACL/QoS TCAMs (such as available, used, reserved, and used percentage of the LOU, ANDOR, and ORAND).
- The available, used, reserved, and used percentage for the CPU rate limiters.

The **show platform hardware capacity interface** command displays the following information:

- Tx/Rx drops—Displays the sum of transmit and receive drop counters on each online module (aggregate for all ports) and provides the port number that has the highest drop count on the module.
- Tx/Rx per port buffer size—Summarizes the port-buffer size on a per-module basis for modules where there is a consistent buffer size across the module.

The **show platform hardware capacity monitor** command displays the following SPAN information:

- The maximum local SPAN sessions, maximum RSPAN sessions, maximum ERSPAN sessions, and maximum service module sessions.
- The local SPAN sessions used/available, RSPAN sessions used/available, ERSPAN sessions used/available, and service module sessions used/available.

The **show platform hardware capacity multicast** command displays the following information:

- Multicast Replication Mode: ingress and egress IPv4 and IPv6 modes.
- The MET table usage that indicates the total used and the percentage used for each module in the system.

- The bidirectional PIM DF table usage that indicates the total used and the percentage used.

The **show platform hardware capacity system** command displays the following information:

- PFC operating mode (PFC Version: PFC3A, PFC3B, unknown, and so forth)
- Supervisor redundancy mode (RPR, RPR+, SSO, none, and so forth)
- Module-specific switching information, including the following information:
  - Part number (WS-SUP720-BASE, WS-X6548-RJ-45, and so forth)
  - Series (supervisor engine, fabric, CEF720, CEF256, dCEF256, or classic)
  - CEF Mode (central CEF, dCEF)

The **show platform hardware capacity vlan** command displays the following VLAN information:

- Total VLANs
- VTP VLANs that are used
- External VLANs that are used
- Internal VLANs that are used
- Free VLANs

Examples

This example shows how to display CPU capacity and utilization information for the route processor, the switch processor, and the LAN module in the Cisco 7600 series router:

```
Router# show platform hardware capacity cpu

CPU Resources
  CPU utilization: Module             5 seconds       1 minute       5 minutes
                   1  RP               0% /  0%            1%              1%
                   1  SP               5% /  0%            5%              4%
                   7                  69% /  0%           69%             69%
                   8                  78% /  0%           74%             74%
  Processor memory: Module   Bytes:       Total           Used           %Used
                    1  RP             176730048       51774704             29%
                    1  SP             192825092       51978936             27%
                    7                 195111584       35769704             18%
                    8                 195111584       35798632             18%
  I/O memory: Module         Bytes:       Total           Used           %Used
              1  RP                     35651584       12226672             34%
              1  SP                     35651584        9747952             27%
              7                         35651584        9616816             27%
              8                         35651584        9616816             27%
Router#
```

This example shows how to display EOBC-related statistics for the route processor, the switch processor, and the DFCs in the Cisco 7600 series router:

```
Router# show platform hardware capacity eobc

EOBC Resources
  Module                    Packets/sec     Total packets     Dropped packets
  1  RP      Rx:                     61            108982                   0
             Tx:                     37             77298                   0
  1  SP      Rx:                     34            101627                   0
             Tx:                     39            115417                   0
  7          Rx:                      5             10358                   0
             Tx:                      8             18543                   0
  8          Rx:                      5             12130                   0
             Tx:                     10             20317                   0
```

```
Router#
```

This example shows how to display the current and peak switching utilization:

```
Router# show platform hardware capacity fabric

Switch Fabric Resources
  Bus utilization: current is 100%, peak was 100% at 12:34 12mar45
  Fabric utilization:      ingress                    egress
      Module channel speed current peak               current peak
       1      0        20G   100%  100% 12:34 12mar45  100%    100% 12:34 12mar45

       1      1        20G   12%    80% 12:34 12mar45   12%     80% 12:34 12mar45
       4      0        20G   12%    80% 12:34 12mar45   12%     80% 12:34 12mar45
      13      0         8G   12%    80% 12:34 12mar45   12%     80% 12:34 12mar45
Router#
```

This example shows how to display information about the total capacity, the bytes used, and the percentage that is used for the Flash/NVRAM resources present in the system:

```
Router# show platform hardware capacity flash

Flash/NVRAM Resources
  Usage: Module Device               Bytes:      Total          Used     %Used
         1  RP  bootflash:                     31981568      15688048       49%
         1  SP  disk0:                        128577536     105621504       82%
         1  SP  sup-bootflash:                 31981568      29700644       93%
         1  SP  const_nvram:                     129004           856        1%
         1  SP  nvram:                            391160         22065        6%
         7      dfc#7-bootflash:               15204352        616540        4%
         8      dfc#8-bootflash:               15204352             0        0%
Router#
```

This example shows how to display the capacity and utilization of the EARLs present in the system:

```
Router# show platform hardware capacity forwarding

L2 Forwarding Resources
           MAC Table usage:   Module  Collisions  Total       Used       %Used
                              6                0  65536         11          1%

             VPN CAM usage:                        Total       Used       %Used
                                                     512          0          0%
L3 Forwarding Resources
             FIB TCAM usage:                      Total       Used       %Used
                  72 bits (IPv4, MPLS, EoM)     196608         36          1%
                 144 bits (IP mcast, IPv6)       32768          7          1%

                     detail:      Protocol                   Used       %Used
                                  IPv4                         36          1%
                                  MPLS                          0          0%
                                  EoM                           0          0%

                                  IPv6                          4          1%
                                  IPv4 mcast                    3          1%
                                  IPv6 mcast                    0          0%

            Adjacency usage:                      Total       Used       %Used
                                                 1048576        175          1%

     Forwarding engine load:
                     Module       pps   peak-pps                    peak-time
                     6              8       1972  02:02:17 UTC Thu Apr 21 2005
```

```
Netflow Resources
          TCAM utilization:       Module       Created      Failed       %Used
                                  6                 1           0          0%
          ICAM utilization:       Module       Created      Failed       %Used
                                  6                 0           0          0%

                Flowmasks:   Mask#   Type        Features
                       IPv4:     0   reserved    none
                       IPv4:     1   Intf FulNAT_INGRESS NAT_EGRESS FM_GUARDIAN
                       IPv4:     2   unused      none
                       IPv4:     3   reserved    none

                       IPv6:     0   reserved    none
                       IPv6:     1   unused      none
                       IPv6:     2   unused      none
                       IPv6:     3   reserved    none

CPU Rate Limiters Resources
             Rate limiters:       Total         Used      Reserved       %Used
                   Layer 3            9            4             1         44%
                   Layer 2            4            2             2         50%
ACL/QoS TCAM Resources
  Key: ACLent - ACL TCAM entries, ACLmsk - ACL TCAM masks, AND - ANDOR,
       QoSent - QoS TCAM entries, QOSmsk - QoS TCAM masks, OR - ORAND,
       Lbl-in - ingress label, Lbl-eg - egress label, LOUsrc - LOU source,
       LOUdst - LOU destination, ADJ - ACL adjacency

  Module ACLent ACLmsk QoSent QoSmsk Lbl-in Lbl-eg LOUsrc LOUdst  AND  OR  ADJ
  6          1%     1%     1%     1%     1%     1%     0%     0%   0%  0%   1%

Router#
```

This example shows how to display the interface resources:

```
Router# show platform hardware capacity interface

Interface Resources
  Interface drops:
    Module    Total drops:    Tx            Rx      Highest drop port:  Tx  Rx
    9                          0             2                           0  48

  Interface buffer sizes:
    Module                              Bytes:     Tx buffer           Rx buffer
         1                                            12345               12345
         5                                            12345               12345
Router#
```

This example shows how to display SPAN information:

```
Router# show platform hardware capacity monitor

SPAN Resources
  Source sessions: 2 maximum, 0 used
    Type                                  Used
    Local                                    0
    RSPAN source                             0
    ERSPAN source                            0
    Service module                           0
  Destination sessions: 64 maximum, 0 used
    Type                                  Used
    RSPAN destination                        0
    ERSPAN destination (max  24)             0
Router#
```

This example shows how to display the capacity and utilization of resources for Layer 3 multicast functionality:

```
Router# show platform hardware capacity multicast

L3 Multicast Resources
  IPv4 replication mode: ingress
  IPv6 replication mode: ingress
  Bi-directional PIM Designated Forwarder Table usage: 4 total, 0 (0%) used
  Replication capability: Module                                IPv4        IPv6
                          5                                   egress      egress
                          9                                  ingress     ingress
  MET table Entries: Module                               Total    Used    %Used
                     5                                    65526       6       0%
Router#
```

This example shows how to display information about the system power capacities and utilizations:

```
Router# show platform hardware capacity power

Power Resources
  Power supply redundancy mode: administratively combined
                                                      operationally combined
  System power: 1922W, 0W (0%) inline, 1289W (67%) total allocated
  Powered devices: 0 total
Router#
```

This example shows how to display the capacity and utilization of QoS policer resources per EARL in the Cisco 7600 series router:

```
Router# show platform hardware capacity qos

 QoS Policer Resources
  Aggregate policers: Module                      Total         Used     %Used
                      1                            1024          102       10%
                      5                            1024            1        1%
  Microflow policer configurations: Module        Total         Used     %Used
                                    1                64           32       50%
                                    5                64            1        1%
Router#
```

This example shows how to display information about the key system resources:

```
Router# show platform hardware capacity system

System Resources
  PFC operating mode: PFC3BXL
  Supervisor redundancy mode: administratively rpr-plus, operationally rpr-plus
  Switching Resources: Module   Part number               Series      CEF mode
                       5        WS-SUP720-BASE        supervisor           CEF
                       9        WS-X6548-RJ-45            CEF256           CEF
Router#
```

This example shows how to display VLAN information:

```
Router# show platform hardware capacity vlan

VLAN Resources
  VLANs: 4094 total, 10 VTP, 0 extended, 0 internal, 4084 free
Router#
```

Related Commands

Command	Description
show msfc	Displays MSFC information.
show platform	Displays platform information.

show platform isg

To display Constellation WAN (CWAN) iEdge Route Processor information, use the **show platform isg** command in privileged EXEC mode.

show platform isg {**msi-all** | **slot** {*slot-number* | **all**} | **vrf** {*vrf-number* | **all**}}

Syntax Description

msi-all	Displays CWAN Multiservice Interface (MSI) information.
slot	Displays active slot session information.
slot-number	Slot number.
all	Displays information about all CWAN iEdge slots.
vrf	Displays CWAN iEdge VPN routing and forwarding (VRF) information.
vrf-number	VRF ID.
all	Displays information about all CWAN VRFs.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRC	This command was introduced.

Examples

The following is sample output from the **show platform isg vrf all** command. The field descriptions are self-explanatory.

```
Router# show platform isg vrf all

dbg_stdby_cd_fibobj          35042
dbg_stdby_cd_rem_fibobj      492
dbg_stdby_cd_no_objhdl       1120
dbg_stdby_cd_no_ps           0
dbg_stdby_unpck_vrf_node     1612
dbg_stdby_unpck_pl_hdl       33922
dbg_stdby_unpck_rem_vrf_node 0
```

Related Commands

Command	Description
show platform	Displays platform information.

show platform oam

To display Operation, Administration, and Maintenance (OAM) information of a platform, use the **show platform oam** command in privileged EXEC mode.

show platform oam {**link-monitor** [**interface** *type number*] | **loopback**}

Syntax Description

link-monitor	Displays link monitoring information.
interface *type number*	(Optional) Displays the interface name and number.
loopback	Displays information about the loopback ports.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRC	This command was introduced.

Examples

The following is sample output from the **show platform oam link-monitor interface GigabitEthernet 1/1** command. The fields are self-explanatory.

```
Router# show platform oam link-monitor interface GigabitEthernet 1/1

Interface Gi1/1:
  first_poll = 0
  symprd_tlv_sent = 0
  frmprd_tlv_sent = 0
  frm_poll_cnt = 1
  frmsec_poll_cnt = 10
  rxcrc_poll_cnt = 1
  txcrc_poll_cnt = 1
  symbol_period_start = 00:00:01.752
  prev_rx_error_frames = 2
  total_rx_error_frames = 0
  error_frame_period_start = 2
  total_frame_period_start = 20
  prev_error_frame_seconds = 0
  total_error_frame_seconds = 0
  prev_rx_crc_error_frames = 0
  prev_tx_crc_error_frames = 2
  total_frm_tlvs = 0
  total_frmsec_tlvs = 0
  total_symprd_tlvs = 0
  total_frmprd_tlvs = 0
```

Related Commands

Command	Description
show platform	Displays platform information.

show platform redundancy

To display platform-specific Constellation WAN (CWAN) redundancy information, use the **show platform redundancy** command in privileged EXEC mode.

show platform redundancy {**atm** | **ccb** *slot-number cpu-number* | **cwpa-ce3** | **cwpa-ct3** | **cwpa-e1** | **cwpa-stm1** | **cwpa-t1** | **frame-relay** | **hdlc** | **if-config** {*slot-number cpu-number* [*bay-number*] | **default-retvals**} | **mlp** | **multilink-vc** | **osm-chocx** | **osm-ct3** | **ppp** | **shadowstate** | **spa-chocx** | **spa-ct3** | **switchover**}

Syntax Description

atm	Displays CWAN ATM redundancy state information.
ccp	Displays the CWAN Configuration Control Block (CCB) list.
slot-number	Slot number.
cpu-number	CPU number.
cwpa-ce3	Displays CWAN port adapter (CWPA) Channelized E3 (CE3) redundancy state information.
cwpa-ct3	Displays CWPA-CT3 redundancy state information.
cwpa-e1	Displays CWPA-E1 redundancy state information.
cwpa-stm1	Displays CWPA Synchronous Transport Module level-1 (STM-1) virtual circuit (VC) information.
cwpa-t1	Displays CWPA-T1 redundancy state information.
frame-relay	Displays CWAN Frame Relay redundancy state information.
hdlc	Displays CWAN High-Level Data Link Control (HDLC) redundancy state information.
if-config	Displays the CWAN IF-configuration list.
bay-number	(Optional) Shared Port Adapter (SPA) bay number.
default-retvals	Displays default IF-configuration return values.
mlp	Displays CWAN Multilink Point-to-Point Protocol (MLP) redundancy state information.
multilink-vc	Displays CWAN Multilink VC information.
osm-chocx	Displays CWAN Optical Services Module (OSM) Channelized OC-12/OC-3 line card (CHOCX) redundancy state information.
osm-ct3	Displays CWAN OSM-CT3 redundancy state information.
ppp	Displays CWAN PPP redundancy state information.
shadowstate	Displays the CWAN interface descriptor block (IDB) shadow state.
spa-chocx	Displays CHOCX SPA VC information.
spa-ct3	Displays CT3 SPA VC information.
switchover	Displays CWAN switchover redundancy information.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRC	This command was introduced.

Examples

The following is sample output from the **show platform redundancy** command with the **if-config** keyword. The fields are self-explanatory.

```
Router# show platform redundancy if-config 4 0

Current number of elements = 0
Current maximum elements = 128
List was grown = 0 times
Number of elements sorted = 0
List errors = 0
List flags = 0x1E
Current element pointer = 0x0
List pointer = 0x50A27438
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
| C=Command T=Type P=Port t=timedOut D=Dirty S=Sync      |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|  C  | T  |  P   | key address | t | D | S | value      |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
```

Related Commands

Command	Description
show platform	Displays platform information.

show platform software filesystem

To display information about file systems, use the **show platform software filesystem** command in privileged EXEC or diagnostic mode.

show platform software filesystem {**bootflash:** | **stby-bootflash:** | **fpd:** | **harddisk:** | **stby-harddisk:** | **obfl:** | **stby-obfl:** | **usb0:** | **stby-usb0:** | **usb1:** | **stby-usb1:**} [**all**] [**details**]

Syntax Description

bootflash:	File system on the bootflash device.
stby-bootflash:	Standby file system on the bootflash device (if the standby Route Processor [RP] is preset).
fpd:	Synthetic file system that is used by the field-programmable device (FPD) upgrade process—for Cisco Technical Support only.
harddisk:	File system on the hard disk device.
stby-harddisk:	Standby file system on the harddisk device (if the standby RP is preset).
obfl:	File system on the on board failure logging (OBFL) device.
stby-obfl:	Standby file system on the OBFL device (if the standby RP is preset).
usb0:	File system on the USB0 device (if installed).
stby-usb0:	Standby file system on the USB0 device (if the standby RP is preset).
usb1:	File system on the USB1 device (if installed).
stby-usb1:	Standby file system on the USB1 device (if the standby RP is preset).
all	(Optional) All possible device information.
details	(Optional) File system details.

Command Default

No default behavior or values

Command Modes

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR1000 Series Routers.

Usage Guidelines

Use this command to ascertain the presence or absence of specific files and to determine space usage in the file system. This command is helpful to monitor the growth of log file sizes, because rapid growth of log files could indicate possible problems with the router.

Examples

The following example displays information about the files in the bootflash file system. It also shows the number of bytes used out of the total available in the bootflash file system.

```
Router# show platform software filesystem bootflash:

-#- --length-- ---------date/time--------- path
  1       4096 Apr 01 2008 13:34:30 +00:00 /bootflash/
  2      16384 Dec 04 2007 04:32:46 +00:00 /bootflash/lost+found
  3       4096 Dec 04 2007 06:06:24 +00:00 /bootflash/.ssh
  4        963 Dec 04 2007 06:06:16 +00:00 /bootflash/.ssh/ssh_host_key
  5        627 Dec 04 2007 06:06:16 +00:00 /bootflash/.ssh/ssh_host_key.pub
  6       1675 Dec 04 2007 06:06:18 +00:00 /bootflash/.ssh/ssh_host_rsa_key
  7        382 Dec 04 2007 06:06:18 +00:00 /bootflash/.ssh/ssh_host_rsa_key.pub
  8        668 Dec 04 2007 06:06:24 +00:00 /bootflash/.ssh/ssh_host_dsa_key
  9        590 Dec 04 2007 06:06:24 +00:00 /bootflash/.ssh/ssh_host_dsa_key.pub
 10       4096 Dec 04 2007 06:06:36 +00:00 /bootflash/.rollback_timer
 11       4096 Mar 18 2008 17:31:17 +00:00 /bootflash/.prst_sync
 12       4096 Dec 04 2007 04:34:45 +00:00 /bootflash/.installer
 13  205951180 Mar 18 2008 17:23:03 +00:00 /bootflash/asr1000rp1-advipservicesk
 14   46858444 Mar 18 2008 17:28:55 +00:00 /bootflash/asr1000rp1-espbase.02.01.
 15   20318412 Mar 18 2008 17:28:56 +00:00 /bootflash/asr1000rp1-rpaccess-k9.02
 16   22266060 Mar 18 2008 17:28:57 +00:00 /bootflash/asr1000rp1-rpbase.02.01.0
 17   21659852 Mar 18 2008 17:28:57 +00:00 /bootflash/asr1000rp1-rpcontrol.02.0
 18   45934796 Mar 18 2008 17:28:58 +00:00 /bootflash/asr1000rp1-rpios-advipser
 19   34169036 Mar 18 2008 17:28:59 +00:00 /bootflash/asr1000rp1-sipbase.02.01.
 20   22067404 Mar 18 2008 17:29:00 +00:00 /bootflash/asr1000rp1-sipspa.02.01.0
 21       7180 Mar 18 2008 17:29:00 +00:00 /bootflash/packages.conf

461897728 bytes available (419782656 bytes used)
```

The following example displays information only about the bootflash file system itself, such as file system type and access permissions:

```
Router# show platform software filesystem bootflash: details

Filesystem: bootflash
Filesystem Path: /bootflash
Filesystem Type: ext2
Mounted: Read/Write
```

Table 132 describes the significant fields shown in the displays of file system information.

Table 132 show platform software filesystem Field Descriptions

Field	Description
#	Display line number.
Length	File size in bytes.
Date/Time	Date and time the file system was created.
Path	Full path of a file in the file system.
Filesystem Path	Root of the file system.
Filesystem Type	Type of file system. One of the following values: • ext2—Second extended file system. • jffs2—Journaling flash file system, version 2. • vfat—Virtual file allocation table (FAT16 or FAT32).
Mounted	Access permissions to the file system.

Related Commands

Command	Description
show platform software mount	Displays the mounted file systems (both physical and virtual) on a shared port adapter (SPA) in a SPA interface processor (SIP), on an Embedded Services Processor (ESP), or on a Route Processor (RP).
show platform software tech-support	Displays system information or creates a technical support information tar file for Cisco Technical Support.

show platform software memory

To display memory information for the specified process, use the **show platform software memory** command in privileged EXEC or diagnostic mode.

show platform software memory [**database | messaging**] {**chassis-manager** *slot* | **cpp-control-process** *process* | **cpp-driver** *process* | **cpp-ha-server** *process* | **cpp-service-process** *process* | **forwarding-manager** *slot* | **host-manager** *slot* | **interface-manager** *slot* | **ios** *slot* | **logger** *slot* | **pluggable-services** *slot* | **shell-manager** *slot*} [**brief**]

Syntax Description

database	(Optional) Displays database memory information for the specified process.
messaging	(Optional) Displays messaging memory information for specified process. The information displayed is for internal debugging purposes only.
chassis-manager *slot*	Displays memory information for the Chassis Manager process in the specified *slot*. Possible *slot* values are: • **0**—Cisco ASR 1000 Series SPA Interface Processor (SIP) slot 0 • **1**—Cisco ASR 1000 Series SIP slot 1 • **2**—Cisco ASR 1000 Series SIP slot 2 • **f0**—Cisco ASR 1000 Series Embedded Services Processor (ESP) slot 0 • **f1**—Cisco ASR 1000 Series ESP slot 1 • **fp active**—Active Cisco ASR 1000 Series ESP • **fp standby**—Standby Cisco ASR 1000 Series ESP • **r0**—Cisco ASR 1000 Series Route Processor (RP) slot 0 • **r1**—Cisco ASR 1000 Series RP slot 1 • **rp active**—Active Cisco ASR 1000 Series RP • **rp standby**—Standby Cisco ASR 1000 Series RP
cpp-control-process	Displays memory information for the specified Cisco Packet Processor (CPP) Client Control process. Possible *process* values are: • **cpp active**—Active CPP Client Control process • **cpp standby**—Standby CPP Client Control process The information displayed is for internal debugging purposes only.
cpp-driver	Displays memory information for the specified CPP Driver process. Possible *process* values are: • **cpp active**—Active CPPDriver process • **cpp standby**—Standby CPP Driver process The information displayed is for internal debugging purposes only.

cpp-ha-server	Displays memory information for the specified CPP High Availability (HA) Server process. Possible *process* values are: • **cpp active**—Active CPP HA Server process • **cpp standby**—Standby CPP HA Server process The information displayed is for internal debugging purposes only.
cpp-service-process	Displays memory information for the specified CPP Client Service process. Possible *process* values are: • **cpp active**—Active CPP Client Service process • **cpp standby**—Standby CPP Client Service process The information displayed is for internal debugging purposes only.
forwarding-manager *slot*	Displays memory information for the Forwarding Manager process in the specified *slot*. Possible *slot* values are: • **f0**—Cisco ASR 1000 Series ESP slot 0 • **f1**—Cisco ASR 1000 Series ESP slot 1 • **fp active**—Active Cisco ASR 1000 Series ESP • **fp standby**—Standby Cisco ASR 1000 Series ESP • **r0**—Cisco ASR 1000 Series RP slot 0 • **r1**—Cisco ASR 1000 Series RP slot 1 • **rp active**—Active Cisco ASR 1000 Series RP • **rp standby**—Standby Cisco ASR 1000 Series RP
host-manager *slot*	Displays memory information for the Host Manager process in the specified *slot*. Possible *slot* values are: • **0**—Cisco ASR 1000 Series SIP slot 0 • **1**—Cisco ASR 1000 Series SIP slot 1 • **2**—Cisco ASR 1000 Series SIP slot 2 • **f0**—Cisco ASR 1000 Series ESP slot 0 • **f1**—Cisco ASR 1000 Series ESP slot 1 • **fp active**—Active Cisco ASR 1000 Series ESP • **fp standby**—Standby Cisco ASR 1000 Series ESP • **r0**—Cisco ASR 1000 Series RP slot 0 • **r1**—Cisco ASR 1000 Series RP slot 1 • **rp active**—Active Cisco ASR 1000 Series RP • **rp standby**—Standby Cisco ASR 1000 Series RP

interface-manager *slot*	Displays memory information for the Interface Manager process in the specified *slot*. Possible *slot* values are: • **0**—Cisco ASR 1000 Series SIP slot 0 • **1**—Cisco ASR 1000 Series SIP slot 1 • **2**— Cisco ASR 1000 Series SIP slot 2 • **r0**—Cisco ASR 1000 Series RP slot 0 • **r1**—Cisco ASR 1000 Series RP slot 1 • **rp active**—Active Cisco ASR 1000 Series RP • **rp standby**—Standby Cisco ASR 1000 Series RP
ios *slot*	Displays memory information for the IOS process in the specified *slot*. Possible *slot* values are: • **0/0**—Cisco ASR 1000 Series SIP slot 0, bay 0 • **0/1**—Cisco ASR 1000 Series SIP slot 0, bay 1 • **0/2**—Cisco ASR 1000 Series SIP slot 0, bay 2 • **0/3**—Cisco ASR 1000 Series SIP slot 0, bay 3 • **1/0**—Cisco ASR 1000 Series SIP slot 1, bay 0 • **1/1**—Cisco ASR 1000 Series SIP slot 1, bay 1 • **1/2**—Cisco ASR 1000 Series SIP slot 1, bay 2 • **1/3**—Cisco ASR 1000 Series SIP slot 1, bay 3 • **2/0**—Cisco ASR 1000 Series SIP slot 2, bay 0 • **2/1**—Cisco ASR 1000 Series SIP slot 2, bay 1 • **2/2**—Cisco ASR 1000 Series SIP slot 2, bay 2 • **2/3**—Cisco ASR 1000 Series SIP slot 2, bay 3 • **r0**—Cisco ASR 1000 Series RP slot 0 • **r1**—Cisco ASR 1000 Series RP slot 1 • **rp active**—Active Cisco ASR 1000 Series RP • **rp standby**—Standby Cisco ASR 1000 Series RP

logger *slot*	Displays memory information for the logger process in the specified *slot*. Possible *slot* values are: • **0**—Cisco ASR 1000 Series SIP slot 0 • **1**—Cisco ASR 1000 Series SIP slot 1 • **2**—Cisco ASR 1000 Series SIP slot 2 • **f0**—Cisco ASR 1000 Series ESP slot 0 • **f1**—Cisco ASR 1000 Series ESP slot 1 • **fp active**—Active Cisco ASR 1000 Series ESP • **fp standby**—Standby Cisco ASR 1000 Series ESP • **r0**—Cisco ASR 1000 Series RP slot 0 • **r1**—Cisco ASR 1000 Series RP slot 1 • **rp active**—Active Cisco ASR 1000 Series RP • **rp standby**—Standby Cisco ASR 1000 Series RP
pluggable-services *slot*	Displays memory information for the pluggable-services process in the specified *slot*. Possible *slot* values are: • **r0**—Cisco ASR 1000 Series RP slot 0 • **r1**—Cisco ASR 1000 Series RP slot 1 • **rp active**—Active Cisco ASR 1000 Series RP • **rp standby**—Standby Cisco ASR 1000 Series RP
shell-manager *slot*	Displays memory information for the Shell Manager process in the specified slot. Possible *slot* values are: • **r0**—Cisco ASR 1000 Series RP slot 0 • **r1**—Cisco ASR 1000 Series RP slot 1 • **rp active**—Active Cisco ASR 1000 Series RP • **rp standby**—Standby Cisco ASR 1000 Series RP
brief	(Optional) Displays abbreviated memory information for the specified process.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers.

Usage Guidelines

The specification of the **database** and **brief** keywords are optional.

The specification of a process and slot are required.

Examples

The following example displays memory information for the Forwarding Manager process for Cisco ASR 1000 Series RP slot 0:

```
Router# show platform software memory forwarding-manager r0
Module: cdllib
  allocated: 900, requested: 892, overhead: 8
  Allocations: 2, failed: 0, frees: 1
Module: eventutil
  allocated: 117379, requested: 117059, overhead: 320
  Allocations: 46, failed: 0, frees: 6
Module: uipeer
  allocated: 9264, requested: 9248, overhead: 16
  Allocations: 3, failed: 0, frees: 1
Module: Summary
  allocated: 127543, requested: 127199, overhead: 344
  Allocations: 51, failed: 0, frees: 8
```

Table 133 describes the significant fields shown in the display.

Table 133 show platform software memory Field Descriptions

Field	Description
Module:	Name of submodule.
allocated:	Memory, allocated in bytes.
requested:	Number of bytes requested by application.
overhead:	Allocation overhead.
Allocations:	Number of discrete allocation event attempts.
failed:	Number of allocation attempts that were attempted, but failed.
frees:	Number of free events.

The following example displays abbreviated (**brief** keyword) memory information for the Chassis Manager process for Cisco ASR 1000 Series ESP slot 0:

```
Router# show platform software memory chassis-manager f0 brief
  module            allocated     requested     allocs        frees
  ------------------------------------------------------------------------
  CPP Features      692           668           3             0
  Summary           497816        495344        323           14
  chunk             419322        419290        4             0
  eventutil         68546         66146         312           12
  uipeer            9256          9240          4             2
```

Table 134 describes the significant fields shown in the **brief** keyword display.

Table 134 show platform software memory brief Field Descriptions

Field	Description
module	Name of submodule.
allocated	Memory, allocated in bytes.
requested	Number of bytes requested by application.
allocs	Number of discrete allocation event attempts.
frees	Number of free events.

show platform software mount

To display the mounted file systems, both physical and virtual, for a Cisco ASR 1000 Series SPA Interface Processor (SIP), Cisco ASR 1000 Series Embedded Services Processor (ESP), or Cisco ASR 1000 Series Route Processor (RP), use the **show platform software mount** command in privileged EXEC or diagnostic mode.

show platform software mount [*slot* [**brief**]]

Syntax Description

slot	(Optional) Displays mounted file systems for the specified *slot*. Possible *slot* values are: • **0**—Cisco ASR 1000 Series SIP slot 0 • **1**—Cisco ASR 1000 Series SIP slot 1 • **2**—Cisco ASR 1000 Series SIP slot 2 • **f0**—Cisco ASR 1000 Series ESP slot 0 • **f1**—Cisco ASR 1000 Series ESP slot 1 • **fp active**—Active Cisco ASR 1000 Series ESP • **fp standby**—Standby Cisco ASR 1000 Series ESP • **r0**—Cisco ASR 1000 Series RP slot 0 • **r1**—Cisco ASR 1000 Series RP slot 1 • **rp active**—Active Cisco ASR 1000 Series RP • **rp standby**—Standby Cisco ASR 1000 Series RP
brief	(Optional) Displays abbreviated mounted file system information.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers.

Usage Guidelines

If no slot is specified, the command returns mounted file systems for the active RP.

This command allows you to ascertain the presence or absence of specific system mounts. For example, this command might be used to determine /tmp-related mounts, which are used to create many run-time directories and files.

Users may be requested to execute this command to collect information about the underlying configuration of the platform software.

The RP output can differ depending on how the router was booted, and whether there are USB devices inserted.

The SIP and ESP output can differ depending on whether the chassis is a dual or single RP.

Examples

The following example displays mounted file systems for the active RP:

```
Router# show platform software mount
Filesystem                          Used   Available  Use% Mounted on
rootfs                                 0           0     -  /
proc                                   0           0     -  /proc
sysfs                                  0           0     -  /sys
none                                 524     1037640    1%  /dev
/dev/bootflash1                   298263       42410   88%  /bootflash
/dev/harddisk1                    609208     4025132   14%  /misc/scratch
/dev/loop1                         28010           0  100%  /tmp/sw/mount/2007-10-14_...
/dev/loop2                         26920           0  100%  /tmp/sw/mount/2007-10-14_...
/dev/loop3                         48236           0  100%  /tmp/sw/mount/2007-10-14_...
/dev/loop4                          6134           0  100%  /tmp/sw/mount/2007-10-14_...
/dev/loop5                         43386           0  100%  /tmp/sw/mount/2007-10-14_...
/dev/loop6                         30498           0  100%  /tmp/sw/mount/2007-10-14_...
/dev/loop7                         14082           0  100%  /tmp/sw/mount/2007-10-14_...
none                                 524     1037640    1%  /dev
/proc/bus/usb                          0           0     -  /proc/bus/usb
/dev/mtdblock1                       460        1588   23%  /obfl
automount(pid4165)                     0           0     -  /vol
```

The following example displays mounted file systems for the Cisco ASR 1000 Series ESP in ESP slot 0:

```
Router# show platform software mount f0
Filesystem                          Used   Available Use% Mounted on
rootfs                                 0           0     -  /
proc                                   0           0     -  /proc
sysfs                                  0           0     -  /sys
none                               10864      507124    3%  /dev
/dev/loop1                         41418           0  100%  /tmp/sw/fp/0/0/fp/mount
none                               10864      507124    3%  /dev
/proc/bus/usb                          0           0     -  /proc/bus/usb
/dev/mtdblock1                       504        1544   25%  /obfl
automount(pid3210)                     0           0     -  /misc1
```

The following example displays mounted file systems for the active Cisco ASR 1000 Series RP:

```
Router# show platform software mount rp active
Filesystem                          Used   Available  Use% Mounted on
rootfs                                 0           0     -  /
proc                                   0           0     -  /proc
sysfs                                  0           0     -  /sys
none                                 436     1037728    1%  /dev
/dev/bootflash1                   256809       83864   76%  /bootflash
/dev/harddisk1                    252112     4382228    6%  /misc/scratch
/dev/loop1                         30348           0  100%  /tmp/sw/mount/2007-09-27_...
/dev/loop2                         28394           0  100%  /tmp/sw/mount/2007-09-27_...
/dev/loop3                         42062           0  100%  /tmp/sw/mount/2007-09-27_...
/dev/loop4                          8384           0  100%  /tmp/sw/mount/2007-09-27_...
/dev/loop5                         41418           0  100%  /tmp/sw/mount/2007-09-27_...
/dev/loop6                         21612           0  100%  /tmp/sw/mount/2007-09-27_...
/dev/loop7                         16200           0  100%  /tmp/sw/mount/2007-09-27_...
none                                 436     1037728    1%  /dev
/proc/bus/usb                          0           0     -  /proc/bus/usb
```

```
/dev/mtdblock1                          484         1564    24%  /obfl
automount(pid4004)                        0            0     -  /vol
```

Table 135 describes the significant fields shown in the SIP slot (**0**, **1**, or **2**) displays.

Table 135 show platform software mount SIP slot Field Descriptions

Field	Description
Filesystem	Logical name of the file system device.
Used	Number of 1Kb blocks used.
Available	Number of free 1Kb blocks available.
Use%	Percentage of 1Kb blocks used of the total available.
Mounted on	Canonical path to the mounted file system.

The following example displays abbreviated (**brief** keyword) mounted file system information for Cisco ASR 1000 Series SIP slot 0:

```
Router# show platform software mount 0 brief
Mount point: rootfs
  Type     : rootfs
  Location : /
  Options  : rw

Mount point: proc
  Type     : proc
  Location : /proc
  Options  : rw

Mount point: sysfs
  Type     : sysfs
  Location : /sys
  Options  : rw

Mount point: none
  Type     : tmpfs
  Location : /dev
  Options  : rw

Mount point: /dev/loop1
  Type     : iso9660
  Location : /tmp/sw/cc/0/0/cc/mount
  Options  : ro

Mount point: none
  Type     : tmpfs
  Location : /dev
  Options  : rw

Mount point: /proc/bus/usb
  Type     : usbfs
  Location : /proc/bus/usb
  Options  : rw

Mount point: /dev/mtdblock1
  Type     : jffs2
  Location : /obfl
  Options  : rw,noatime,nodiratime
```

```
Mount point: automount(pid3199)
  Type     : autofs
  Location : /misc1
  Options  : rw,fd=5,pgrp=3199,timeout=60,minproto=2,maxproto=4,indirect
```

Table 136 describes the significant fields shown in the **brief** keyword display.

Table 136 show platform software mount brief Field Descriptions

Field	Description
Mount point:	Logical name of the file system device.
Type:	File system type.
Location:	Canonical path to the mounted file system.
Options:	Mount point type-specific flags and settings.

show platform software process list

To display a list of the processes running in a given slot, use the **show platform software process list** command in privileged EXEC or diagnostic mode.

show platform software process list *slot* [**name** *process-name* | **process-id** *process-id* | **summary**]

Syntax Description

slot	Displays running process information for the specified *slot*. Possible *slot* values are: • **0**—Cisco ASR 1000 Series SPA Interface Processor (SIP) slot 0 • **1**—Cisco ASR 1000 Series SIP slot 1 • **2**—Cisco ASR 1000 Series SIP slot 2 • **f0**—Cisco ASR 1000 Series Embedded Services Processor (ESP) slot 0 • **f1**—Cisco ASR 1000 Series ESP slot 1 • **fp active**—Active Cisco ASR 1000 Series ESP • **fp standby**—Standby Cisco ASR 1000 Series ESP • **r0**—Cisco ASR 1000 Series Route Processor (RP) slot 0 • **r1**—Cisco ASR 1000 Series RP slot 1 • **rp active**—Active Cisco ASR 1000 Series RP • **rp standby**—Standby Cisco ASR 1000 Series RP
name *process-name*	(Optional) Displays information for the specified process name.
process-id *process-id*	(Optional) Displays information for the specified process ID.
summary	(Optional) Displays summary process information for the running host.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC (#)

Diagnostic (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers.

Usage Guidelines

The **name** and **process-id** keywords can be used to narrow the process list display down to specific processes.

The **summary** keyword can be used to display summary information about running processes.

Examples

The following example displays information about running processes for Cisco ASR 1000 Series SIP slot 0:

```
Router# show platform software process list 0
Name                         Pid    PPid  Group Id  Status    Priority  Size
------------------------------------------------------------------------------
init                           1       0         1  S               20  1974272
ksoftirqd/0                    2       1         1  S               39  0
events/0                       3       1         1  S               15  0
khelper                        4       1         1  S               15  0
kthread                        5       1         1  S               15  0
kblockd/0                     19       5         1  S               15  0
khubd                         23       5         1  S               15  0
pdflush                       59       5         1  S               20  0
pdflush                       60       5         1  S               20  0
kswapd0                       61       5         1  S               15  0
aio/0                         62       5         1  S               15  0
xfslogd/0                     63       5         1  S               15  0
xfsdatad/0                    64       5         1  S               15  0
mtdblockd                    626       1         1  S               20  0
loop0                       1370       1         1  S                0  0
portmap                     1404       1      1404  S               20  2076672
portmap                     1406       1      1406  S               20  2076672
loop1                       1440       1         1  S                0  0
udevd                       2104       1      2104  S               16  1974272
jffs2_gcd_mtd1              2796       1         1  S               30  0
klogd                       3093       1      3093  S               20  1728512
automount                   3199       1      3199  S               20  2396160
xinetd                      3214       1      3214  S               20  3026944
xinetd                      3216       1      3216  S               20  3026944
pvp.sh                      3540       1      3540  S               20  3678208
inotifywait                 3575    3540      3575  S               20  1900544
pman.sh                     3614    3540      3614  S               20  3571712
pman.sh                     3714    3540      3714  S               20  3571712
btrace_rotate.s             3721    3614      3721  S               20  3133440
agetty                      3822       1      3822  S               20  1720320
mcp_chvrf.sh                3823       1      3823  S               20  2990080
sntp                        3824       1      3824  S               20  2625536
issu_switchover             3825       1      3825  S               20  3899392
xinetd                      3827    3823      3823  S               20  3026944
cmcc                        3862    3714      3862  S               20  26710016
pman.sh                     3883    3540      3883  S               20  3571712
pman.sh                     4014    3540      4014  S               20  3575808
hman                        4020    3883      4020  R               20  19615744
imccd                       4114    4014      4114  S               20  31539200
inotifywait                 4196    3825      3825  S               20  1896448
pman.sh                     4351    3540      4351  S               20  3575808
plogd                       4492    4351      4492  S               20  22663168
inotifywait                 4604    3721      4604  S               20  1900544
```

Table 137 describes the significant fields shown in the display.

Table 137 show platform software process list Field Descriptions

Field	Description
Name	Name of the process.
Pid	Process ID.
PPid	Parent Process ID.
Group Id	Process group ID.

Table 137 show platform software process list Field Descriptions (continued)

Field	Description
Status	Process status.
Priority	Process priority.
Size	Virtual memory size (in bytes).

The following example displays information about a specific named process for Cisco ASR 1000 Series SIP slot 0:

```
Router# show platform software process list 0 name sleep
Name: sleep
  Process id       : 25938
  Parent process id: 3891
  Group id         : 3891
  Status           : S
  Session id       : 3816
  User time        : 0
  Kernel time      : 0
  Priority         : 20
  Virtual bytes    : 2482176
  Resident pages   : 119
  Resident limit   : 4294967295
  Minor page faults: 182
  Major page faults: 0
```

The following example displays information about a specific process identifier for Cisco ASR 1000 Series SIP slot 0:

```
Router# show platform software process list 0 process-id 1
Name: init
  Process id       : 1
  Parent process id: 0
  Group id         : 1
  Status           : S
  Session id       : 1
  User time        : 1
  Kernel time      : 741
  Priority         : 20
  Virtual bytes    : 1974272
  Resident pages   : 161
  Resident limit   : 4294967295
  Minor page faults: 756
  Major page faults: 0
```

Table 138 describes the significant fields shown in the **name** and **process-id** keyword displays.

Table 138 show platform software process list name and process-id Field Descriptions

Field	Description
Name	Name of the process.
Process id	Process ID.
Parent process id	Parent process ID.
Group id	Process group ID.
Status	Process status.

Table 138 show platform software process list name and process-id Field Descriptions (continued)

Field	Description
Session id	Process session ID.
User time	Time (in seconds) spent in user mode.
Kernel time	Time (in seconds) spent in kernel mode.
Priority	Process priority.
Virtual bytes	Virtual memory size (in bytes).
Resident pages	Resident page size.
Resident limit	Current limit on Resident pages.
Minor page faults	Number of minor page faults.
Major page faults	Number of major page faults.

The following example displays process summary information for Cisco ASR 1000 Series SIP slot 0:

```
Router# show platform software process list 0 summary
Total number of processes: 54
  Running          : 4
  Sleeping         : 50
  Disk sleeping    : 0
  Zombies          : 0
  Stopped          : 0
  Paging           : 0

  Up time          : 1562
  Idle time        : 1511
  User time        : 1606
  Kernel time      : 1319

  Virtual memory   : 587894784
  Pages resident   : 45436
  Major page faults: 25
  Minor page faults: 149098

Architecture     : ppc
  Memory (kB)
    Physical       : 524288
    Total          : 479868
    Used           : 434948
    Free           : 44920
    Active         : 183020
    Inactive       : 163268
    Inact-dirty    : 0
    Inact-clean    : 0
    Dirty          : 0
    AnonPages      : 76380
    Bounce         : 0
    Cached         : 263764
    Commit Limit   : 239932
    Committed As   : 201452
    High Total     : 0
    High Free      : 0
    Low Total      : 479868
    Low Free       : 44920
    Mapped         : 59996
    NFS Unstable   : 0
    Page Tables    : 1524
```

```
  Slab           : 73760
  VMmalloc Chunk : 426840
  VMmalloc Total : 474856
  VMmalloc Used  : 47372
  Writeback      : 0

Swap (kB)
  Total          : 0
  Used           : 0
  Free           : 0
  Cached         : 0

Buffers (kB)     : 6144

Load Average
  1-Min          : 0.00
  5-Min          : 0.00
  15-Min         : 0.00
```

Table 139 describes the significant fields shown in the **summary** keyword display.

Table 139 show platform software process list summary Field Descriptions

Field	Description
Total number of processes	Total number of processes in all possible states.
Running	Number of processes in the running state.
Sleeping	Number of processes in the sleeping state.
Disk sleeping	Number of processes in the disk-sleeping state.
Zombies	Number of processes in the zombie state.
Stopped	Number of processes in the stopped state.
Paging	Number of processes in the paging state.
Up time	System Up time (in seconds).
Idle time	System Idle time (in seconds).
User time	System time (in seconds) spent in user mode.
Kernel time	System time (in seconds) spent in kernel mode.
Virtual memory	Virtual memory size (in bytes).
Pages resident	Resident page size.
Major page faults	Number of major page faults.
Minor page faults	Number of minor page faults.
Architecture	System CPU architecture: PowerPC (ppc).
Memory (kB)	System memory heading.
Physical	Total physical memory (in kilobytes).
Total	Total available memory (in kilobytes). This value represents the physical memory available for kernel use.
Used	Used memory (in kilobytes).
Free	Free memory (in kilobytes).
Active	Most recently used memory (in kilobytes).

Table 139 show platform software process list summary Field Descriptions (continued)

Field	Description
Inactive	Memory (in kilobytes) that has been less recently used. It is more eligible to be reclaimed for other purposes.
Inact-dirty	Memory (in kilobytes) that may need to be written to persistent store (cache or disk).
Inact-clean	Memory (in kilobytes) that is readily available for re-use.
Dirty	Memory (in kilobytes) that is waiting to get written back to the disk.
AnonPages	Memory (in kilobytes) that is allocated when a process requests memory from the kernel via the malloc() system call. This memory has no file backing on disk.
Bounce	Memory (in kilobytes) that is allocated to bounce buffers.
Cached	Amount of physical RAM (in kilobytes) used as cache memory.
Commit Limit	Total amount of memory (in kilobytes) currently available to be allocated on the system. This limit is only adhered to if strict overcommit accounting is enabled.
Committed As	Total amount of memory (in kilobytes) presently allocated on the system. The committed memory is a sum of all of the memory that has been allocated by processes, even if it has not been used by them as of yet.
High Total	Total amount of memory (in kilobytes) that is not directly mapped into kernel space. The High Total value can vary based on the type of kernel used.
High Free	Amount of free memory (in kilobytes) that is not directly mapped into kernel space. The High Free value can vary based on the type of kernel used.
Low Total	Total amount of memory (in kilobytes) that is directly mapped into kernel space. The Low Total value can vary based on the type of kernel used.
Low Free	Amount of free memory (in kilobytes) that is directly mapped into kernel space. The Low Free value can vary based on the type of kernel used.
Mapped	Total amount of memory (in kilobytes) that has been used to map devices, files, or libraries using the **mmap** command.
NFS Unstable	Total amount of memory (in kilobytes) used for unstable NFS pages. Unstable NFS pages are pages that have been written into the page cache on the server, but have not yet been synchronized to disk.
Page Tables	Total amount of memory (in kilobytes) dedicated to the lowest page table level.
Slab	Total amount of memory (in kilobytes) used by the kernel to cache data structures for its own use.

Table 139 show platform software process list summary Field Descriptions (continued)

Field	Description
VMalloc Chunk	Largest contiguous block of available virtual address space (in kilobytes) that is free.
VMalloc Total	Total amount of memory (in kilobytes) of total allocated virtual address space.
VMalloc Used	Total amount of memory (in kilobytes) of used virtual address space.
Writeback	Memory (in kilobytes) that is actively being written back to the disk.
Swap (kB)	Swap memory heading.
Total	Total swap memory (in kilobytes).
Used	Used swap memory (in kilobytes).
Free	Free swap memory (in kilobytes).
Cached	Cached swap memory (in kilobytes).
Buffers (kB)	Buffers heading.
Load Average	Indicators of system load.
1-Min	Average number of processes running for the last minute.
5-Min	Average number of processes running for the last 5 minutes.
15-Min	Average number of processes running for the last 15 minutes.

show platform software tech-support

To display system information or create a technical support information tar file for Cisco Technical Support, use the **show platform software tech-support** command in privileged EXEC or diagnostic mode.

show platform software tech-support [**file** {**bootflash:***filename*.**tgz** | **fpd:***filename*.**tgz** | **harddisk:***filename*.**tgz** | **obfl:***filename*.**tgz** | **stby-bootflash:***filename*.**tgz** | **stby-harddisk:***filename*.**tgz** | **stby-obfl:***filename*.**tgz** | **stby-usb0:***filename*.**tgz** | **stby-usb1:***filename*.**tgz**}]

Syntax Description

file	(Optional) Creates a technical support information tar file for the specified destination file path.
bootflash:*filename*.**tgz**	Creates a technical support information tar file for the boot flash memory file system on the active RP.
fpd:*filename*.**tgz**	Creates a technical support information tar file for the field-programmable device (FPD) image package on the active RP. The information displayed is for internal debugging puposes only.
harddisk:*filename*.**tgz**	Creates a technical support information tar file for the hard disk file system on the active RP.
obfl:*filename*.**tgz**	Creates a technical support information tar file for the file system for Onboard Failure Logging (obfl) files. The information displayed is for internal debugging puposes only.
stby-bootflash: *filename*.**tgz**	Creates a technical support information tar file for the boot flash memory file system on the standby RP. The information displayed is for internal debugging puposes only.
stby-harddisk: *filename*.**tgz**	Creates a technical support information tar file for the hard disk file system on the standby RP. The information displayed is for internal debugging puposes only.
stby-obfl:*filename*.**tgz**	Creates a technical support information tar file for the Onboard Failure Logging (obfl) files on the standby RP. The information displayed is for internal debugging puposes only.
stby-usb0:*filename*.**tgz**	Creates a technical support information tar file for Universal Serial Bus (USB) memory. The information displayed is for internal debugging puposes only.
stby-usb1:*filename*.**tgz**	Creates a technical support information tar file for Universal Serial Bus (USB) memory. The information displayed is for internal debugging puposes only.

Command Default

No default behavior or values.

Command Modes

Privileged EXEC (#)
Diagnostic (diag)

Command History

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers.

Usage Guidelines

If the **file** keyword is specified, the specification of the **bootflash:** or **harddisk:** keyword and filename is required.

The **show platform software tech-support** command without a destination file path specification returns a large volume of information in a short period of time. You should save the output of the **show platform software tech-support** command in a log file to send to Cisco Technical Support for analysis.

Examples

The following example displays system information for Cisco Technical Support:

```
Router# show platform software tech-support
---- show version installed -----
Type: provisioning file, Version: unknown
  Provisioned on: RP0, Status: active
  File: packages.conf.super
  Modified: 2007-11-07 15:06:12.212303000 +0000
  SHA1 (header): d929d995d5ba2d3dedf67137c3e0e321b1727d7b
  SHA1 (calculated): d929d995d5ba2d3dedf67137c3e0e321b1727d7b
  SHA1 (external): a16881b6a7e3a5593b63bf211f72b8af9c534063
instance address        : 0X890DE9B4
    fast failover address   : 00000000
    cpp interface handle  0
    instance address        : 0X890DE9B8
    fast failover address   : 00000000
    cpp interface handle  0
    instance address        : 0X890DE9BC
    fast failover address   : 00000000
...
```

Note The **show platform software tech-support** command returns a large volume of information in a short period of time. The example above has been abbreviated for the purposes of this description.

The following example creates a technical support information tar file for the boot flash memory file system on the active RP:

```
Router# show platform software tech-support file bootflash:tech_support_output.tgz
Running tech support command set; please wait...
Creating file 'bootflash:target_support_output.tgz.tgz' ...
File 'bootflash:target_support_output.tgz.tgz' created successfully
```

The following example creates a technical support information tar file for the hard disk file system on the active RP:

```
Router# show platform software tech-support file harddisk:tech_support_output.tgz
Running tech support command set; please wait...
Creating file 'harddisk:tech_support_ouput.tgz.tgz' ...
File 'harddisk:tech_support_ouput.tgz.tgz' created successfully
```

show platform supervisor

To display platform supervisor information, use the **show platform supervisor** command in privileged EXEC mode.

show platform supervisor mtu slot *slot-number* **port** *port-number*

Syntax Description

mtu	Displays supervisor operating Maximum Tranmission Unit (MTU).
slot *slot-number*	Displays information for the specified slot.
port *port-number*	Displays information for the specified port.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRA	This command was introduced.

Examples

The following is sample output from the **show platform supervisor** command. The fields are self-explanatory.

```
Router# show platform supervisor mtu slot 5 port 1

 User configured MTU : 9216
 Real Operating MTU  : 9236
```

Related Commands

Command	Description
show platform	Displays platform information.

show power

To display information about the power status, use the **show power** command in user EXEC or privileged EXEC mode**.**

show power [**available** | **inline** [*interface number* | **module number**] | **redundancy-mode** | **status** {**all** | **fan-tray** *fan-tray-number* | **module** *slot* | **power-supply** *pwr-supply-number*} | **total** | **used**]

Syntax Description

available	(Optional) Displays the available system power (margin).
inline	(Optional) Displays the inline power status.
interface number	(Optional) Specifies the interface type; possible valid values are **ethernet**, **fastethernet**, **gigabitethernet**, **tengigabitethernet**, **null**, **port-channel**, and **vlan**. See the "Usage Guidelines" section for additional information.
module number	Displays the power status for a specific module.
redundancy-mode	(Optional) Displays the power-supply redundancy mode.
status	(Optional) Displays the power status.
all	Displays all the FRU types.
fan-tray *fan-tray-number*	Displays the power status for the fan tray.
module *slo*t	Displays the power status for a specific module.
power-supply *pwr-supply-number*	Displays the power status for a specific power supply; valid values are **1** and **2**.
total	(Optional) Displays the total power that is available from the power supplies.
used	(Optional) Displays the total power that is budgeted for powered-on items.

Defaults

This command has no default settings.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17a)SX1	The output was changed to include the total system-power information.
12.2(17b)SXA	This command was changed to include information about the inline power status for a specific module.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(18)SXF	The output was changed to include information about the high-capacity power supplies.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The *interface-number* argument designates the module and port number. Valid values for *interface-number* depend on the specified interface type and the chassis and module that are used. For example, if you specify a Gigabit Ethernet interface and have a 48-port 10/100BASE-T Ethernet module that is installed in a 13-slot chassis, valid values for the module number are from 1 to 13 and valid values for the port number are from 1 to 48.

Valid values for *vlan-id* are from 1 to 4094.

The Inline power field in the **show power** output displays the inline power that is consumed by the modules. For example, this example shows that module 9 has consumed 0.300 A of inline power:

```
Inline power   #    current
module         9    0.300A
```

Examples

This example shows how to display the available system power:

```
Router> show power available

system power available = 20.470A
Router>
```

This example shows how to display power-supply redundancy mode:

```
Router# show power redundancy-mode

system power redundancy mode = redundant
Router#
```

This command shows how to display the system-power status:

```
Router> show power

system power redundancy mode = combined
system power total =     3984.12 Watts (94.86 Amps @ 42V)
system power used =      1104.18 Watts (26.29 Amps @ 42V)
system power available = 2879.94 Watts (68.57 Amps @ 42V)
                         Power-Capacity PS-Fan Output Oper
PS   Type                Watts   A @42V Status Status State
---- ------------------ ------- ------ ------ ------ -----
1    WS-CAC-3000W       2830.80 67.40  OK     OK     on
2    WS-CAC-1300W       1153.32 27.46  OK     OK     on
Note: PS2 capacity is limited to 2940.00 Watts (70.00 Amps @ 42V)
      when PS1 is not present
                         Pwr-Allocated  Oper
Fan  Type                Watts   A @42V State
---- ------------------ ------- ------ -----
1    FAN-MOD-9           241.50  5.75  OK
2                        241.50  5.75  failed
                         Pwr-Requested  Pwr-Allocated  Admin Oper
Slot Card-Type           Watts   A @42V Watts   A @42V State State
---- ------------------ ------- ------ ------- ------ ----- -----
1    WS-X6K-SUP2-2GE     145.32  3.46   145.32  3.46  on    on
2                          -     -      145.32  3.46  -     -
3    WS-X6516-GBIC       118.02  2.81   118.02  2.81  on    on
5    WS-C6500-SFM        117.18  2.79   117.18  2.79  on    on
7    WS-X6516A-GBIC      214.20  5.10     -     -     on    off (insuff cooling capacity)
8    WS-X6516-GE-TX      178.50  4.25   178.50  4.25  on    on
9    WS-X6816-GBIC       733.98 17.48     -     -     on    off (connector rating
exceeded)
Router>
```

This example shows how to display the power status for all FRU types:

```
Router# show power status all

FRU-type       #    current   admin state oper
power-supply   1    27.460A   on          on
module         1    4.300A    on          on
module         2    4.300A    -           -   (reserved)
module         5    2.690A    on          on
Router#
```

This example shows how to display the power status for a specific module:

```
Router# show power status module 1

FRU-type       #    current   admin state oper
module         1    -4.300A   on          on
Router#
```

This example shows how to display the power status for a specific power supply:

```
Router# show power status power-supply 1

FRU-type       #    current   admin state oper
power-supply   1    27.460A   on          on
Router#
```

This example displays information about the high-capacity power supplies:

```
Router# show power status power-supply 2

                       Power-Capacity PS-Fan Output Oper
PS   Type              Watts   A @42V Status Status State
---- ----------------- ------- ------ ------ ------ -----
1    WS-CAC-6000W      2672.04  63.62 OK     OK     on
2    WS-CAC-9000W-E    2773.68  66.04 OK     OK     on
Router#
```

This example shows how to display the total power that is available from the power supplies:

```
Router# show power total

system power total = 27.460A
Router#
```

This example shows how to display the total power that is budgeted for powered-on items:

```
Router# show power used

system power used = -6.990A
Router#
```

This command shows how to display the inline power status on the interfaces:

```
Router# show power inline

Interface            Admin    Oper    Power ( mWatt )  Device
-------------------- ----- ---------- --------------- -----------
FastEthernet9/1      auto  on         6300            Cisco 6500 IP Phone
FastEthernet9/2      auto  on         6300            Cisco 6500 IP Phone
.
.
. <Output truncated>
```

This command shows how to display the inline power status for a specific module:

```
Router# show power inline mod 7
```

```
Interface  Admin    Oper     Power       Device         Class
                            (Watts)
---------- ----- ---------- ------- --------------  -----------
Gi7/1      auto   on            6.3  Cisco IP Phone 7960  n/a
Gi7/2      static power-deny      0  Ieee PD              3
.
.
. <Output truncated>
```

Related Commands

Command	Description
power enable	Turns on power for the modules.
power redundancy-mode	Sets the power-supply redundancy mode.

show processes

To display information about the active Cisco IOS processes or the Cisco IOS Software Modularity POSIX-style processes, use the **show processes** command in user EXEC or privileged EXEC mode.

Cisco IOS Software

show processes [**history** | *process-id* | **timercheck**]

Cisco IOS Software Modularity

show processes

Syntax Description

history	(Optional) For Cisco IOS processes only. Displays the process history in an ordered format.
process-id	(Optional) For Cisco IOS processes only. An integer that specifies the process for which memory and CPU utilization data will be returned.
timercheck	(Optional) For Cisco IOS processes only. Displays the processes configured for a timer check.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
12.2(2)T	This command was modified. The **history** keyword was added.
12.3(2)T	This command was modified. The *process-id* argument was added.
12.2(18)SXF4	This command was modified. The syntax was modified to support Cisco IOS Software Modularity images.
12.3(14)T	This command was modified. The **timercheck** keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

Cisco IOS Software Modularity

Although no optional keywords or arguments are supported for the base **show processes** command when a Software Modularity image is running, more details about processes are displayed using the **show processes cpu**, **show processes detailed**, **show processes kernel**, and **show processes memory** commands.

Examples

Example output varies between Cisco IOS software images and Cisco IOS Software Modularity software images. The following sections show output examples for each image:

- Cisco IOS Software
- Cisco IOS Software Modularity

Cisco IOS Software

The following is sample output from the **show processes** command:

```
Router# show processes

CPU utilization for five seconds: 21%/0%; one minute: 2%; five minutes: 2%
 PID QTy       PC Runtime (ms)    Invoked   uSecs    Stacks TTY Process
   1 Cwe 606E9FCC             0          1       0 5600/6000   0 Chunk Manager
   2 Csp 607180F0             0     121055       0 2608/3000   0 Load Meter
   3 M*          0             8         90      88 9772/12000  0 Exec
   4 Mwe 619CB674             0          1       023512/24000  0 EDDRI_MAIN
   5 Lst 606F6AA4         82064      61496    1334 5668/6000   0 Check heaps
   6 Cwe 606FD444             0        127       0 5588/6000   0 Pool Manager
   7 Lwe 6060B364             0          1       0 5764/6000   0 AAA_SERVER_DEADT
   8 Mst 6063212C             0          2       0 5564/6000   0 Timers
   9 Mwe 600109D4             0          2       0 5560/6000   0 Serial Backgroun
  10 Mwe 60234848             0          2       0 5564/6000   0 ATM Idle Timer
  11 Mwe 602B75F0             0          2       0 8564/9000   0 ATM AutoVC Perio
  12 Mwe 602B7054             0          2       0 5560/6000   0 ATM VC Auto Crea
  13 Mwe 606068B8             0          2       0 5552/6000   0 AAA high-capacit
  14 Msi 607BABA4        251264     605013     415 5628/6000   0 EnvMon
  15 Mwe 607BFF8C             0          1       0 8600/9000   0 OIR Handler
  16 Mwe 607D407C             0      10089       0 5676/6000   0 IPC Dynamic Cach
  17 Mwe 607CD03C             0          1       0 5632/6000   0 IPC Zone Manager
  18 Mwe 607CCD80             0     605014       0 5708/6000   0 IPC Periodic Tim
  19 Mwe 607CCD24             0     605014       0 5704/6000   0 IPC Deferred Por
  20 Mwe 607CCE2C             0          1       0 5596/6000   0 IPC Seat Manager
```

Table 140 describes the fields shown in the display.

Table 140 show processes Field Descriptions

Field	Description
CPU utilization for five seconds	CPU utilization for the last 5 seconds. The second number indicates the percentage of CPU time spent at the interrupt level.
one minute	CPU utilization for the last minute.
five minutes	CPU utilization for the last 5 minutes.
PID	Process ID.
Q	Process queue priority. Possible values: C (critical), H (high), M (medium), and L (low).

Table 140 show processes Field Descriptions (continued)

Field	Description
Ty	Scheduler test. Possible values: • * (currently running) • E (waiting for an event) • S (ready to run, voluntarily relinquished processor) • rd (ready to run, wakeup conditions have occurred) • we (waiting for an event) • sa (sleeping until an absolute time) • si (sleeping for a time interval) • sp (sleeping for a time interval as an alternate call • st (sleeping until a timer expires) • hg (hung: the process will never execute again) • xx (dead: the process has terminated, but has not yet been deleted).
PC	Current program counter.
Runtime (ms)	CPU time that the process has used (in milliseconds).
Invoked	Number of times that the process has been invoked.
uSecs	Microseconds of CPU time for each process invocation.
Stacks	Low water mark/Total stack space available (in bytes).
TTY	Terminal that controls the process.
Process	Name of the process.

Note Because platforms have a 4- to 8- millisecond clock resolution, run times are considered reliable only after a large number of invocations or a reasonable, measured run time.

For a list of process descriptions, see http://www.cisco.com/en/US/products/sw/iosswrel/ps1828/products_tech_note09186a00800a65d0.shtml.

The following is sample output from the **show processes history** command:

```
Router# show processes history

PID Exectime(ms) Caller PC Process Name
   3          12 0x0        Exec
  16           0 0x603F4DEC GraphIt
  21           0 0x603CFEF4 TTY Background
  22           0 0x6042FD7C Per-Second Jobs
  67           0 0x6015CD38 SMT input
  39           0 0x60178804 FBM Timer
  16           0 0x603F4DEC GraphIt
  21           0 0x603CFEF4 TTY Background
  22           0 0x6042FD7C Per-Second Jobs
  16           0 0x603F4DEC GraphIt
  21           0 0x603CFEF4 TTY Background
```

```
  22           0 0x6042FD7C Per-Second Jobs
  67           0 0x6015CD38 SMT input
  39           0 0x60178804 FBM Timer
  24           0 0x60425070 Compute load avgs
  11           0 0x605210A8 ARP Input
  69           0 0x605FDAF4 DHCPD Database
  69           0 0x605FD568 DHCPD Database
  51           0 0x60670B3C IP Cache Ager
  69           0 0x605FD568 DHCPD Database
  36           0 0x606E96DC SSS Test Client
  69           0 0x605FD568 DHCPD Database
 --More--
```

Table 141 describes the significant fields shown in the display.

Table 141 show processes history Field Descriptions

Field	Description
PID	Process ID.
Exectime (ms)	Execution time (in milliseconds) of the most recent run or the total execution time of the most recent consecutive runs.
Caller PC	Current program counter of this process before it was suspended.
Process Name	Name of the process.

The following is sample output from the **show processes** *process-id* command:

```
Router# show processes 6

Process ID 6 [Pool Manager], TTY 0
Memory usage [in bytes]
 Holding: 921148, Maximum: 940024, Allocated: 84431264, Freed: 99432136
 Getbufs: 0, Retbufs: 0, Stack: 12345/67890
CPU usage
 PC: 0x60887600, Invoked: 188, Giveups: 100, uSec: 24
 5Sec: 3.03%, 1Min: 2.98%, 5Min: 1.55%, Average: 0.58%,
 Age: 662314 msec, Runtime: 3841 msec
 State: Running, Priority: Normal
```

Table 142 describes the fields shown in the display.

Table 142 show processes process-id Field Descriptions

Field	Description
Process ID	Process ID number and process name.
TTY	Terminal that controls the process.
Memory usage [in bytes]	This section contains fields that show the memory used by the specified process.
Holding	Amount of memory currently allocated to the process.
Maximum	Maximum amount of memory allocated to the process since its invocation.
Allocated	Bytes of memory allocated by the process.
Freed	Bytes of memory freed by the process.
Getbufs	Number of times that the process has requested a packet buffer.

Table 142 show processes process-id Field Descriptions (continued)

Field	Description
Retbufs	Number of times that the process has relinquished a packet buffer.
Stack	Low water mark/Total stack space available (in bytes).
CPU usage	This section contains fields that show the CPU resources used by the specified process.
PC	Current program counter of this process before it was suspended.
Invoked	Number of times that the process executed since its invocation.
Giveups	Number of times that the process voluntarily gave up the CPU.
uSec	Microseconds of CPU time for each process invocation.
5Sec	CPU utilization by process in the last five seconds.
1Min	CPU utilization by process in the last minute.
5Min	CPU utilization by process in the last five minutes.
Average	The average amount of CPU utilization by the process since its invocation.
Age	Milliseconds since the process was invoked.
Runtime	CPU time that the process has used (in milliseconds).
State	Current state of the process. Possible values: Running, Waiting for Event, Sleeping (Mgd Timer), Sleeping (Periodic), Ready, Idle, Dead.
Priority	The priority of the process. Possible values: Low, Normal, High.

Cisco IOS Software Modularity

The following is sample output from the **show processes** command when a Cisco IOS Software Modularity image is running:

```
Router# show processes

Total CPU utilization for 5 seconds: 99.7%; 1 minute: 98.9%; 5 minutes: 86.5%
PID   TID  Prio STATE       Blocked   Stack           CPU  Name
1     1    0    Ready                0    (128K)   2m28s  procnto-cisco
1     2    63   Receive     1        0    (128K)   0.000  procnto-cisco
1     3    10   Receive     1        0    (128K)   0.000  procnto-cisco
1     4    11   Receive     1        0    (128K)   1.848  procnto-cisco
1     5    63   Receive     1        0    (128K)   0.000  procnto-cisco
1     6    63   Receive     1        0    (128K)   0.000  procnto-cisco
12290 1    10   Receive     1        12288(128K)   0.080  chkptd.proc
12290 2    10   Receive     8        12288(128K)   0.000  chkptd.proc
3     1    15   Condvar     1027388  12288(128K)   0.016  qdelogger
3     2    15   Receive     1        12288(128K)   0.004  qdelogger
3     3    16   Condvar     1040024  12288(128K)   0.004  qdelogger
4     1    10   Receive     1        4096 (128K)   0.016  devc-pty
6     1    62   Receive     1        8192 (128K)   0.256  devc-ser2681
6     2    63   Intr                 8192 (128K)   0.663  devc-ser2681
7     1    10   Receive     1        32768(128K)   0.080  dumper.proc
7     2    10   Receive     1        32768(128K)   0.008  dumper.proc
7     3    10   Receive     1        32768(128K)   0.000  dumper.proc
7     4    10   Receive     1        32768(128K)   0.020  dumper.proc
7     5    10   Receive     1        32768(128K)   0.008  dumper.proc
4104  2    10   Receive     1        12288(128K)   0.000  pipe
4104  3    10   Receive     1        12288(128K)   0.000  pipe
8210  1    10   Nanosleep            8192 (128K)   0.040  watchdog.proc
8211  1    10   Receive     1        16384(128K)   0.044  syslogd.proc
```

```
8211  2    10   Receive     7          16384(128K)   0.000  syslogd.proc
8211  3    10   Sigwaitin               16384(128K)   0.000  syslogd.proc
8212  2    10   Receive     1          24576(128K)   0.024  name_svr.proc
8212  3    10   Receive     1          24576(128K)   0.100  name_svr.proc
8212  4    10   Receive     1          24576(128K)   0.340  name_svr.proc
8212  5    10   Receive     1          24576(128K)   0.304  name_svr.proc
8213  1    10   Receive     1          24576(128K)   0.644  wdsysmon.proc
8213  2    10   Receive     5          24576(128K)   0.052  wdsysmon.proc
8213  3    10   Receive     10         24576(128K)   0.004  wdsysmon.proc
8213  4    63   Nanosleep               24576(128K)   0.000  wdsysmon.proc
8214  1    10   Receive     1          94208(128K)   0.132  sysmgr.proc
8214  2    10   Sigwaitin               94208(128K)   0.000  sysmgr.proc
8214  3    10   Receive     8          94208(128K)   0.004  sysmgr.proc
8214  4    10   Receive     1          94208(128K)   0.000  sysmgr.proc
8214  5    10   Receive     1          94208(128K)   0.000  sysmgr.proc
8214  6    10   Receive     1          94208(128K)   0.004  sysmgr.proc
8214  7    10   Receive     1          94208(128K)   0.000  sysmgr.proc
8214  8    10   Receive     1          94208(128K)   0.000  sysmgr.proc
8214  9    10   Receive     1          94208(128K)   0.000  sysmgr.proc
8214  10   10   Receive     1          94208(128K)   0.000  sysmgr.proc
12317 1    10   Receive     23         73728(128K)   2.212  ios-base
12317 2    10   Receive     1          73728(128K)   0.064  ios-base
12317 3    10   Reply       1          73728(128K)  17.800  ios-base
12317 4    11   Nanosleep               73728(128K)   0.000  ios-base
12317 5    10   Receive     1          73728(128K)  21.108  ios-base
12317 6    45   Intr                    73728(128K)   0.000  ios-base
12317 7    35   Intr                    73728(128K)   0.064  ios-base
12317 8    10   Reply       12336      73728(128K)   0.776  ios-base
12317 9    10   Receive     1          73728(128K)  12.608  ios-base
12317 10   25   Intr                    73728(128K)  26.404  ios-base
12317 11   25   Intr                    73728(128K)   0.088  ios-base
12317 12   45   Intr                    73728(128K)   0.000  ios-base
12317 13   10   Receive     1          73728(128K)   6.456  ios-base
12317 14   20   Reply       6          73728(128K)   0.064  ios-base
12317 15   10   Receive     1          73728(128K)   8.064  ios-base
12324 1    10   Receive     1          40960(128K)  73.088  iprouting.iosproc
12324 2    10   Ready                  40960(128K)  32.552  iprouting.iosproc
12324 4    11   Nanosleep              40960(128K)   0.000  iprouting.iosproc
12324 5    10   Receive     1          40960(128K)   4.312  iprouting.iosproc
12324 6    10   Receive     1          40960(128K)   6.988  iprouting.iosproc
12324 7    10   Reply       1          40960(128K)  41.108  iprouting.iosproc
12324 8    10   Receive     1          40960(128K)   0.032  iprouting.iosproc
12324 9    10   Reply       1          40960(128K)   0.332  iprouting.iosproc
12330 1    10   Receive     1          36864(128K)   0.000  cdp2.iosproc
12330 2    10   Receive     1          36864(128K)   0.004  cdp2.iosproc
12330 3    10   Receive     1          36864(128K)   0.024  cdp2.iosproc
12330 4    11   Nanosleep              36864(128K)   0.000  cdp2.iosproc
12330 5    10   Reply       1          36864(128K)   0.228  cdp2.iosproc
12330 6    10   Receive     1          36864(128K)   0.000  cdp2.iosproc
12330 7    10   Receive     9          36864(128K)   0.000  cdp2.iosproc
12334 1    10   Receive     1          45056(128K)   0.000  inetd.proc
12334 2    10   Sigwaitin              45056(128K)   0.000  inetd.proc
12334 3    10   Receive     1          45056(128K)   0.000  inetd.proc
12334 4    10   Receive     1          45056(128K)   0.020  inetd.proc
12334 5    10   Receive     1          45056(128K)   0.000  inetd.proc
12335 1    10   Receive     1          118784(128K)   0.000  tcp.proc
12335 2    10   Receive     1          118784(128K)   0.000  tcp.proc
12335 3    10   Sigwaitin              118784(128K)   0.000  tcp.proc
12335 4    10   Condvar     7A602080   118784(128K)   5.092  tcp.proc
12335 5    10   Ready                  118784(128K)  21.092  tcp.proc
12335 6    10   Receive     1          118784(128K)  14.280  tcp.proc
12335 7    10   Receive     1          118784(128K)   0.000  tcp.proc
12336 1    10   Receive     1          53248(128K)   0.000  udp.proc
12336 3    10   Sigwaitin              53248(128K)   0.000  udp.proc
```

```
12336 4    10   Condvar     7A602080  53248(128K)   0.000  udp.proc
12336 5    10   Receive     11        53248(128K)   0.072  udp.proc
12336 6    10   Receive     1         53248(128K)   0.028  udp.proc
12336 7    10   Receive     1         53248(128K)   0.000  udp.proc
12336 8    10   Receive     1         53248(128K)   0.000  udp.proc
```

Table 143 describes the significant fields shown in the display.

Table 143 show processes (Software Modularity) Field Descriptions

Field	Description
PID	Process ID.
TID	Task ID.
Prio	Process priority.
STATE	Current state of process.
Blocked	Thread (with given process ID) that is currently blocked by the process.
Stack	Size, in kilobytes, of the memory stack.
CPU	CPU time, in minutes and seconds, used by the process.
Name	Process name.

Related Commands

Command	Description
show processes cpu	Displays detailed CPU utilization statistics (CPU use per process) when a Software Modularity image is running.
show processes detailed	Displays detailed information about POSIX and Cisco IOS processes when a Software Modularity image is running.
show processes kernel	Displays information about System Manager kernel processes when a Software Modularity image is running.
show processes memory	Displays amount of system memory used per system process.

show processes cpu

To display detailed CPU utilization statistics (CPU use per process) when Cisco IOS or Cisco IOS Software Modularity images are running, use the **show processes cpu** command in user EXEC or privileged EXEC mode.

Cisco IOS Software

show processes cpu [**history** [**table**] | **sorted** [**1min** | **5min** | **5sec**]]

Cisco IOS Software Modularity

show processes cpu [**detailed** [*process-id* | *process-name*] | **history**]

Syntax Description

history	(Optional) Displays CPU history in a graph format.
table	(Optional) Displays CPU history in a table format.
sorted	(Optional) For Cisco IOS images only. Displays CPU utilization sorted by percentage.
1min	(Optional) Sorts CPU utilization based on 1 minute utilization.
5min	(Optional) Sorts CPU utilization based on 5 minutes utilization.
5sec	(Optional) Sorts CPU utilization based on 5 seconds utilization.
detailed	(Optional) For Cisco IOS Software Modularity images only. Displays more detailed information about Cisco IOS processes (not for POSIX processes).
process-id	(Optional) For Cisco IOS Software Modularity images only. Process identifier.
process-name	(Optional) For Cisco IOS Software Modularity images only. Process name.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.0	This command was introduced.
12.2(2)T	This command was modified. The **history** keyword was added.
12.3(8)	This command was enhanced to display Address Resolution Protocol (ARP) output.
12.3(14)T	This command was enhanced to display ARP output.
12.2(18)SXF4	This command was enhanced to support Cisco IOS Software Modularity images.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
12.2(33)SCB3	This command was integrated into Cisco IOS Release 12.2(33)SCB3. Support was added for Cisco uBR10012 and uBR7200 routers.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

Cisco IOS Software

If you use the optional **history** keyword, three graphs are displayed for Cisco IOS images:

- CPU utilization for the last 60 seconds
- CPU utilization for the last 60 minutes
- CPU utilization for the last 72 hours

Maximum usage is measured and recorded every second; average usage is calculated on periods of more than one second. Consistently high CPU utilization over an extended period indicates a problem. Use the **show processes cpu** command to troubleshoot. Also, you can use the output of this command in the Cisco Output Interpreter tool to display potential issues and fixes. Output Interpreter is available to registered users of Cisco.com who are logged in and have Java Script enabled.

For a list of system processes, go to http://www.cisco.com/en/US/products/sw/iosswrel/ps1828/products_tech_note09186a00800a65d0.shtml.

Cisco IOS Software Modularity

Cisco IOS Software Modularity images display only one graph that shows the CPU utilization for the last 60 minutes. The horizontal axis shows times (for example, 0, 5, 10, 15 minutes), and the vertical axis shows total percentage of CPU utilization (0 to 100 percent).

Examples

Example output varies between Cisco IOS software images and Cisco IOS Software Modularity software images. The following sections show output examples for each image:

- Cisco IOS Software
- Cisco IOS Software Modularity

Cisco IOS Software

The following is sample output from the **show processes cpu** command without keywords:

```
Router# show processes cpu

CPU utilization for five seconds: 5%/2%; one minute: 3%; five minutes: 2%
  PID  Runtime (ms)     Invoked   uSecs   5Sec  1Min  5Min  TTY  Process
    1          1736          58   29931     0%    0%    0%  0    Check heaps
    2            68         585     116  1.00% 1.00%    0%  0    IP Input
    3             0         744       0     0%    0%    0%  0    TCP Timer
    4             0           2       0     0%    0%    0%  0    TCP Protocols
    5             0           1       0     0%    0%    0%  0    BOOTP Server
    6            16         130     123     0%    0%    0%  0    ARP Input
    7             0           1       0     0%    0%    0%  0    Probe Input
    8             0           7       0     0%    0%    0%  0    MOP Protocols
    9             0           2       0     0%    0%    0%  0    Timers
   10           692          64   10812     0%    0%    0%  0    Net Background
   11             0           5       0     0%    0%    0%  0    Logger
   12             0          38       0     0%    0%    0%  0    BGP Open
   13             0           1       0     0%    0%    0%  0    Net Input
   14           540        3466     155     0%    0%    0%  0    TTY Background
   15             0           1       0     0%    0%    0%  0    BGP I/O
   16          5100        1367    3730     0%    0%    0%  0    IGRP Router
   17            88        4232      20  0.20% 1.00%    0%  0    BGP Router
   18           152       14650      10     0%    0%    0%  0    BGP Scanner
   19           224          99    2262     0%    0% 1.00%  0    Exec
```

The following is sample output of the one-hour portion of the output. The Y-axis of the graph is the CPU utilization. The X-axis of the graph is the increment within the time period displayed in the graph. This example shows the individual minutes during the previous hour. The most recent measurement is on the left of the X-axis.

```
Router# show processes cpu history

!--- One minute output omitted

666577686575667667666666766767767676766666766767767666566667
637801619899351370977199144373235868993274085826964392261 3
100
90
80         *  *                     * *     *  * *  *
70  * * ***** *  ** ***** ***  **** ******  *  *******     * *
60  #***###*##*#***######*#*##******#*###*#*#*##*#*##*#*#######*#
50  ############################################################
40  ############################################################
30  ############################################################
20  ############################################################
10  ############################################################
   0....5....1....1....2....2....3....3....4....4....5....5....
             0    5    0    5    0    5    0    5    0    5
              CPU% per minute (last 60 minutes)
             * = maximum CPU% # = average CPU%

!--- 72-hour output omitted
```

The top two rows, read vertically, display the highest percentage of CPU utilization recorded during the time increment. In this example, the CPU utilization for the last minute recorded is 66 percent. The device may have reached 66 percent only once during that minute, or it may have reached 66 percent multiple times. The device records only the peak reached during the time increment and the average over the course of that increment.

The following is sample output from the **show processes cpu** command on a Cisco uBR10012 router:

```
Router# show processes cpu

CPU utilization for five seconds: 2%/0%; one minute: 2%; five minutes: 2%
 PID Runtime(ms)   Invoked      uSecs   5Sec   1Min   5Min TTY Process
   1           8       471         16  0.00%  0.00%  0.00%   0 Chunk Manager
   2           4       472          8  0.00%  0.00%  0.00%   0 Load Meter
   3           0         1          0  0.00%  0.00%  0.00%   0 IPC 0x50000 Vers
   4           0        10          0  0.00%  0.00%  0.00%   0 C10K Card Event
   5           0        65          0  0.00%  0.00%  0.00%   0 Retransmission o
   6           0         5          0  0.00%  0.00%  0.00%   0 IPC ISSU Dispatc
   7        5112       472      10830  0.63%  0.18%  0.18%   0 Check heaps
   8           0         1          0  0.00%  0.00%  0.00%   0 Pool Manager
   9           0         2          0  0.00%  0.00%  0.00%   0 Timers
  10           0         2          0  0.00%  0.00%  0.00%   0 Serial Backgroun
  11           0       786          0  0.00%  0.00%  0.00%   0 WBCMTS process
  12           0         1          0  0.00%  0.00%  0.00%   0 AAA_SERVER_DEADT
  13           0         1          0  0.00%  0.00%  0.00%   0 Policy Manager
  14           0         1          0  0.00%  0.00%  0.00%   0 Crash writer
  15           0         1          0  0.00%  0.00%  0.00%   0 RO Notify Timers
  16           0         1          0  0.00%  0.00%  0.00%   0 RMI RM Notify Wa
  17           0      2364          0  0.00%  0.00%  0.00%   0 Facility Alarm
  18           0        41          0  0.00%  0.00%  0.00%   0 IPC Dynamic Cach
```

The following is sample output from the **show processes cpu** command that shows an ARP probe process:

```
Router# show processes cpu | include ARP

17       38140    389690          97  0.00%  0.00%  0.00%   0 ARP Input
36           0         1           0  0.00%  0.00%  0.00%   0 IP ARP Probe
40           0         1           0  0.00%  0.00%  0.00%   0 ATM ARP INPUT
80           0         1           0  0.00%  0.00%  0.00%   0 RARP Input
114          0         1           0  0.00%  0.00%  0.00%   0 FR ARP
```

Table 144 describes the fields shown in the output.

Table 144 show processes cpu Field Descriptions

Field	Description
CPU utilization for five seconds	CPU utilization for the last 5 seconds. The second number indicates the percent of CPU time spent at the interrupt level.
1 minute	CPU utilization for the last minute.
5 minutes	CPU utilization for the last 5 minutes.
PID	Process ID.
Runtime (ms)	CPU time that the process has used (in milliseconds).
Invoked	Number of times that the process has been invoked.
uSecs	Microseconds of CPU time for each process invocation.
5Sec	CPU utilization by task in the last 5 seconds.
1Min	CPU utilization by task in the last minute.
5Min	CPU utilization by task in the last 5 minutes.
TTY	Terminal that controls the process.
Process	Name of the process.

Note Because platforms have a 4- to 8-millisecond clock resolution, run times are considered reliable only after several invocations or a reasonable, measured run time.

Cisco IOS Software Modularity

The following is sample output from the **show processes cpu** command when a Software Modularity image is running:

```
Router# show processes cpu

Total CPU utilization for 5 seconds: 99.6%; 1 minute: 98.5%; 5 minutes: 85.3%
PID       5Sec    1Min     5Min Process
1         0.0%    0.1%     0.8% kernel
3         0.0%    0.0%     0.0% qdelogger
4         0.0%    0.0%     0.0% devc-pty
6         0.7%    0.2%     0.1% devc-ser2681
7         0.0%    0.0%     0.0% dumper.proc
4104      0.0%    0.0%     0.0% pipe
8201      0.0%    0.0%     0.0% mqueue
8202      0.0%    0.0%     0.0% fsdev.proc
8203      0.0%    0.0%     0.0% flashfs_hes_slot1.proc
8204      0.0%    0.0%     0.0% flashfs_hes_slot0.proc
```

```
8205       0.0%     0.0%      0.0% flashfs_hes_bootflash.proc
8206       0.0%     0.0%      0.0% dfs_disk2.proc
8207       0.0%     0.0%      0.0% dfs_disk1.proc
8208       0.0%     0.0%      0.0% dfs_disk0.proc
8209       0.0%     0.0%      0.0% ldcache.proc
8210       0.0%     0.0%      0.0% watchdog.proc
8211       0.0%     0.0%      0.0% syslogd.proc
8212       0.0%     0.0%      0.0% name_svr.proc
8213       0.0%     0.1%      0.0% wdsysmon.proc
8214       0.0%     0.0%      0.0% sysmgr.proc
8215       0.0%     0.0%      0.0% kosh.proc
12290      0.0%     0.0%      0.0% chkptd.proc
12312      0.0%     0.0%      0.0% sysmgr.proc
12313      0.0%     0.0%      0.0% syslog_dev.proc
12314      0.0%     0.0%      0.0% itrace_exec.proc
12315      0.0%     0.0%      0.0% packet.proc
12316      0.0%     0.0%      0.0% installer.proc
12317     29.1%    28.5%     19.6% ios-base
12318      0.0%     0.0%      0.0% fh_fd_oir.proc
12319      0.0%     0.0%      0.1% fh_fd_cli.proc
12320      0.0%     0.0%      0.0% fh_metric_dir.proc
12321      0.0%     0.0%      0.0% fh_fd_snmp.proc
12322      0.0%     0.0%      0.0% fh_fd_none.proc
12323      0.0%     0.0%      0.0% fh_fd_intf.proc
12324     48.5%    48.5%     35.8% iprouting.iosproc
12325      0.0%     0.0%      0.0% fh_fd_timer.proc
12326      0.0%     0.0%      0.0% fh_fd_ioswd.proc
12327      0.0%     0.0%      0.0% fh_fd_counter.proc
12328      0.0%     0.0%      0.0% fh_fd_rf.proc
12329      0.0%     0.0%      0.0% fh_server.proc
12330      0.0%     0.0%      0.0% cdp2.iosproc
12331      0.0%     0.0%      0.0% fh_policy_dir.proc
12332      0.0%     0.0%      0.0% ipfs_daemon.proc
12333      0.0%     0.0%      0.0% raw_ip.proc
12334      0.0%     0.0%      0.0% inetd.proc
12335     19.1%    20.4%     12.6% tcp.proc
12336      0.0%     0.0%      0.0% udp.proc
```

Table 145 describes the significant fields shown in the display.

Table 145 show processes cpu (Software Modularity) Field Descriptions

Field	Description
Total CPU utilization for five seconds	Total CPU utilization for the last 5 seconds. The second number indicates the percent of CPU time spent at the interrupt level.
1 minute	CPU utilization for the last minute.
5 minutes	CPU utilization for the last 5 minutes.
PID	Process ID.
5Sec	Percentage of CPU time spent at the interrupt level for this process during the last five seconds.
1Min	Percentage of CPU time spent at the interrupt level for this process during the last minute.
5Min	Percentage of CPU time spent at the interrupt level for this process during the last five minutes.
Process	Process name.

The following is partial sample output from the **show processes cpu** command with the **detailed** keyword when a Software Modularity image is running:

```
Router# show processes cpu detailed

Total CPU utilization for 5 seconds: 99.6%; 1 minute: 99.3%; 5 minutes: 88.6%
PID/TID   5Sec    1Min     5Min Process             Prio  STATE        CPU
1         0.0%    0.7%     0.7% kernel                                 8.900
      1   0.4%    0.7%    11.4% [idle thread]          0  Ready        2m28s
      2   0.0%    0.0%     0.0%                       63  Receive      0.000
      3   0.0%    0.0%     0.0%                       10  Receive      0.000
      4   0.0%    0.0%     0.1%                       11  Receive      1.848
      5   0.0%    0.0%     0.0%                       63  Receive      0.000
.
.
.
PID/TID   5Sec    1Min     5Min Process             Prio  STATE        CPU
8214      0.0%    0.0%     0.0% sysmgr.proc                            0.216
      1   0.0%    0.0%     0.0%                       10  Receive      0.132
      2   0.0%    0.0%     0.0%                       10  Sigwaitin    0.000
      3   0.0%    0.0%     0.0%                       10  Receive      0.004
      4   0.0%    0.0%     0.0%                       10  Receive      0.000
      5   0.0%    0.0%     0.0%                       10  Receive      0.000
      6   0.0%    0.0%     0.0%                       10  Receive      0.004
      7   0.0%    0.0%     0.0%                       10  Receive      0.000
      8   0.0%    0.0%     0.0%                       10  Receive      0.000
      9   0.0%    0.0%     0.0%                       10  Receive      0.000
     10   0.0%    0.0%     0.0%                       10  Receive      0.000
     11   0.0%    0.0%     0.0%                       10  Receive      0.000
     12   0.0%    0.0%     0.0%                       10  Receive      0.000
     13   0.0%    0.0%     0.0%                       10  Receive      0.028
     14   0.0%    0.0%     0.0%                       10  Receive      0.040
     15   0.0%    0.0%     0.0%                       10  Receive      0.000
     16   0.0%    0.0%     0.0%                       10  Receive      0.000
     17   0.0%    0.0%     0.0%                       10  Receive      0.004
     18   0.0%    0.0%     0.0%                       10  Receive      0.000
     19   0.0%    0.0%     0.0%                       10  Receive      0.000
     20   0.0%    0.0%     0.0%                       10  Receive      0.000
     21   0.0%    0.0%     0.0%                       10  Receive      0.004
     22   0.0%    0.0%     0.0%                       10  Receive      0.000
PID/TID   5Sec    1Min     5Min Process             Prio  STATE        CPU
8215      0.0%    0.0%     0.0% kosh.proc                              0.044
      1   0.0%    0.0%     0.0%                       10  Reply        0.044
PID/TID   5Sec    1Min     5Min Process             Prio  STATE        CPU
12290     0.0%    0.0%     0.0% chkptd.proc                            0.080
      1   0.0%    0.0%     0.0%                       10  Receive      0.080
      2   0.0%    0.0%     0.0%                       10  Receive      0.000
PID/TID   5Sec    1Min     5Min Process             Prio  STATE        CPU
12312     0.0%    0.0%     0.0% sysmgr.proc                            0.112
      1   0.0%    0.0%     0.0%                       10  Receive      0.112
      2   0.0%    0.0%     0.0%                       10  Sigwaitin    0.000
PID/TID   5Sec    1Min     5Min Process             Prio  STATE        CPU
12316     0.0%    0.0%     0.0% installer.proc                         0.072
      1   0.0%    0.0%     0.0%                       10  Receive      0.000
      3   0.0%    0.0%     0.0%                       10  Nanosleep    0.000
      4   0.0%    0.0%     0.0%                       10  Sigwaitin    0.000
      6   0.0%    0.0%     0.0%                       10  Receive      0.000
Process sbin/ios-base, type IOS, PID = 12317
CPU utilization for five seconds: 12%/9%; one minute: 13%; five minutes: 10%
Task  Runtime(ms)  Invoked  uSecs    5Sec   1Min   5Min TTY Task Name
   1         219     1503    145   0.00%  0.00%  0.00%   0 Hot Service Task
   2       23680    42384    558   2.39%  6.72%  4.81%   0 Service Task
   3        6104    11902    512   3.51%  1.99%  1.23%   0 Service Task
   4        1720     5761    298   1.91%  0.90%  0.39%   0 Service Task
```

```
  5           0         5       0   0.00%  0.00%  0.00%   0 Chunk Manager
  6           0         1       0   0.00%  0.00%  0.00%   0 Connection Mgr
  7           4       106      37   0.00%  0.00%  0.00%   0 Load Meter
  8        6240      7376     845   0.23%  0.15%  0.55%   0 Exec
  9         379        62    6112   0.00%  0.07%  0.04%   0 Check heaps
 10           0         1       0   0.00%  0.00%  0.00%   0 Pool Manager
 11           3         2    1500   0.00%  0.00%  0.00%   0 Timers
 12           0         1       0   0.00%  0.00%  0.00%   0 AAA_SERVER_DEADT
 13           0         2       0   0.00%  0.00%  0.00%   0 AAA high-capacit
 14         307       517     593   0.00%  0.05%  0.03%   0 EnvMon
 15           0         1       0   0.00%  0.00%  0.00%   0 OIR Handler
 16         283        58    4879   0.00%  0.04%  0.02%   0 ARP Input
 17           0         2       0   0.00%  0.00%  0.00%   0 Serial Backgroun
 18           0        81       0   0.00%  0.00%  0.00%   0 ALARM_TRIGGER_SC
 19           0         2       0   0.00%  0.00%  0.00%   0 DDR Timers
 20           0         2       0   0.00%  0.00%  0.00%   0 Dialer event
 21           4         2    2000   0.00%  0.00%  0.00%   0 Entity MIB API
 22           0        54       0   0.00%  0.00%  0.00%   0 Compute SRP rate
 23           0         9       0   0.00%  0.00%  0.00%   0 IPC Dynamic Cach
 24           0         1       0   0.00%  0.00%  0.00%   0 IPC Zone Manager
 25           0         1       0   0.00%  0.00%  0.00%   0 IPC Punt Process
 26           4       513       7   0.00%  0.00%  0.00%   0 IPC Periodic Tim
 27          11       513      21   0.00%  0.00%  0.00%   0 IPC Deferred Por
 28           0         1       0   0.00%  0.00%  0.00%   0 IPC Seat Manager
 29          83      1464      56   0.00%  0.00%  0.00%   0 EEM ED Syslog
.
.
.
```

Table 146 describes the significant fields shown in the display.

Table 146 show processes cpu detailed (Software Modularity) Field Descriptions

Field	Description
Total CPU utilization for five seconds	Total CPU utilization for the last 5 seconds. The second number indicates the percent of CPU time spent at the interrupt level.
1 minute	CPU utilization for the last minute.
5 minutes	CPU utilization for the last 5 minutes.
PID/TID	Process ID or task ID.
5Sec	Percentage of CPU time spent at the interrupt level for this process during the last five seconds.
1Min	Percentage of CPU time spent at the interrupt level for this process during the last minute.
5Min	Percentage of CPU time spent at the interrupt level for this process during the last five minutes.
Process	Process name.
Prio	Priority level of the process.
STATE	Current state of the process.
CPU	CPU utilization of the process in minutes and seconds.
type	Type of process; can be either IOS or POSIX.
Task	Task sequence number.

Table 146 show processes cpu detailed (Software Modularity) Field Descriptions (continued)

Field	Description
Runtime(ms)	CPU time that the process has used (in milliseconds).
Invoked	Number of times that the process has been invoked.
uSecs	Microseconds of CPU time for each process invocation.
5Sec	CPU utilization by task in the last 5 seconds.
1Min	CPU utilization by task in the last minute.
5Min	CPU utilization by task in the last 5 minutes.
TTY	Terminal that controls the process.
Task Name	Task name.

Related Commands

Command	Description
show processes	Displays information about active processes.
show processes memory	Displays the amount of system memory used per system process.

show processes interrupt mask buffer

To display information in the interrupt mask buffer, use the **show processes interrupt mask buffer** command in privileged EXEC mode.

show processes interrupt mask buffer

buffer	Displays stack trace and information about the places where interrupts have been masked more than the configured threshold time.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(2)T	This command was introduced.

Examples

The following is sample output from the **show processes interrupt mask buffer** command. The output displays stack trace and relevant information about the places where interrupts have been masked more than the configured threshold time:

```
Router# show processes interrupt mask buffer

Allowable interrupt mask time : 50 micro seconds
 Allowable number of half pipeline ticks for this platform : 5000
 Buffer Size            : 50 entries
 NETS Disable       : 3
 TTY  Disable        : 4
 ALL  Disable        : 4
 emt_call          : 11
 disable_interrupts : 12

  PID  Level  Time Spent(us)  Count  Stack Trace

    3   11      360            1       0x608C3C14 0x60894748 0x6089437C 0x608943AC
0x609CEC88 0x609CECFC 0x609C8524
    3   11      322            1       0x608C3C14 0x608943BC 0x609CEC88 0x609CECFC
0x609C8524 0x60867C28 0x607C70B0
    3   4       147            1       0x6078AED4 0x6078BE94 0x6078C750 0x6078C8D4
0x607E27F0 0x607E27C0 0x607E50B0
```

Related Commands

Command	Description
clear processes interrupt mask detail	Clears the interrupt masked details for all processes and stack traces which have been dumped into the interrupt mask buffer.
scheduler interrupt mask profile	Enables or disables interrupt mask profiling for all processes running on the system.
scheduler interrupt mask size	Configures the maximum number of entries that can exist in the interrupt mask buffer.

Command	Description
scheduler interrupt mask time	Configures the maximum amount of time a process can run with interrupts masked.
show processes interrupt mask detail	Displays interrupt masked details for the specified process or all processes in the system.

show processes interrupt mask detail

To display information about interrupt masking, use the **show processes interrupt mask detail** command in privileged EXEC mode.

show processes interrupt mask detail [*pid]*

Syntax Description

detail	Displays information about the total amount of time and the number of times interrupts have been masked by all processes.
pid	(Optional) An integer that specifies the process id for which to display the total accumulated time and the number of times interrupts have been masked.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(2)T	This command was introduced.

Examples

The following is sample output from the **show processes interrupt mask detail** command. the output displays information about the total amount of time and number of times interrupts have been masked by all processes:

```
Router# show processes interrupt mask detail

PID  Time Spent(us)    Count  Process Name

2       6388           1791   Load Meter
3       7957           16831  Exec
5       6710           2813   Check heaps
```

The following is sample output from the show processes interrupt mask detail command with the process ID specified. The output displays the total time (accumulative), number of times interrupts have been masked by a specific process:

```
Router# show processes interrupt mask detail 2

Process ID      : 2
 Process Name : Load Meter
 Total Interrupt Masked Time  : 6586 (us)
 Total Interrupt Masked Count : 1845
```

Related Commands

Command	Description
clear processes interrupt mask detail	Clears the interrupt masked details for all processes and stack traces which have been dumped into the interrupt mask buffer.
scheduler interrupt mask profile	Enables or disables interrupt mask profiling for all processes running on the system.

Command	Description
scheduler interrupt mask size	Configures the maximum number of entries that can exist in the interrupt mask buffer.
scheduler interrupt mask time	Configures the maximum amount of time a process can run with interrupts masked.
show processes interrupt mask buffer	Displays the information stored in the interrupt mask buffer.

show processes memory

To show the amount of memory used by each system process in Cisco IOS or Cisco IOS Software Modularity images, use the **show processes memory** command in privileged EXEC mode.

Cisco IOS Software

show processes memory [*process-id* | **sorted** [**allocated** | **getbufs** | **holding**]]

Cisco IOS Software Modularity

show processes memory [**detailed** [*process-name*[**:***instance-id*] | *process-id* [**taskid** *task-id*]]] [**alloc-summary** | **sorted** {**start** | **size** | **caller**}]

Syntax Description

Cisco IOS Software Syntax	
process-id	(Optional) Process ID (PID) of a specific process. When you specify a process ID, only details for the specified process will be shown.
sorted	(Optional) Displays memory data sorted by the "Allocated, " "Getbufs," or "Holding" column. If the **sorted** keyword is used by itself, data is sorted by the "Holding" column by default.
allocated	(Optional) Displays memory data sorted by the "Allocated" column.
getbufs	(Optional) Displays memory data sorted by the "Getbufs" (Get Buffers) column.
holding	(Optional) Displays memory data sorted by the "Holding" column. This is the default.
Cisco IOS Software Modularity Syntax	
detailed	(Optional) Displays detailed information about iosproc processes.
process-name	(Optional) Process name.
:*instance-id*	(Optional) Instance name of either the Cisco IOS task or POSIX process. The colon is required.
process-id	(Optional) Process identifier.
taskid	(Optional) Displays detailed memory usage of a Cisco IOS task within a process.
task-id	(Optional) Cisco IOS task identifier.
alloc-summary	(Optional) Displays summary POSIX process memory usage per allocator.
sorted	(Optional) Displays POSIX process memory usage sorted by start address, size, or the PC that called the process.
start	(Optional) Displays POSIX process memory usage sorted by start address of the process.
size	(Optional) Displays POSIX process memory usage sorted by size of the process.
caller	(Optional) Displays POSIX process memory usage sorted by the PC that called the process.

Command Default

Cisco IOS Software

The memory used by all types of system processes is displayed.

Cisco IOS Software Modularity

The system memory followed by a one-line summary of memory information about each Software Modularity process is displayed.

Command Modes

Privileged Exec (#)

Command History

Release	Modification
10.0	This command was introduced.
12.0(23)S	The **sorted** [**allocated** | **getbufs** | **holding**] syntax was introduced. [CSCdy22469]
12.2(13)	The **sorted** [**allocated** | **getbufs** | **holding**] syntax was integrated in Cisco IOS Release 12.2(13).
12.2(13)S	The **sorted** [**allocated** | **getbufs** | **holding**] syntax was integrated in Cisco IOS Release 12.2(13)S.
12.2(13)T	The **sorted** [**allocated** | **getbufs** | **holding**] syntax was integrated in Cisco IOS Release 12.2(13)T.
12.0(28)S	The output of the header line was updated to support the Memory Thresholding feature.
12.2(22)S	The output of the header line was updated to support the Memory Thresholding feature.
12.3(7)T	The output of the header line was updated to support the Memory Thresholding feature.
12.0(30)S	The summary information (first lines of output) for this command was separated out and labeled by memory pool type (Total Process Memory, Total I/O Memory, and so on). This enhancement also corrected a total process memory mismatch error (mismatch between **show processes memory**, **show processes memory sorted**, and **show memory** and its variants).
12.2(28)S	The summary information (first lines of output) for this command was separated out and labeled by memory pool type (Total Process Memory, Total I/O Memory, and so on). This enhancement also corrected a total process memory mismatch error (mismatch between **show processes memory**, **show processes memory sorted**, and **show memory** and its variants).
12.3(11)T	The summary information (first lines of output) for this command was separated out and labeled by memory pool type (Total Process Memory, Total I/O Memory, and so on). This enhancement also corrected a total process memory mismatch error (mismatch between **show processes memory**, **show processes memory sorted**, and **show memory** and its variants).
12.2(18)SXF4	The syntax was modified to support Cisco IOS Software Modularity images.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **show processes memory** command (and **show processes memory sorted** command) displays a summary of total, used, and free memory, followed by a list of processes and their memory impact.

If the standard **show processes memory** *process-id* command is used, processes are sorted by their process ID (PID). If the **show processes memory sorted** command is used, the default sorting is by the Holding value.

Output Prior to Releases 12.3(7)T, 12.2(22)S, and 12.0(28)S

The first line (header line) of the **show processes memory** [**sorted**] command listed Total memory, Used memory, and Free memory values.

Output in Releases 12.3(7)T, 12.3(8)T, 12.2(22)S Through 12.2(27)S2, 12.0(28)S, and 12.0(29)S

In Releases 12.3(7)T, 12.2(22)S, and 12.0(28)S, the "Memory Thresholding" feature was introduced. This feature affected the header line and the "Holding" column of the **show processes memory** command as follows.

The value for "Total" in the **show processes memory** command and the values listed in the "Holding" column, showed the total (cumulative) value for the processor memory pools and the alternate memory pool* (typically, the I/O memory pool). However, the **show processes memory sorted** version of this command, and other commands, such as the **show memory summary** command, did not include the alternate memory pool in the totals (in other words, these commands showed the total value for the Processor memory pool only). This caused an observed mismatch of memory totals between commands.

If you are using these releases, use the output of **show memory summary** command to determine the individual amounts of Total and Free memory for the Processor memory pool and the I/O memory pool.

Output in Releases 12.3(11)T, 12.2(28)S, 12.0(30)S and Later Releases

Beginning in Releases 12.3(11)T, 12.2(28)S, and 12.0(30)S, the summary information (first output lines) for the **show processes memory** command is separated by memory pool. For example, there are now individual lines for "Total Process Memory," "Total I/O Memory," and "Total PCI Memory." If using these releases or later releases, your Total Process Memory should match the total process memory shown for other commands, such as the **show memory summary** command.

About Alternate Memory Pools

An "alternate memory pool" is a memory pool which can be used as an alternative to allocate memory when the target (main) memory pool has been filled. For example, many platforms have a memory type called "Fast" that is limited to a small size (because the memory media used for Fast memory is expensive). To prevent memory allocations from failing once the available Fast memory has been used up, the normal Processor memory can be configured as an alternative memory pool for the Fast memory pool.

Cisco IOS Software Modularity

Use the **show processes memory** command without any arguments and keywords to display the system memory followed by a one-line summary of memory information about each modular Cisco IOS process. Use the **detailed** keyword with this command to display detailed memory information about all processes. Other arguments and keywords are used to display Cisco IOS Software Modularity process memory information for a specified process name or process ID.

Examples

Example output varies between Cisco IOS software releases. To view the appropriate output, choose one of the following sections:

- show processes memory Command for Releases Prior to 12.3(7)T, 12.2(22)S, and 12.0(28)S

- show processes memory Command for Releases Prior to 12.3(11)T, 12.2(28)S, and 12.0(30)S
- show processes memory Command for Cisco IOS Software Modularity

show processes memory Command for Releases Prior to 12.3(7)T, 12.2(22)S, and 12.0(28)S

The following is sample output from the **show processes memory** command:

```
Router# show processes memory

Processor Pool Total:   25954228 Used:    8368640 Free:   17585588

 PID TTY  Allocated      Freed    Holding    Getbufs    Retbufs Process
   0   0    8629528     689900    6751716          0          0 *Init*
   0   0      24048      12928      24048          0          0 *Sched*
   0   0        260        328         68     350080          0 *Dead*
   1   0          0          0      12928          0          0 Chunk Manager
   2   0        192        192       6928          0          0 Load Meter
   3   0     214664        304     227288          0          0 Exec
   4   0          0          0      12928          0          0 Check heaps
   5   0          0          0      12928          0          0 Pool Manager
   6   0        192        192      12928          0          0 Timers
   7   0        192        192      12928          0          0 Serial Backgroun
   8   0        192        192      12928          0          0 AAA high-capacit
   9   0          0          0      24928          0          0 Policy Manager
  10   0          0          0      12928          0          0 ARP Input
  11   0        192        192      12928          0          0 DDR Timers
  12   0          0          0      12928          0          0 Entity MIB API
  13   0          0          0      12928          0          0 MPLS HC Counter
  14   0          0          0      12928          0          0 SERIAL A'detect
.
.
.
  78   0          0          0      12992          0          0 DHCPD Timer
  79   0        160          0      13088          0          0 DHCPD Database
                                  8329440 Total
```

Table 147 describes the significant fields shown in the display.

Table 147 show processes memory Field Descriptions

Field	Description
Processor Pool Total	Total amount of memory, in kilobytes, held for the Processor memory pool.
Used	Total amount of used memory, in kilobytes, in the Processor memory pool.
Free	Total amount of free memory, in kilobytes, in the Processor memory pool.
PID	Process ID.
TTY	Terminal that controls the process.
Allocated	Bytes of memory allocated by the process.
Freed	Bytes of memory freed by the process, regardless of who originally allocated it.
Holding	Amount of memory, in kilobytes, currently allocated to the process.
Getbufs	Number of times the process has requested a packet buffer.
Retbufs	Number of times the process has relinquished a packet buffer.
Process	Process name.
Init	System initialization process.

Table 147 show processes memory Field Descriptions (continued)

Field	Description
Sched	The scheduler process.
Dead	Processes as a group that are now dead.
<value> Total	Total amount of memory, in kilobytes, held by all processes (sum of the "Holding" column).

The following is sample output from the **show processes memory** command when the **sorted** keyword is used. In this case, the output is sorted by the "Holding" column, from largest to smallest.

```
Router# show processes memory sorted

Processor Pool Total:   25954228 Used:    8371280 Free:   17582948

 PID TTY  Allocated      Freed    Holding    Getbufs    Retbufs Process
   0   0    8629528     689900    6751716          0          0 *Init*
   3   0     217304        304     229928          0          0 Exec
  53   0     109248        192      96064          0          0 DHCPD Receive
  56   0          0          0      32928          0          0 COPS
  19   0      39048          0      25192          0          0 Net Background
  42   0          0          0      24960          0          0 L2X Data Daemon
  58   0        192        192      24928          0          0 X.25 Background
  43   0        192        192      24928          0          0 PPP IP Route
  49   0          0          0      24928          0          0 TCP Protocols
  48   0          0          0      24928          0          0 TCP Timer
  17   0        192        192      24928          0          0 XML Proxy Client
   9   0          0          0      24928          0          0 Policy Manager
  40   0          0          0      24928          0          0 L2X SSS manager
  29   0          0          0      24928          0          0 IP Input
  44   0        192        192      24928          0          0 PPP IPCP
  32   0        192        192      24928          0          0 PPP Hooks
  34   0          0          0      24928          0          0 SSS Manager
  41   0        192        192      24928          0          0 L2TP mgmt daemon
  16   0        192        192      24928          0          0 Dialer event
  35   0          0          0      24928          0          0 SSS Test Client
 --More--
```

The following is sample output from the **show processes memory** command when a Process ID (*process-id*) is specified:

```
Router# show processes memory 1

Process ID: 1
Process Name: Chunk Manager
Total Memory Held: 8428 bytes

Processor memory holding = 8428 bytes
pc = 0x60790654, size =      6044, count =    1
pc = 0x607A5084, size =      1544, count =    1
pc = 0x6076DBC4, size =       652, count =    1
pc = 0x6076FF18, size =       188, count =    1

I/O memory holding = 0 bytes

Router# show processes memory 2

Process ID: 2
Process Name: Load Meter
Total Memory Held: 3884 bytes
```

```
Processor memory holding = 3884 bytes
pc = 0x60790654, size =      3044, count =    1
pc = 0x6076DBC4, size =       652, count =    1
pc = 0x6076FF18, size =       188, count =    1

I/O memory holding = 0 bytes
```

show processes memory Command for Releases Prior to 12.3(11)T, 12.2(28)S, and 12.0(30)S

The following example shows the output of the **show processes memory** command before the changes to the summary information were made. Note that the "Total:" in the **show processes summary** command indicates total memory for all memory pools; in this example, the **show processes memory** Total of 35423840 can be obtained by adding the Processor and I/O totals shown in the output of the **show memory summary** command. Note also that the **show processes memory sorted** command lists the Total Processor Memory (matches the **show memory summary** Processor Total, but the **show processes memory** command (without the **sorted** keyword) lists the Total for all memory pools (Processor plus I/O memory).

```
Router# show version | include IOS

Cisco IOS Software, 3600 Software (C3660-BIN-M), Version 12.3(9)

Router# show memory summary

               Head    Total(b)     Used(b)     Free(b)   Lowest(b)  Largest(b)
Processor   61E379A0    27035232     8089056    18946176    17964108    17963664
      I/O    3800000     8388608     2815088     5573520     5561520     5573472

.
.
.

Router# show processes memory

Total: 35423840, Used: 10904192, Free: 24519648
 PID TTY  Allocated      Freed    Holding    Getbufs    Retbufs Process
   0   0   14548868    3004980    9946092          0          0 *Init*
   0   0      12732     567448      12732          0          0 *Sched*
.
.
.

Router# show processes memory sorted

Total: 27035232, Used: 8089188, Free: 18946044
 PID TTY  Allocated      Freed    Holding    Getbufs    Retbufs Process
   0   0   14548868    3004980    9946092          0          0 *Init*
  64   0      76436       3084      74768          0          0 CEF process
.
.
.

Router# show version | include IOS

Cisco IOS Software, 3600 Software (c3660-p-mz), Version 12.0(29)S,

Router# show memory summary

               Head      Total(b)     Used(b)     Free(b)   Lowest(b)  Largest(b)
Processor    126CB10    49,331,668     6454676    42876992    42642208    42490796

Router# show processes memory
```

```
Total: 50,994,868, Used: 6220092, Free: 44774776
 PID TTY  Allocated      Freed    Holding    Getbufs    Retbufs Process
   0   0    6796228     627336    5325956          0          0 *Init*
   0   0        200      29792        200          0          0 *Sched*
   0   0        192        744          0     349000          0 *Dead*
   1   0          0          0      12896          0          0 Chunk Manager
.
.

Router# show processes memory sorted

Total: 50,994,868, Used: 6222644, Free: 44772224
 PID TTY  Allocated      Freed    Holding    Getbufs    Retbufs Process
   0   0    6796228     627336    5325956          0          0 *Init*
  13   0      39056          0      25264          0          0 Net Background
  48   0          0          0      24896          0          0 L2X SSS manager
  18   0          0          0      24896          0          0 IP Input
.
.
```

show processes memory Command for Cisco IOS Software Modularity

The following is sample output from the **show processes memory** command when a Cisco IOS Software Modularity image is running:

```
Router# show processes memory

System Memory : 262144K total, 113672K used, 148472K free

PID       Text    Data   Stack  Dynamic     Total Process
1            0       0      12        0        12 kernel
12290       52       8      28      196       284 dumper.proc
3           12       8       8      144       172 devc-pty
4          132       8       8       32       180 devc-ser2681
6           16      12      24       48       100 pipe
8199        12      12       8       48        80 mqueue
8200        16      24      48      452       540 fsdev.proc
8201        52      20       8       96       176 flashfs_hes_slot1.proc
8202        52      20       8       80       160 flashfs_hes_bootflash.proc
8203        52      20       8      128       208 flashfs_hes_slot0.proc
8204        20      68      12      164       264 dfs_disk1.proc
8205        20      68      12      164       264 dfs_disk0.proc
8206        36       4       8      144       192 ldcache.proc
8207        32       8      20      164       224 syslogd.proc
8208        24       4      28      464       520 name_svr.proc
8209       124     104      28      344       600 wdsysmon.proc
8210       100     144      52      328       624 sysmgr.proc
8211        12       4      28       64       108 kosh.proc
12308      100     144      16      144       404 sysmgr.proc
12309       24       4      12      112       152 chkptd.proc
12310       12       4       8       96       120 syslog_dev.proc
12311       44       4      24      248       320 fh_metric_dir.proc
12312       36       4      24      216       280 fh_fd_snmp.proc
12313       36       4      24      216       280 fh_fd_intf.proc
12314       32       4      24      216       276 fh_fd_timer.proc
12315       40       4      24      216       284 fh_fd_ioswd.proc
12316       28       4      24      200       256 fh_fd_counter.proc
12317       80      20      44      368       512 fh_server.proc
12326      140      40      28      280       488 tcp.proc
12327       48       4      24      256       332 udp.proc
12328        4       4      28     4660      4696 iprouting.iosproc
12329        4       4      36      600       644 cdp2.iosproc
```

Table 148 describes the significant fields shown in the display.

Table 148 show processes memory (Software Modularity) Field Descriptions

Field	Description
total	Total amount of memory, in kilobytes, on the device.
used	Amount of memory, in kilobytes, used in the system.
free	Amount of free memory, in kilobytes, available in the system.
PID	Process ID.
Text	Amount of memory, in kilobytes, used by the text segment of the specified process.
Data	Amount of memory, in kilobytes, used by the data segment of the specified process.
Stack	Amount of memory, in kilobytes, used by the stack segment of the specified process.
Dynamic	Amount of memory, in kilobytes, used by the dynamic segment of the specified process.
Total	Total amount of memory, in kilobytes, used by the specified process.
Process	Process name.

The following is sample output from the **show processes memory** command with details about the memory of the process named cdp2.iosproc:

```
Router# show processes memory detailed cdp2.iosproc

System Memory : 262144K total, 113460K used, 148684K free

Process sbin/cdp2.iosproc, type IOS, PID = 12329
    640K total, 4K text, 4K data, 32K stack, 600K dynamic

Memory Summary for TaskID = 1
Holding = 10032

        PC       Size  Count
0x7322FC74       9192      1
0x73236538        640      1
0x73231E8C        200      1
```

The following is sample output from the **show processes memory** command with details about the memory of process 12322 and the task with the ID of 1:

```
Router# show processes memory detailed 12322 taskid 1

System Memory : 262144K total, 113456K used, 148688K free

Process sbin/c7200-p-blob, type IOS, PID = 12322
    16568K total, 16K text, 8K data, 64K stack, 16480K dynamic

Memory Summary for TaskID = 1
Holding = 10248

        PC       Size  Count
0x7322FC74       9192      1
0x73236538        640      1
0x73231E8C        256      1
```

```
0x74175060        160      1
```

Table 149 describes the significant fields shown in the display that are different from Table 148 on page 947.

Table 149 show processes memory detailed process-id taskid Field Descriptions

Field	Description
type	Type of process: POSIX or Cisco IOS.
Memory summary for TaskID	Task ID.
Holding	Amount of memory, in bytes, currently held by the task.
PC	Caller PC of the task.
Size	Amount of memory, in bytes, used by this task.
Count	Number of times that task has been called.

The following is sample output from the **show processes memory** command with details about the memory of POSIX process ID 234567 with summary process memory usage per allocator:

```
Router# show processes memory detailed 234567 alloc-summary

System Memory : 262144K total, 113672K used, 148472K free

Process sbin/sysmgr.proc, type POSIX, PID = 12308
    404K total, 100K text, 144K data, 16K stack, 144K dynamic
    81920 heapsize, 68620 allocated, 8896 free

Allocated Blocks
Address    Usize      Size       Caller
0x0806C358 0x00000478 0x000004D0 0x721C7290
0x0806D1E0 0x00000128 0x00000130 0x72B90248
0x0806D318 0x00003678 0x000036E0 0x72B9820C
0x0806D700 0x000002A0 0x000002C0 0x72B8EB58
0x0806D770 0x00000058 0x00000060 0x72BA5488
0x0806D7D8 0x000000A0 0x000000B0 0x72B8D228
0x0806D8A8 0x00000200 0x00000208 0x721A728C
0x0806FF78 0x00000068 0x00000070 0x72BA78EC
0x08071438 0x0000005C 0x00000068 0x72B908A8
0x08071508 0x0000010E 0x00000120 0x72BA7AFC
0x08072840 0x000000A8 0x000000C0 0x7270A060
0x08072910 0x0000010C 0x00000118 0x7273A898
0x08072A30 0x000000E4 0x000000F0 0x72749074
0x08072B28 0x000000B0 0x000000B8 0x7276E87C
0x08072BE8 0x0000006C 0x00000078 0x727367A4
0x08072C68 0x000000B8 0x000000C0 0x7271E2A4
0x08072D30 0x000000D0 0x000000D8 0x7273834C
0x08072E10 0x00000250 0x00000258 0x72718A70
0x08073070 0x000002F4 0x00000300 0x72726484
0x08073378 0x000006A8 0x000006B0 0x73EA4DC4
0x08073A30 0x00000060 0x00000068 0x7352A9F8
0x08073B38 0x00000068 0x00000070 0x72B92008
0x08073BB0 0x00000058 0x00000060 0x72B9201C
0x08073EB8 0x00002FB4 0x000031C0 0x08026FEC
0x08074028 0x000020B8 0x000020C0 0x72709C9C
0x08077400 0x000000A0 0x000000A8 0x721DED94
0x08078028 0x000022B8 0x000022C0 0x727446B8
0x0807C028 0x00002320 0x00002328 0x72B907C4

Free Blocks
```

```
Address    Size
0x0806FFF0 0x00000010
0x080714A8 0x00000058
0x08073E18 0x00000098
0x08073FE8 0x00000018
0x08076FA0 0x00000328
0x080774B0 0x00000B50
0x0807FFB8 0x00000048
0x08080028 0x00003FD8
```

Table 150 describes the significant fields shown in the display.

Table 150 show processes memory detailed alloc-summary Field Descriptions

Field	Description
heapsize	Size of the process heap, in kilobytes.
allocated	Amount of memory, in kilobytes, allocated from the heap.
free	Amount of free memory, in kilobytes, in the heap for the specified process.
Address	Block address, in hexadecimal.
Usize	Block size, in hexadecimal, without the trailer header.
Size	Block size, in hexadecimal.
Caller	Caller PC of the allocator of this block.

Related Commands

Command	Description
show memory	Displays statistics about memory, including memory-free pool statistics.
show processes	Displays information about the active processes.

show protocols

To display the configured protocols, use the **show protocols** command in user EXEC or privileged EXEC mode.

show protocols [*interface-name interface-number*]

Syntax Description

interface-name (Optional) The type of interfaces. It can be one of the following values:

- **ATM**—ATM interface
- **Async**—Async interface
- **Auto-Template**—Auto-Template interface
- **BVI**—Bridge-Group Virtual Interface
- **CDMA-Ix**—CDMA Ix interface
- **Container**—Container interface
- **CTunnel**—CTunnel interface
- **Dialer**—Dialer interface
- **Ethernet**—Institute of Electrical Electronics Engineers (IEEE) 802.3
- **FastEthernet**—FastEthernet IEEE 802.3
- **EsconPhy**—ESCON interface
- **fcpa**—Fiber Channel
- **Filter**—Filter interface
- **multiservice**—Multiservice interface
- **Pos-channel**—POS Channel interfaces
- **SBC**—Session Border Controller
- **SYSCLOCK**—Telecom-Bus Clock Controller
- **Tunnel**—Tunnel interface
- **Vif**—PGM Multicast Host interface
- **Virtual-Access**—Virtual access interface
- **Virtual-PPP**—Virtual PPP interface
- **Virtual-Template**—Virtual template interface
- **Virtual-TokenRing**—Virtual TokenRing
- **Vlan**—Catalyst VLANs
- **vmi**—Virtual Multipoint Interface

	• **voaBypassIn**—VOA-Bypass-In interface • **voaBypassOut**—VOA-Bypass-Out interface • **voaFilterIn**—VOA-Filter-In interface • **voaFilterOut**—VOA-Filter-Out interface • **voaIn**—VOA-In interface • **voaOut**—VOA-Out interface
interface-number	(Optional) Interface number.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
12.0(3)T	The command was integrated in a release earlier than Cisco IOS Release 12.0(3)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

The **show protocols** command shows the global and interface-specific status of any configured Level 3 protocol.

Examples

The following is sample output from the **show protocols** command. The field names are self-explanatory.

```
Router# show protocols

Global values:
  Internet Protocol routing is enabled
FastEthernet0/0 is up, line protocol is up
  Internet address is 10.4.9.14/24
vmi1 is down, line protocol is down
FastEthernet0/1 is up, line protocol is up
  Internet address is 10.4.8.14/24
ATM2/0 is administratively down, line protocol is down
ATM2/0.1 is administratively down, line protocol is down
ATM2/0.2 is administratively down, line protocol is down
ATM2/0.200 is administratively down, line protocol is down
Ethernet3/0 is administratively down, line protocol is down
Ethernet3/0.1 is administratively down, line protocol is down
Ethernet3/1 is administratively down, line protocol is down
Ethernet3/2 is administratively down, line protocol is down
Ethernet3/3 is administratively down, line protocol is down
ATM6/0 is administratively down, line protocol is down
SSLVPN-VIF0 is up, line protocol is up
  Interface is unnumbered. Using address of SSLVPN-VIF0 (0.0.0.0)
Virtual-Access1 is down, line protocol is down
```

```
Virtual-Template1 is down, line protocol is down
Virtual-Access2 is up, line protocol is up
Port-channel5 is down, line protocol is down
Port-channel5.1 is down, line protocol is down
Port-channel15 is down, line protocol is down
Virtual-Template100 is down, line protocol is down
  Interface is unnumbered. Using address of vmi1 (0.0.0.0)
Dialer3 is up, line protocol is up
```

For more information on the parameters or protocols shown in this sample output, see the *Cisco IOS IP Addressing Services Configuration Guide* and the *Cisco IOS IP Routing Protocols Configuration Guide*.

show region

To display valid memory regions (memory mapping) in use on your system, use the **show region** command in privileged EXEC mode.

show region [**address** *hex-address*]

Syntax Description

address *hex-address*	(Optional) If a hexadecimal address is specified, this command will search the region list for the specified address.

Command Default

All memory regions are displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(13)	This command was introduced.
12.0(23)S	This command was integrated into Cisco IOS Release 12.0(23)S.
12.2(25)S	This command was modified. The command output was updated to display information about free regions.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRE	This command was modified. The output was updated to display heap region memory size in chunks of 16 MB.

Usage Guidelines

This command can be useful for troubleshooting system bus errors. The system encounters a bus error when the processor tries to access a memory location that either does not exist (a software error) or does not respond properly (a hardware problem).

To use the **show region** command to troubleshoot a bus error, note the memory location address from the **show version** command, the **show context** command, or from the system error message that alerted you to the bus error. The **show region** command can then be used to determine if that address is a valid memory location.

For example, in the output of the **show version** command after a system restart caused by a bus error, you will see output similar to “System restarted by bus error at PC 0x30EE546, address 0xBB4C4.” In this case, the memory location that the router tried to access is 0xBB4C4. If the address falls within one of the ranges in the **show region** output, it means that the router was accessing a valid memory address, but the hardware corresponding to that address is not responding properly. This indicates a hardware problem.

If the address reported by the bus error does not fall within the ranges displayed in the **show region** output, this error means that the router was trying to access an address that is not valid, which indicates that it is a Cisco IOS software problem.

More detailed information is available on Cisco.com in Tech Note #7949, *Troubleshooting Bus Error Crashes*.

Transient Memory Allocation

The Transient Memory Allocation feature is enabled on platforms like the Cisco 7200 series router and the Cisco 10000 series router. This feature allocates all transient memory in a separate memory address space (separate region), so that there is no interleaving of static and transient memory blocks. Hence, the output of the **show region** command will have heap region memory size in chunks of 16 MB.

Examples

The following is sample output from the **show region** command:

```
Router# show region

Region Manager:

      Start          End      Size(b)  Class  Media  Name
 0x0C000000  0x0FFFFFFF    67108864  Iomem  R/W    iomem
 0x20000000  0x2FFFFFFF   268435456  Local  R/W    extended_2
 0x50000000  0x5FFFFFFF   268435456  Local  R/W    extended_1
 0x60000000  0x7BFFFFFF   469762048  Local  R/W    main
 0x600090F8  0x6200A807    33560336  IText  R/O    main:text
 0x62014C50  0x62F5B1EF    16016800  IData  R/W    main:data
 0x62F5B1F0  0x6333500F     4038176  IBss   R/W    main:bss
 0x63335010  0x6359A0D3     2511044  Local  R/W    main:saved-data
 0x6359A0D4  0x6459A0D3    16777216  Local  R/W    main:heap
 0x7B000000  0x7BFFFFFF    16777216  Local  R/W    main:heap
 0x80000000  0x8BFFFFFF   201326592  Local  R/W    main:(main_k0)
 0xA0000000  0xABFFFFFF   201326592  Local  R/W    main:(main_k1)

Free Region Manager:

      Start          End      Size(b)  Class  Media  Name
 0x6459A12C  0x7AFFFFA7   380001916  Local  R/W    heap
```

Table 151 describes the significant fields shown in the display.

Table 151 show region Field Descriptions

Field	Description
Start	Start address of the memory block.
End	End address of the memory block.
Size(b)	Size of the memory block.
Class	Class of the memory.
Media	Type of the region media. Read-only (R/O), read-write (R/W), and so on.
Name	Name of the region.
Iomem	Input/output (I/O) memory. It is a type of packet memory.
Local	Local memory.
IText	Image text memory.
IData	Image data memory.
IBss	Image blind source separation (BSS) memory.
R/W	Read and write memory.
R/O	Read-only memory.

Related Commands

Command	Description
show context	Displays information stored in NVRAM when an unexpected system reload (system exception) occurs.
show memory	Displays detailed memory statistics for the system.
show version	Shows hardware and software information for the system.

show registry

To display the function registry information when Cisco IOS or Cisco IOS Software Modularity images are running, use the **show registry** command in user EXEC or privileged EXEC mode.

Cisco IOS Software

show registry [*registry-name* [*registry-number*]] [**brief** | **statistics**]

Cisco IOS Software Modularity

show registry [**name** [*registry-name* [*registry-number*]]] [**brief** [**name** [*registry-name* [*registry-number*]]] | **preemptions** | **rpcp status** | **statistics** [**brief**] [**name** [*registry-name* [*registry-number*]]] [**remote**]] [**process** {*process-name* | *process-id*}]

Syntax Description

Cisco IOS Software Syntax	
registry-name	(Optional) Name of the registry to display.
registry-number	(Optional) Number of the registry to display.
brief	(Optional) Displays limited functions and services information.
statistics	(Optional) Displays function registry statistics.
Cisco IOS Software Modularity Syntax	
name	(Optional) Displays information about a specific registry.
registry-name	(Optional) Name of the registry to examine.
registry-number	(Optional) Number of the registry to examine.
brief	(Optional) Displays limited functions and services information.
preemptions	(Optional) Displays registry preemptions information.
rpcp status	(Optional) Displays status of remote procedure call (RPC) proxy.
statistics	(Optional) Displays function registry statistics.
remote	(Optional) Displays name server interactions and call statistics.
process	(Optional) Displays process-specific information.
process-name	(Optional) Process name.
process-id	(Optional) Process ID. Number in range from 1 to 4294967295.

Command Default

If no options are specified, registry information is displayed for all registries.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
11.1	This command was introduced.
12.2(18)SXF4	Keywords and arguments were added to support Software Modularity images and this command was integrated into Cisco IOS Release 12.2(18)SXF4.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

Example output varies between Cisco IOS software images and Cisco IOS Software Modularity software images. To view the appropriate output, choose one of the following sections:

- Cisco IOS Software
- Cisco IOS Software Modularity

Cisco IOS Software

The following is sample output from the **show registry** command using the **brief** keyword:

```
Router# show registry atm 3/0/0 brief

Registry objects: 1799  bytes: 213412

--
Registry 23: ATM Registry
  Service 23/0:
  Service 23/1:
  Service 23/2:
  Service 23/3:
  Service 23/4:
  Service 23/5:
  Service 23/6:
  Service 23/7:
  Service 23/8:
  Service 23/9:
  Service 23/10:
  Service 23/11:
  Service 23/12:
  Service 23/13:
  Service 23/14:
.
.
.
Registry 25: ATM routing Registry
  Service 25/0:
```

Table 152 describes the significant fields shown in the display.

Table 152 show registry brief (Cisco IOS) Field Descriptions

Field	Description
Registry objects	Number of objects in the registry.
bytes	Registry size, in bytes.
Registry	Displays the specified registry service number and type of registry service.

Cisco IOS Software Modularity

The following is partial sample output from the **show registry** command when running a software Modularity image:

```
Router# show registry

Registry information for ios-base:1:
=====================================================

----------------------------
AAA_ACCOUNTING :   11 services
                /    1 :  List    list[000]
                /    2 :  List    list[000]
                /    3 :  Case    size[020] list[000] default=0x7267C5D0  returnd
                /    4 :  Case    size[020] list[000] default=0x7267C5D0  returnd
                           16  0x72779400
                /    5 :  Case    size[020] list[000] default=0x7267C5D0  returnd
                /    6 :  Case    size[020] list[000] default=0x7267C5D0  returnd
                           16  0x7277915C
                /    7 :  Retval  size[020] list[000] default=0x7267C5E4  returno
                /    8 :  Retval  size[020] list[000] default=0x7267C5E4  returno
                /    9 :  Retval  size[020] list[000] default=0x7267C5E4  returno
                /   10 :  Stub    0x7267C5E4  return_zero
                /   11 :  Stub    0x76545BA0
AAA_ACCOUNTING :   11 services,   140 global bytes,   160 heap bytes
.
.
.
```

Table 153 describes the significant fields shown in the display.

Table 153 show registry (Software Modularity) Field Descriptions

Field	Description
Registry information	Displays the registry information by process name.
services	Number of services displayed.
global bytes	Number of bytes for the service,
heap bytes	Size of the service heap, in bytes,

show reload

To display the reload status on the router, use the **show reload** command in EXEC mode.

show reload

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can use the **show reload** command to display a pending software reload. To cancel the reload, use the **reload cancel** privileged EXEC command.

Examples

The following sample output from the **show reload** command shows that a reload is schedule for 12:00 a.m. (midnight) on Saturday, April 20:

```
Router# show reload

Reload scheduled for 00:00:00 PDT Sat April 20 (in 12 hours and 12 minutes)
Router#
```

Related Commands

Command	Description
reload	Reloads the operating system.

show resource-pool queue

To display resource pool and queue information about the router, use the **show resource-pool queue** command in user EXEC or privileged EXEC mode.

show resource-pool queue {**description** | **statistics**}

Syntax Description

description	Displays information about the resource-pool queue description.
statistics	Displays information about the resource-pool queue statistics.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced in a release earlier than Cisco IOS Release 15.0(1)M.

Usage Guidelines

Use the **show resource-pool queue** command to display the resource pool and queue information on the router.

Examples

The following is sample output from the **show resource-pool queue description** command. The field descriptions are self-explanatory.

```
Router# show resource-pool description

Resource-management call state description

State Description

--------------------------- -----------
RM_DNIS_AUTHOR : Waiting for DNIS author
RM_DNIS_AUTH_SUCCEEDED : Waiting for resource alloc
RM_DNIS_RES_ALLOCATED : Call established
RM_DNIS_REQ_IDLE : Disc while in RM_DNIS_AUTHOR/RM_DNIS_AUTH_SUCCEEDED
/RM_DNIS_REQ_IDLE_AUTHOR
RM_DNIS_REQ_IDLE_AUTHOR : New call while in RM_DNIS_REQ_IDLE
RM_RPM_RES_AUTHOR : Waiting for RPM author
RM_RPM_RES_ALLOCATING : Waiting for resource alloc
RM_RPM_RES_ALLOCATED : RPM call established
RM_RPM_AUTH_REQ_IDLE : Disc while in RM_RPM_RES_AUTHOR
/RM_RPM_AUTH_REQ_IDLE_AUTHOR
RM_RPM_RES_REQ_IDLE : Disc while in RM_RPM_RES_ALLOCATING
/RM_RPM_RES_REQ_IDLE_AUTHOR
RM_RPM_AUTH_REQ_IDLE_AUTHOR: New call while in RM_RPM_AUTH_REQ_IDLE
RM_RPM_RES_REQ_IDLE_AUTHOR : New call while in RM_RPM_RES_REQ_IDLE
RM_RPM_DISCONNECTING : RPM initiates disconnect and is waiting for ack
RM_RPM_DISCONNECTING_AUTHOR: New call while in RM_RPM_DISCONNECTING
5400-XM-1#sh resource-pool queue stat
```

The following is sample output from the **show resource-pool queue statistics** command:

```
Router# show resource-pool statistics

Resource-management event queue information (queue depth 0)
Event In queue Total
--------------------------- ---------- ----------
DIALER_INCALL : 0 0
DIALER_DISCON : 0 0
GUARDTIMER_EXPIRY_EVENT : 0 0
RM_DNIS_AUTHOR_SUCCESS : 0 0
RM_DNIS_AUTHOR_FAIL : 0 0
RM_DNIS_RES_ALLOC_SUCCESS : 0 0
RM_DNIS_RES_ALLOC_FAIL : 0 0
RM_DNIS_RPM_REQUEST : 0 0
RM_RPM_RES_AUTHOR_SUCCESS : 0 0
RM_RPM_RES_AUTHOR_FAIL : 0 0
RM_RPM_RES_ALLOC_SUCCESS : 0 0
RM_RPM_RES_ALLOC_FAIL : 0 0
RM_RPM_DISC_ACK : 0 0
--------------------------- ---------- ----------
SUM : 0 0
Resource-management call information (0 active calls)
State Active Total
--------------------------- ---------- ----------
RM_DNIS_AUTHOR : 0 0
RM_DNIS_AUTH_SUCCEEDED : 0 0
RM_DNIS_RES_ALLOCATED : 0 0
RM_DNIS_REQ_IDLE : 0 0
RM_DNIS_REQ_IDLE_AUTHOR : 0 0
RM_RPM_RES_AUTHOR : 0 0
RM_RPM_RES_ALLOCATING : 0 0
RM_RPM_RES_ALLOCATED : 0 0
RM_RPM_AUTH_REQ_IDLE : 0 0
RM_RPM_RES_REQ_IDLE : 0 0
RM_RPM_AUTH_REQ_IDLE_AUTHOR: 0 0
RM_RPM_RES_REQ_IDLE_AUTHOR : 0 0
RM_RPM_DISCONNECTING : 0 0
RM_RPM_DISCONNECTING_AUTHOR: 0 0
--------------------------- ---------- ----------
SUM : 0 0
00:03:34 since last clear command
Other resource-management info:
Active Processes 4
Throttle limit 4 (0 calls rejected)
Event queue depth 0 (peak 0)
Pending calls 0 (peak 0)
Buffer queue depth 648 (low watermark 648)
```

show rom-monitor

To show both the read-only and the upgrade ROM monitor (ROMMON) image versions and also the ROMMON image running on the Cisco 7200 VXR or Cisco 7301 router, use the **show rom-monitor** command in user EXEC, privileged EXEC, or diagnostic mode.

Supported Platforms Other than the Cisco ASR1000 Series Routers

show rom-monitor

Cisco ASR 1000 Series Routers

show rom-monitor *slot*

Syntax Description

slot	Specifies the slot that contains the ROMMON. Options include: • *number*—The number of the SIP slot that requires the ROMMON upgrade • **F0**—Embedded Service Processor slot 0. • **F1**—Embedded Service Processor slot 1. • **FP active**—Active Embedded Service Processor. • **FP standby**—Sstandby Embedded Service Processor. • **R0**—Route Processor slot 0. • **R1**—Route Processor slot 1. • **RP active**—Active Route Processor. • **RP standby**—Standby Route Processor.

Command Modes

User EXEC (>)
Privileged EXEC (#)
Diagnostic (diag)

Command History

Release	Modification
12.0(28)S	This command was introduced on the Cisco 7200 VXR router.
12.3(9)	This command was integrated into Cisco IOS Release 12.3(9) and implemented on the Cisco 7301 router.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Release	Modification
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers and the following enhancements were introduced: • This command was introduced in diagnostic mode. The command can be entered in both privileged EXEC and diagnostic mode on the Cisco ASR 1000 Series Routers. • The *slot* argument was introduced.
15.0(1)M	The command was modified on Cisco 1800 series routers. The output of the command was modified to let you know that the upgradable ROMMON version is not visible due to the license activity and reload is required.

Usage Guidelines

Use the **show rom-monitor** command when the router boots a Cisco IOS software iamge. In this case, the device prompt will be something like “Router>” where “Router” is the hostname of the device. Use the **showmon** command when the device boot to Rom Monitor mode instead of booting a Cisco IOS image. In this case, the device prompt will be something like “rommon n >” where "n" is a number.

Note On Cisco 1800 series routers, the **show rom-monitor** command does not show the version of the upgradable ROMMON.

To view the version of the upgradable ROMMON, you may need to reload the router while using the upgradable ROMMON image. If you are using the read-only ROMMON, then the upgradable ROMMON disappears. You need to run the **upgrade rom-monitor file** command for the upgradable ROMMON. Otherwise, the **upgrade rom-monitor preference upgrade** command is rejected with the message “No Upgrade ROMMON present, cannot select it.” During ROMMON bootup, if you are running upgradable ROMMON, then the ROMMON first displays the read-only ROMMON message, “Running new upgrade for first time.” This message is followed by the upgradable ROMMON message.

Examples

The following sample output from the **show rom-monitor** command, applicable to both the Cisco 7200 VXR and Cisco 7301 routers, displays both the ROMMON images and verifies that the upgrade ROMMON image is running:

```
Router> show rom-monitor

ReadOnly ROMMON version:

System Bootstrap, Version 12.2(20031011:151758)
Copyright (c) 2004 by Cisco Systems, Inc.

Upgrade ROMMON version:

System Bootstrap, Version 12.2(20031011:151758)
Copyright (c) 2004 by Cisco Systems, Inc.

Currently running ROMMON from Upgrade region
ROMMON from Upgrade region is selected for next boot
```

The following is sample output from the **show rom-monitor** command in on Cisco 1800 series routers. To view the version of the upgradable ROMMON, you may need to reload the router while using the upgradable ROMMON image.

```
Router# show rom-monitor

ReadOnly ROMMON version:

System Bootstrap, Version 12.3(8r)YH3, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2005 by cisco Systems, Inc.

Upgrade ROMMON version is not visible due to recent license activity,
such as license installation, removal, or the use of evaluation license
Reload is required to show the upgrade ROMMON version

Currently running ROMMON from Upgrade region
ROMMON from Upgrade region is selected for next boot

Router# reload

Proceed with reload? [confirm]

*Apr 13 18:44:08.583: %SYS-5-RELOAD: Reload requested  by console. Reload Reason: Reload
Command.
System Bootstrap, Version 12.3(8r)YH3, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2005 by cisco Systems, Inc.

 Running new upgrade for first time

System Bootstrap, Version 12.3(8r)YH13, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2008 by cisco Systems, Inc.
C1800 platform with 262144 Kbytes of main memory with parity disabled

Upgrade ROMMON initialized
```

In the following example, the ROMMON image in RP 0 of a Cisco ASR 1006 router is verified using the **show rom-monitor** command:

```
Router# show rom-monitor r0

System Bootstrap, Version 12.2(33r)XN1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2007 by cisco Systems, Inc.
```

The fields in the examples are self-explanatory.

show rom-monitor slot

To display the ROM monitor (ROMMON) status, use the **show rom-monitor** command in user EXEC or privileged EXEC mode.

show rom-monitor slot *num* {**sp** | **rp**}

Syntax Description

num	Displays the slot number of the ROMMON for which the status is to be displayed.
sp	Displays the ROMMON status of the switch processor.
rp	Displays the ROMMON status of the route processor.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was integrated into Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

When you enter the **show rom-monitor slot** command, the output displays the following:

- Region region1 and region2—Displays the status of the ROMMON image and the order of preference from which the region1 or region2 images should be booted. The ROMMON image status values are as follows:
  - First run—Indicates that a check of the new image is being run.
  - Invalid—Indicates that the new image has been checked and the upgrade process has started.
  - Approved—Indicates that the ROMMON field upgrade process has completed.
- Currently running—This field displays the currently running image and the region.

The **sp** or **rp** keyword is required only if a supervisor engine is installed in the specified slot.

Examples

This example shows how to display ROMMON information:

```
Router# show rom-monitor slot 1 sp

   Region F1:APPROVED
   Region F2:FIRST_RUN, preferred
   Currently running ROMMON from F1 region
Router#
```

Related Commands

Command	Description
upgrade rom-monitor	Sets the execution preference on a ROMMON.

show running identity policy

To display identity policy information, use the **show running identity policy** command in privileged EXEC mode.

show running identity policy [*name*]

Syntax Description

name	(Optional) Name of the identity policy.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(18)SX	This command was introduced.

Examples

The following is output from the **show running identity policy** command:

```
Router# show running identity policy
Building configuration...
Current configuration:
identity policy p1
  access-group some-acl
identity policy p2
  access-group another-acl
  redirect url http://www.foo.com/bar.html match redirect-acl
end
```

Related Commands

Command	Description
show running-configuration	Displays the running configuration for a router.

show running identity profile

To display identity profile information, use the **show running identity profile** command in privileged EXEC mode.

show running identity profile [**default** | **dot1x** | **eapoudp**]

Syntax Description

default	(Optional) Displays default identity profile information.
dot1x	(Optional) Displays 802.1x identity profile information.
eapoudp	(Optional) Displays EAPoUDP identity profile information.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(18)SX	This command was introduced.

Examples

The following is output from the **show running identity profile** command:

```
Router# show running identity profile
Building configuration...
Current configuration:
identity profile default
  device authorize type cisco ip phone
identity profile eapoudp
  device authorize ip-address 10.0.0.0 255.0.0.0 policy p1
identity profile dot1x
  device authorize mac-address 0001.0203.0405 ffff.ffff.ffff policy p2
end
```

Related Commands

Command	Description
show running-configuration	Displays the running configuration for a router.

show running-config

To display the contents of the current running configuration file or the configuration for a specific module, Layer 2 VLAN, class map, interface, map class, policy map, or virtual circuit (VC) class, use the **show running-config** command in privileged EXEC mode.

show running-config [*options*]

Syntax Description

options (Optional) Keywords used to customize output.

- **all**—Expands the output to include the commands that are configured with default parameters. If the **all** keyword is not used, the output does not display commands configured with default parameters.
- **brief**—Displays the configuration without certification data. The **brief** keyword can be used with the **linenum** keyword.
- **class-map** [*name*] [**linenum**] —Displays class map information. The **linenum** keyword can be used with the **class-map** *name* option.
- **control-plane** [**cef-exception** | **host** | **transit**] —Displays control-plane information. The **cef-exception**, **host**, and **transit** keywords can be used with **control-plane** option.
- **flow** {**exporter** | **monitor** | **record**}—Displays global flow configuration commands. The **exporter**, **monitor**, and **record** keywords can be used with the **flow** option.
- **full**—Displays the full configuration.
- **interface** *type number*—Displays interface-specific configuration information. If you use the **interface** keyword, you must specify the interface type and the interface number (for example, **interface ethernet 0**). Keywords for common interfaces include **async**, **ethernet**, **fastEthernet**, **group-async**, **loopback**, **null**, **serial**, and **virtual-template**. Use the **show run interface ?** command to determine the interfaces available on your system.
- **linenum**—Displays line numbers in the output. The **brief** or **full** keyword can be used with the **linenum** keyword. The **linenum** keyword can be used with the **class-map**, **interface**, **map-class**, **policy-map**, and **vc-class** keywords.
- **map-class** [**atm** | **dialer** | **frame-relay**] [**name**] [**linenum**]—Displays map class information. This option is described separately; see the **show running-config map-class** command page.

- **partition types** —Displays the configuration corresponding to partition. The **types** keyword can be used with the **partition** option.
- **policy-map** [*name*] [**linenum**]—Displays policy map information. The **linenum** keyword can be used with the **policy-map** *name* option.
- **vc-class** *name* [**linenum**]—Displays VC class information (display is available only on certain routers such as the Cisco 7500 series. The **linenum** keyword can be used with the **vc-class** *name* option.
- **view full**—Enables the display of a full running configuration. This is for view-based users who typically can view only configuration commands that they are entitled to access for that particular view.
- **vrf** *name*—Displays the VRF—aware configuration **module** *number*.
- **vlan** [*vlan-id*]—Specifies the VLAN information to display; valid values are from 1 to 4094.

Command Default

The default syntax, **show running-config**, displays the contents of the running configuration file, except commands configured with default parameters.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
11.0	This command was introduced.
12.0	This command was replaced by the **more system:running-config** command.
12.0(1)T	This command was integrated into Cisco IOS Release 12.0(1)T, and the output modifier (|) was added.
12.2(4)T	This command was modified. The **linenum** keyword was added.
12.3(8)T	This command was modified. The **view full** option was added.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX. The **module** *number* and **vlan** *vlan-id* keywords and arguments were added for the Supervisor Engine 720.
12.2(17d)SXB	This command was integrated into Release 12.2(17d)SXB and implemented on the Supervisor Engine 2.
12.2(33)SXH	This command was modified. The **all** keyword was added.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2. This command was enhanced to display configuration information for traffic shaping overhead accounting for ATM and was implemented on the Cisco 10000 series router for the PRE3.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SB	This command was modified. Support for the Cisco 7300 series router was added.
12.4(24)T	This command was modified in a release earlier than Cisco IOS Release 12.4(24)T. The **partition** and **vrf** keywords were added. The **module** and **vlan** keywords were removed.

Usage Guidelines

The **show running-config** command is technically a command alias (substitute or replacement syntax) of the **more system:running-config** command. Although more use of commands is recommended (due to their uniform structure across platforms and their expandable syntax), the **show running-config** command remains enabled to accommodate its widespread use, and to allow typing shortcuts such as **show run**.

The **show running-config interface** command is useful when there are multiple interfaces and you want to look at the configuration of a specific interface.

The **linenum** keyword causes line numbers to be displayed in the output. This option is useful for identifying a particular portion of a very large configuration.

You can enter additional output modifiers in the command syntax by including a pipe character (|) after the optional keyword. For example, **show running-config interface serial 2/1 linenum | begin 3**. To display output modifiers that are available for a keyword, enter **| ?** after the keyword. Depending on the platform you are using, the keywords and the arguments for the *options* argument may vary.

Prior to Cisco IOS Release 12.2(33)SXH, **show running-config** command output omitted configuration commands set with default values. Effective with Release 12.2(33)SXH, the **show running-config all** command displays more complete configuration information, including default settings and values. For example, if the Cisco Discovery Protocol (abbreviated as CDP in the output) holdtime value is set to its default of 180:

- The **show running-config** command does not display this value.
- The **show running-config all** displays this output: `cdp holdtime 180`.

If the Cisco Discovery Protocol holdtime is changed to a nondefault value (for example, 100), the output of the **show running-config** and **show running-config all** commands is the same; that is, the configured parameter is displayed.

Note In Release 12.2(33)SXH, implementation of the **all** keyword expands the output to include some of the commands that are configured with default values. In subsequent Cisco IOS releases, additional configuration commands that are configured with default values will be added to the output of the **show running-config all** command.

Cisco 7600 Series Router

In some cases, you might see a difference in the duplex mode that is displayed between the **show interfaces** command and the **show running-config** command. The duplex mode that is displayed in the **show interfaces** command is the actual duplex mode that the interface is running. The **show interfaces** command displays the operating mode for an interface, and the **show running-config** command displays the configured mode for an interface.

The **show running-config** command output for an interface might display the duplex mode but no configuration for the speed. This output indicates that the interface speed is configured as auto and that the duplex mode shown becomes the operational setting once the speed is configured to something other than auto. With this configuration, it is possible that the operating duplex mode for that interface does not match the duplex mode that is displayed with the **show running-config** command.

Examples

The following example shows the configuration for serial interface 1. The field descriptions are self-explanatory.

```
Router# show running-config interface serial 1

Building configuration...
```

```
Current configuration:
!
interface Serial1
 no ip address
 no ip directed-broadcast
 no ip route-cache
 no ip mroute-cache
 shutdown
end
```

The following example shows the configuration for Ethernet interface 0/0. Line numbers are displayed in the output.The field descriptions are self-explanatory.

```
Router# show running-config interface ethernet 0/0 linenum

Building configuration...

Current configuration : 104 bytes
 1 : !
 2 : interface Ethernet0/0
 3 :  ip address 10.4.2.63 255.255.255.0
 4 :  no ip route-cache
 5 :  no ip mroute-cache
 6 : end
```

The following example shows how to set line numbers in the command output and then use the output modifier to start the display at line 10. The field descriptions are self-explanatory.

```
Router# show running-config linenum | begin 10

   10 : boot-start-marker
   11 : boot-end-marker
   12 : !
   13 : no logging buffered
   14 : enable password #####
   15 : !
   16 : spe 1/0 1/7
   17 :  firmware location bootflash:mica-modem-pw.172.16.0.0.bin
   18 : !
   19 : !
   20 : resource-pool disable
   21 : !
   22 : no aaa new-model
   23 : ip subnet-zero
   24 : ip domain name cisco.com
   25 : ip name-server 172.16.11.48
   26 : ip name-server 172.16.2.133
   27 : !
   28 : !
   29 : isdn switch-type primary-5ess
   30 : !
   .
   .
   .
   126 : end
```

The following example shows how to display the module and status configuration for all modules on a Cisco 7600 series router. The field descriptions are self-explanatory.

```
Router# show running-config

Building configuration...
```

```
Current configuration:
!
version 12.0
service timestamps debug datetime localtime
service timestamps log datetime localtime
no service password-encryption
!
hostname Router
!
boot buffersize 126968
boot system flash slot0:7600r
boot bootldr bootflash:c6msfc-boot-mz.120-6.5T.XE1.0.83.bin
enable password lab
!
clock timezone Pacific -8
clock summer-time Daylight recurring
redundancy
 main-cpu
  auto-sync standard
!
ip subnet-zero
!
ip multicast-routing
ip dvmrp route-limit 20000
ip cef
mls flow ip destination
mls flow ipx destination
cns event-service server
!
spanning-tree portfast bpdu-guard
spanning-tree uplinkfast
spanning-tree vlan 200 forward-time 21
port-channel load-balance sdip
!
!
!
 shutdown
!
!
.
.
.
```

In the following sample output from the **show running-config** command, the **shape average** command indicates that traffic shaping overhead accounting for ATM is enabled. The BRAS-DSLAM encapsulation type is qinq and the subscriber line encapsulation type is snap-rbe based on the AAL5 service.The field descriptions are self-explanatory

```
Router# show running-config
.
.
.
subscriber policy recording rules limit 64
no mpls traffic-eng auto-bw timers frequency 0
call rsvp-sync
!
controller T1 2/0
    framing sf
    linecode ami
!
controller T1 2/1
    framing sf
    linecode ami
```

```
!
!
policy-map unit-test
    class class-default
        shape average percent 10 account qinq aal5 snap-rbe
!
```

Related Commands

Command	Description
bandwidth	Specifies or modifies the bandwidth allocated for a class belonging to a policy map, and enables ATM overhead accounting.
boot config	Specifies the device and filename of the configuration file from which the router configures itself during initialization (startup).
configure terminal	Enters global configuration mode.
copy running-config startup-config	Copies the running configuration to the startup configuration. (Command alias for the **copy system:running-config nvram:startup-config** command.)
shape	Shapes traffic to the indicated bit rate according to the algorithm specified, and enables ATM overhead accounting.
show interfaces	Displays statistics for all interfaces configured on the router or access server.
show policy-map	Displays the configuration of all classes for a specified service policy map or all classes for all existing policy maps, and displays ATM overhead accounting information, if configured.
show startup-config	Displays the contents of NVRAM (if present and valid) or displays the configuration file pointed to by the CONFIG_FILE environment variable. (Command alias for the **more:nvram startup-config** command.)

show running-config control-plane

To display the control plane information for the running configuration, use the **show running-config control-plane** command in privileged EXEC mode.

show running-config control-plane [**cef-exception** | **host** | **transit**]

Syntax Description

cef-exception	(Optional) Displays information about control plane Cisco Express Forwarding exceptions.
host	(Optional) Displays information about the control plane host.
transit	(Optional) Displays information about control plane transit.

Command Default

If no keyword is specified, all information about the control plane is displayed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(24)T	This command was introduced in a release earlier than Cisco IOS Release 12.4(24)T.

Examples

The following is sample output from the **show running-config control-plane** command. The field descriptions are self-explanatory.

```
Router# show running-config control-plane

Building configuration...

Current configuration : 14 bytes
!
control-plane
!
end
```

Related Commands

Command	Description
show running-config	Displays the contents of the current running configuration file or the configuration for a specific module.

show running-config map-class

To display only map-class configuration information from the running configuration file, use the **show running-config map-class** command in privileged EXEC mode.

show running-config map-class [**atm** [*map-class-name*] | **dialer** [*map-class-name*] | **frame-relay** [*map-class-name*]] [**linenum**]

Syntax Description

atm	(Optional) Displays only ATM map-class configuration lines.
dialer	(Optional) Displays only dialer map-class configuration lines.
frame-relay	(Optional) Displays only Frame Relay map-class configuration lines.
map-class-name	(Optional) Displays only configuration lines for the specified map-class.
linenum	(Optional) Displays line numbers in the output.

Defaults

Displays all map-class configuration in the running configuration file.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.1	The **map-class** extension to the **show running-config** command was introduced to show only lines pertaining to dialer or Frame Relay map classes.
12.1(2)T	The **atm**, **dialer**, and **frame-relay** keywords and *map-class-name* argument were introduced.
12.2(4)T	The **linenum** keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use the **show running-config map-class** command to display the following information from the running configuration file:

- All map classes configured on the router.
- Map classes configured specifically for ATM, Frame Relay, or dialer.
- A specific ATM, Frame Relay, or dialer map class.

Use the **linenum** keyword to display line numbers in the output. This option is useful for identifying a particular portion of a very large configuration.

Examples

All Map Classes Configured on the Router Example

The following example displays all map classes configured on the router:

```
Router# show running-config map-class
```

```
Building configuration...
Current configuration:
!
map-class frame-relay cir60
 frame-relay bc 16000
 frame-relay adaptive-shaping becn
!
map-class frame-relay cir70
 no frame-relay adaptive-shaping
 frame-relay priority-group 2
!
map-class atm vc100
 atm aal5mux
!
map-class dialer dialer1
 dialer idle-timeout 10
end
```

All Frame Relay Map Classes Example

The following example displays all Frame Relay map classes on the router:

```
Router# show running-config map-class frame-relay

Building configuration...
Current configuration:
!
map-class frame-relay cir60
 frame-relay bc 16000
 frame-relay adaptive-shaping becn
!
map-class frame-relay cir70
 no frame-relay adaptive-shaping
 frame-relay priority-group 2
end
```

A Specific Map Class and Display of Line Numbers Example

The following example displays a specific map class called class1. Line numbers are displayed in the output.

```
Router# show running-config map-class frame-relay class1 linenum

Building configuration...

Current configuration:
1 : !
2 : map-class frame-relay boy
3 :  no frame-relay adaptive-shaping
4 :  frame-relay cir 1000
5 : end
```

Related Commands

Command	Description
map-class atm	Specifies the ATM map class for an SVC.
map-class dialer	Defines a class of shared configuration parameters associated with the dialer map command for outgoing calls from an ISDN interface and for PPP callback.

Command	Description
map-class frame-relay	Specifies a map class to define QoS values for a Frame Relay VC.
more system:running-config	Displays contents of the currently running configuration file (equivalent to the **show running-config** command.)

show running-config partition

To display the list of commands that make up the current running configuration for a specific part of the system's global running configuration, use the **show running-config partition** command in privileged EXEC mode.

show running-config partition *part*

Syntax Description

part	The *part* argument will consist of one or more keyword options. These keywords represent a partition of the system's running configuration state, as a major-descriptor and, in some cases, one or more minor-descriptors. For example, in the command **show running-config partition router eigrp 1**, the major-descriptor for the *part* argument is the **router** keyword, and the minor-descriptors for the *part* argument are the **eigrp 1** keywords. The actual list of *part* keyword options will depend on your system hardware, what feature set you are running, and what features are currently configured on your system. Some examples of command *part* keyword options are provided here for reference. Use the **show running-config partition ?** command on your system to view the list of command options available on your system. • **access-list**—Displays all running configuration commands that make up the access-list configuration partition. • **boot**—Displays all running configuration commands that make up the boot configuration partition. • **class-map**—Displays all running configuration commands that make up the class-map configuration partition. • **global-cdp**—Displays all running configuration commands that make up the global CDP configuration partition. • **interface** [**type** *slot*/*port*/*number*]—Displays all running configuration commands that make up the interfaces configuration partition or the configuration commands that are applied to the specified interface. • **line**—Displays all running configuration commands that make up the line command configuration partition. • **policy-map**—Displays all running configuration commands that make up the policy-map configuration partition. • **route-map**—Displays all running configuration commands that make up the route-map configuration partition. • **router** [*protocol*]—Displays all running configuration commands that make up the router configuration partition, or the configuration commands for the specified routing protocol. • **service**—Displays all running configuration commands that make up the services (small server) configuration partition. • **snmp**—Displays all running configuration commands that make up the SNMP configuration partition. • **|** – Allows for the addition of output modifiers.

Command Default None

Command Modes Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRB	This command was introduced for Cisco 7600 series images in Cisco IOS Release 12.2SR as part of the "Configuration Partitioning" feature.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Usage Guidelines When the Configuration Partitioning feature is enabled, the system groups the configuration state of the device into parts (called "partitions") for the purpose of generating the virtual running configuration file (the list of configuration commands). The selective processing of the system's configuration state for the purpose of generating a partial running configuration is called "configuration partitioning."

Note This command is not related to hard drive or flash drive partitioning.

This granular access to configuration information offers important performance benefits for high-end routing platforms with very large configuration files, as the system wide generation of a complete virtual configuration file from all components on systems with large and complex configurations can become overly resource intensive and be unacceptably slow.

The **show running-config partition** command allows you to display only the part of the running configuration that you want to examine, while also allowing the system to process only the collection of system components (such as specific interfaces) that you need to display. This is in contrast to other existing extensions to the **show running-config** command, which only *filter* the generated list after all system components have been processed.

The Configuration Partitioning feature is enabled by default in Cisco IOS software images that support the feature. To disable the feature, use the **no parser config partition** command.

Examples In the following example, the system generates a view of the running configuration by polling only the components associated with the access-list parts of the running configuration state, and then displays only those access-list-related configuration commands.

```
Router# show running-config partition access-list
        Building configuration...

Current configuration : 127 bytes
!
Configuration of Partition access-list
!
access-list 90 permit 0.0.0.0 1.2.3.5
access-list 100 permit 10 any any
!
end
```

In the following example, only the main configuration partition associated with the interface configuration is queried, and only the configuration commands associated with Fast Ethernet interface 0/1 are displayed.

```
Router# show running-config partition interface fastethernet0/1
Building configuration...

Current configuration : 213 bytes
!
Configuration of Partition interface FastEthernet0/1
!
!
interface FastEthernet0/1
 ip address 10.4.2.39 255.255.255.0
 no ip route-cache cef
 no ip route-cache
 duplex half
 ipv6 enable
 no cdp enable
!
!
end
```

Related Commands

Command	Description
copy running-config startup-config	Copies the running configuration to the default startup configuration file.
show interfaces	Displays statistics for all interfaces configured on the router or access server.
show running-config	Generates and displays a virtual configuration file that lists all configuration commands that are in effect on the system.
show startup-config	Displays the contents of NVRAM (if present and valid) or displays the configuration file pointed to by the CONFIG_FILE environment variable. (Command alias for the **more:nvram startup-config** command.)

show scp

To display Switch-Module Configuration Protocol (SCP) information, use the **show scp** in privileged EXEC mode on the Switch Processor.

show scp {**accounting** | **counters** | **linecards** [**details**] | **mcast** {**group** *group-id* | **inst**} | **process** *id* | **status**}

Syntax Description

accounting	Displays information about the SCP accounting.
counters	Displays information about the SCP counter.
linecards	Displays information about the Optical Services Module (OSM) wide area network (WAN) modules in the chassis.
details	(Optional) Displays detailed information about the OSM WAN module.
mcast	Displays information about the SCP multicast.
group *group-id*	(Optional) Displays information for a specific group and group ID; valid values are from 1 to 127.
inst	(Optional) Displays information for an instance.
process *id*	Displays all the processes that have registered an SAP with SCP.
status	Displays information about the local SCP server status.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC on the Switch Processor

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(18)SXE	The output of the **show scp process** command was changed to display all the processes that have registered an SAP with SCP on the Supervisor Engine 720 only.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to display all the processes that have registered an SAP with SCP:

```
Router# show module

Mod Ports Card Type                                Model              Serial No.
--- ----- ---------------------------------------- ------------------ -----------
  1   48  48-port 10/100 mb RJ45                   WS-X6148-RJ-45     SAL091800RY
  2    0  2 port adapter Enhanced FlexWAN          WS-X6582-2PA       JAE0940MH7Z
  3    8  8 port 1000mb GBIC Enhanced QoS          WS-X6408A-GBIC     SAL09391KZH
  5    2  Supervisor Engine 720 (Active)           WS-SUP720-3BXL     SAL09337UE6
```

```
  6    2  Supervisor Engine 720 (Hot)            WS-SUP720-3BXL     SAL09148P59

Mod MAC addresses                       Hw    Fw           Sw           Status
--- ----------------------------------- ------ ------------ ------------ -------
  1  0013.c3f8.d2c4 to 0013.c3f8.d2f3   5.0   8.3(1)       8.6(0.366)TA Ok
  2  0015.2bc3.5b40 to 0015.2bc3.5b7f   2.1   12.2(nightly 12.2(nightly Ok
  3  0015.6324.ed48 to 0015.6324.ed4f   3.1   5.4(2)       8.6(0.366)TA Ok
  5  0014.a97d.b0ac to 0014.a97d.b0af   4.3   8.4(2)       12.2(nightly Ok
  6  0013.7f0d.0660 to 0013.7f0d.0663   4.3   8.4(2)       12.2(nightly Ok

Mod  Sub-Module                  Model              Serial       Hw     Status
---- --------------------------- ------------------ ------------ ------- -------
  5  Policy Feature Card 3       WS-F6K-PFC3BXL     SAL09337NVE  1.6    Ok
  5  MSFC3 Daughterboard         WS-SUP720          SAL09327AU6  2.3    Ok
  6  Policy Feature Card 3       WS-F6K-PFC3BXL     SAL1033Y0YK  1.8    Ok
  6  MSFC3 Daughterboard         WS-SUP720          SAL09158XB3  2.3    Ok

Mod  Online Diag Status
---- -------------------
  1  Pass
  2  Pass
  3  Pass
  5  Pass
  6  Pass


Router# attach 5

Trying Switch ...
Entering CONSOLE for Switch
Type "^C^C^C" to end this session

Switch-sp# show scp process

Sap Pid Name
=== === ====
0 180 CWAN-RP SCP Input Process
18 42 itasca
20 3 Exec
21 3 Exec
22 180 CWAN-RP SCP Input Process
Total number of SAP registered = 5
Router#
```

show slot

To display information about the PCMCIA flash memory cards file system, use the **show slot** command in user EXEC or privileged EXEC mode.

show slot [**all** | **chips** | **detailed** | **err** | **summary**]

Syntax Description

all	(Optional) Displays all possible flash system information for all PCMCIA flash cards in the system.
chips	(Optional) Displays flash chip information.
detailed	(Optional) Displays the flash detailed directory.
err	(Optional) Displays the flash chip erase and write retries.
summary	(Optional) Displays the flash partition summary.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Usage Guidelines

Use the **show slot** command to display details about the files in a particular linear PCMCIA flash memory card of less than 20 MB and some 32 MB linear PCMCIA cards.

Note Use the **show disk** command for ATA PCMCIA cards. Other forms of this commands are **show disk0:** and **show disk1:**.

For more information regarding file systems and flash cards, access the *PCMCIA Filesystem Compatibility Matrix and Filesystem Information* document at the following URL:

http://www.cisco.com/en/US/partner/products/hw/routers/ps341/products_tech_note09186a00800a7515.shtml

To see which flash cards are used in your router, use the **show version** command and look at the bottom portion of the output.

The following display indicates an ATA PCMCIA flash disk.

```
Router# show version
.
.
46976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
```

The following display indicates a linear PCMCIA flash card with 20480K bytes of flash memory in card at slot 1 with a sector size of 128K.

```
Router# show version
.
.
20480K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
```

Note In some cases the **show slot** command will not display the file systems, use **show slot0:** or **show slot1:**.

Examples

The following example displays information about slot 0. The output is self-explanatory.

```
Router# show slot

PCMCIA Slot0 flash directory:
File  Length   Name/status
  1   11081464  c3660-bin-mz.123-9.3.PI5b
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)
```

The following example shows all possible flash system information for all PCMCIA flash cards in the system.

```
Router# show slot all
Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1        20223K  10821K     9402K     4096K      Read/Write     Direct

PCMCIA Slot0 flash directory:
File  Length   Name/status
        addr      fcksum  ccksum
  1   11081464  c3660-bin-mz.123-9.3.PI5b
        0x40      0x5EA3  0x5EA3
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA


The following example shows flash chip information

Router# show slot chips
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA
```

The following example show the flash detailed directory.

```
Router# show slot detailed

PCMCIA Slot0 flash directory:
File  Length   Name/status
        addr      fcksum  ccksum
  1   11081464  c3660-bin-mz.123-9.3.PI5b
        0x40      0x5EA3  0x5EA3
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)
```

The following example shows the flash chip erase and write retries.

```
Router# show slot err

PCMCIA Slot0 flash directory:
File  Length   Name/status
  1   11081464  c3660-bin-mz.123-9.3.PI5b
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name               erase  write
    1      1       89A0      2048KB    INTEL 28F016SA     0      0
    2      1       89A0      2048KB    INTEL 28F016SA     0      0
    1      2       89A0      2048KB    INTEL 28F016SA     0      0
    2      2       89A0      2048KB    INTEL 28F016SA     0      0
    1      3       89A0      2048KB    INTEL 28F016SA     0      0
    2      3       89A0      2048KB    INTEL 28F016SA     0      0
    1      4       89A0      2048KB    INTEL 28F016SA     0      0
    2      4       89A0      2048KB    INTEL 28F016SA     0      0
    1      5       89A0      2048KB    INTEL 28F016SA     0      0
    2      5       89A0      2048KB    INTEL 28F016SA     0      0
```

The following example shows the flash partition summary.

```
Router# show slot summary
Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1        20223K  10821K     9402K     4096K      Read/Write     Direct
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)
```

Related Commands

Command	Description
dir slot0:	Directory listing of files on a PCMCIA Flash card located in slot0.
dir slot1:	Directory listing of files on a PCMCIA Flash card located in slot1.
show slot0:	Displays information about the PCMCIA flash memory card's file system located in slot 0.
show slot1:	Displays information about the PCMCIA flash memory card's file system located in slot 1.

show slot0:

To display information about the PCMCIA flash memory card's file system located in slot 0, use the **show slot0:** command in user EXEC or privileged EXEC mode.

show slot0: [**all** | **chips** | **detailed** | **err** | **summary**]

Syntax Description

all	(Optional) Displays all possible flash system information for all PCMCIA flash cards in the system.
chips	(Optional) Displays flash chip information.
detailed	(Optional) Displays the flash detailed directory.
err	(Optional) Displays the flash chip erase and write retries.
summary	(Optional) Displays the flash partition summary.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use the **show slot0:** command to display details about the files in a particular linear PCMCIA flash memory card of less than 20 MB and some 32 MB linear PCMCIA cards.

Note Use the **show disk** command for ATA PCMCIA cards. Other forms of this commands are **show disk0:** and **show disk1:**.

For more information regarding file systems and flash cards, access the *PCMCIA Filesystem Compatibility Matrix and Filesystem Information* document at the following URL:

http://www.cisco.com/en/US/partner/products/hw/routers/ps341/products_tech_note09186a00800a7515.shtml

To see which flash cards are used in your router, use the **show version** command and look at the bottom portion of the output.

The following display indicates an ATA PCMCIA flash disk.

```
Router# show version
.
.
46976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
```

The following display indicates a linear PCMCIA flash card with 20480K bytes of flash memory in card at slot 1 with a sector size of 128K.

```
Router# show version
.
.
20480K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
```

Note In some cases the **show slot** command will not display the file systems, use **show slot0:** or **show slot1:**.

Examples

The following example displays information about slot 0. The output is self-explanatory.

```
Router# show slot0:

PCMCIA Slot0 flash directory:
File  Length   Name/status
  1   11081464  c3660-bin-mz.123-9.3.PI5b
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

Router# show slot0: all
Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1        20223K  10821K     9402K     4096K      Read/Write     Direct

PCMCIA Slot0 flash directory:
File  Length   Name/status
        addr      fcksum  ccksum
  1   11081464  c3660-bin-mz.123-9.3.PI5b
        0x40      0x5EA3  0x5EA3
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA

The following example shows flash chip information.

Router# show slot0: chips
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA
```

The following example show the flash detailed directory.

```
Router# show slot0: detailed
```

```
PCMCIA Slot0 flash directory:
File  Length   Name/status
        addr      fcksum  ccksum
  1   11081464  c3660-bin-mz.123-9.3.PI5b
        0x40      0x5EA3  0x5EA3
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)
```

The following example shows the flash chip erase and write retries.

```
Router# show slot0: err

PCMCIA Slot0 flash directory:
File  Length   Name/status
  1   11081464  c3660-bin-mz.123-9.3.PI5b
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name               erase  write
    1      1       89A0      2048KB    INTEL 28F016SA     0      0
    2      1       89A0      2048KB    INTEL 28F016SA     0      0
    1      2       89A0      2048KB    INTEL 28F016SA     0      0
    2      2       89A0      2048KB    INTEL 28F016SA     0      0
    1      3       89A0      2048KB    INTEL 28F016SA     0      0
    2      3       89A0      2048KB    INTEL 28F016SA     0      0
    1      4       89A0      2048KB    INTEL 28F016SA     0      0
    2      4       89A0      2048KB    INTEL 28F016SA     0      0
    1      5       89A0      2048KB    INTEL 28F016SA     0      0
    2      5       89A0      2048KB    INTEL 28F016SA     0      0
```

The following example shows the flash partition summary.

```
Router# show slot0: summary
Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1         20223K  10821K    9402K     4096K      Read/Write     Direct
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)
```

Related Commands

Command	Description
dir slot0:	Directory listing of files on a PCMCIA Flash card located in slot0.
dir slot1:	Directory listing of files on a PCMCIA Flash card located in slot1.
show slot1:	Displays information about the PCMCIA flash memory card's file system located in slot 1.
show slot	Displays information about the PCMCIA flash memory cards.

show slot1:

To display information about the PCMCIA flash memory card's file system located in slot 1, use the **show slot1:** command in user EXEC or privileged EXEC mode.

show slot1: [**all** | **chips** | **detailed** | **err** | **summary**]

Syntax Description

all	(Optional) Displays all possible flash system information for all PCMCIA flash cards in the system.
chips	(Optional) Displays flash chip information.
detailed	(Optional) Displays the flash detailed directory.
err	(Optional) Displays the flash chip erase and write retries.
summary	(Optional) Displays the flash partition summary.

Command Modes

User EXEC
Privileged EXEC

Command History

Release	Modification
12.0	This command was introduced.

Usage Guidelines

Use the **show slot1:** command to display details about the files in a particular linear PCMCIA flash memory card of less than 20 MB and some 32 MB linear PCMCIA cards located in slot 1.

Note Use the **show disk** command for ATA PCMCIA cards. Other forms of this commands are **show disk0:** and **show disk1:**.

For more information regarding file systems and flash cards, access the *PCMCIA Filesystem Compatibility Matrix and Filesystem Information* document at the following URL:

http://www.cisco.com/en/US/partner/products/hw/routers/ps341/products_tech_note09186a00800a7515.shtml

To see which flash cards are used in your router, use the **show version** command and look at the bottom portion of the output.

The following display indicates an ATA PCMCIA flash disk.

```
Router# show version
.
.
46976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
```

The following display indicates a linear PCMCIA flash card with 20480K bytes of flash memory in card at slot 1 with a sector size of 128K.

```
Router# show version
.
.
20480K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
```

Note In some cases the **show slot** command will not display the file systems. Use **show slot0:** or **show slot1:**.

Examples

The following example displays information about slot 0 using the **slot0:** command form. The output is self-explanatory.

```
Router# show slot1:

PCMCIA Slot1 flash directory:
File  Length   Name/status
  1   10907068  c3660-bin-mz.123-7.9.PI4
[10907132 bytes used, 5739008 available, 16646140 total]
16384K bytes of processor board PCMCIA Slot1 flash (Read/Write)

Router# show slot1: all
Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1        20223K  10821K     9402K     4096K      Read/Write     Direct

PCMCIA Slot0 flash directory:
File  Length   Name/status
        addr      fcksum  ccksum
  1   11081464  c3660-bin-mz.123-9.3.PI5b
        0x40      0x5EA3  0x5EA3
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA
```

The following example shows flash chip information.

```
Router# show slot1: chips
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name
    1      1       89A0      2048KB    INTEL 28F016SA
    2      1       89A0      2048KB    INTEL 28F016SA
    1      2       89A0      2048KB    INTEL 28F016SA
    2      2       89A0      2048KB    INTEL 28F016SA
    1      3       89A0      2048KB    INTEL 28F016SA
    2      3       89A0      2048KB    INTEL 28F016SA
    1      4       89A0      2048KB    INTEL 28F016SA
    2      4       89A0      2048KB    INTEL 28F016SA
    1      5       89A0      2048KB    INTEL 28F016SA
    2      5       89A0      2048KB    INTEL 28F016SA
```

The following example show the flash detailed directory.

```
Router# show slot1: detailed

PCMCIA Slot0 flash directory:
```

```
File  Length   Name/status
        addr      fcksum  ccksum
  1   11081464  c3660-bin-mz.123-9.3.PI5b
        0x40      0x5EA3  0x5EA3
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)
```

The following example shows the flash chip erase and write retries.

```
Router# show slot1: err

PCMCIA Slot0 flash directory:
File  Length   Name/status
  1   11081464  c3660-bin-mz.123-9.3.PI5b
[11081528 bytes used, 9627844 available, 20709372 total]
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

   Chip    Bank    Code      Size      Name               erase  write
    1      1       89A0      2048KB    INTEL 28F016SA     0      0
    2      1       89A0      2048KB    INTEL 28F016SA     0      0
    1      2       89A0      2048KB    INTEL 28F016SA     0      0
    2      2       89A0      2048KB    INTEL 28F016SA     0      0
    1      3       89A0      2048KB    INTEL 28F016SA     0      0
    2      3       89A0      2048KB    INTEL 28F016SA     0      0
    1      4       89A0      2048KB    INTEL 28F016SA     0      0
    2      4       89A0      2048KB    INTEL 28F016SA     0      0
    1      5       89A0      2048KB    INTEL 28F016SA     0      0
    2      5       89A0      2048KB    INTEL 28F016SA     0      0
```

The following example shows the flash partition summary.

```
Router# show slot1: summary
Partition   Size    Used      Free      Bank-Size  State          Copy Mode
  1        20223K  10821K     9402K     4096K      Read/Write     Direct
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)
```

Related Commands

Command	Description
dir slot0:	Directory listing of files on a PCMCIA Flash card located in slot0.
dir slot1:	Directory listing of files on a PCMCIA Flash card located in slot1.
show slot0:	Displays information about the PCMCIA flash memory card's file system located in slot 0.
show slot	Displays information about the PCMCIA flash memory cards.

show software authenticity file

To display information related to software authentication for a specific image file, use the **show software authenticity file** command in privileged EXEC mode.

show software authenticity file {**flash0:***filename* | **flash1:***filename* | **flash:***filename* | **nvram:***filename* | **usbflash0:***filename* | **usbflash1:***filename*}

Syntax Description

flash0:	Displays information related to software authentication for flash 0 resources.
filename	Name of the filename in memory.
flash1:	Displays information related to software authentication for flash 1 resources.
flash:	Displays information related to software authentication for flash resources.
nvram:	Displays information related to software authentication for NVRAM resources.
usbflash0:	Displays information related to software authentication for Universal Serial Bus (USB) flash 0 resources.
usbflash1:	Displays information related to software authentication for USB flash 1 resources.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced for the Cisco 1941, 2900sm, 2901, and 3900 routers.

Usage Guidelines

The **show software authenticity file** command allows you to display software authentication related information that includes image credential information, key type used for verification, signing information, and other attributes in the signature envelope, for a specific image file. The command handler will extract the signature envelope and its fields from the image file and dump the required information.

Examples

The following example displays software authentication related information for an image file named c3900-universalk9-mz.SSA:

```
Router# show software authenticity file flash0:c3900-universalk9-mz.SSA

File Name                     : flash0:c3900-universalk9-mz.SSA
Image type                    : Development
    Signer Information
        Common Name           : CiscoSystems
        Organization Unit     : C3900
        Organization Name     : CiscoSystems
    Certificate Serial Number : 4A9F507F
    Hash Algorithm            : SHA512
Signature Algorithm       : 2048-bit RSA
```

```
Key Version                 : A
```

Table 154 describes the significant fields shown in the display.

Table 154 show software authenticity file Field Descriptions

Field	Description
File Name	Name of the filename in the memory. For example, flash0:c3900-universalk9-mz.SSA refers to filename c3900-universalk9-mz.SSA in flash memory (flash0:).
Image type	Displays the type of image.
Signer Information	Signature information.
Common Name	Displays the name of the software manufacturer.
Organization Unit	Displays the hardware the software image is deployed on.
Organization Name	Displays the owner of the software image.
Certificate Serial Number	Displays the certificate serial number for the digital signature.
Hash Algorithm	Displays the type of hash algorithm used in digital signature verification.
Signature Algorithm	Displays the type of signature algorithm used in digital signature verification.
Key Version	Displays the key version used for verification.

Related Commands

Command	Description
show software authenticity keys	Displays the software public keys that are in the storage with the key types.
show software authenticity running	Displays information related to software authentication for the current ROMMON, monitor library (monlib), and Cisco IOS image used for booting.

show software authenticity keys

To display the software public keys that are in the storage with the key types, use the **show software authenticity keys** command in privileged EXEC mode.

show software authenticity keys

Syntax Description

This command has no argument or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced for the Cisco 1941, 2900sm, 2901, and 3900 routers.

Usage Guidelines

The display from this command includes the public keys that are in the storage with the key types.

Examples

The following is sample output from the **show software authenticity keys** command:

```
Router# show software authenticity keys

Public Key #1 Information
-------------------------
Key Type             : Release  (Primary)
Public Key Algorithm : RSA
Modulus (256 bytes)   :
        CC:CA:40:55:8C:71:E2:4A:3A:B6:9D:5C:94:1D:02:BA:
        63:CD:F0:20:2F:C6:CB:C1:D7:3E:8F:27:E3:DA:6D:C6:
        15:EB:2F:D0:A6:66:43:D8:00:2B:E1:7F:3C:E8:5F:28:
        DF:CE:D2:99:FE:02:AB:9E:4E:E2:90:08:F7:1B:BB:AD:
        68:96:20:9C:D6:54:DA:E3:90:61:B0:F9:57:04:FC:DC:
        2F:63:61:E0:6F:2B:23:9B:75:97:0A:E9:D7:9E:39:9A:
        21:FD:AD:52:F9:DC:B4:A8:66:0F:7F:81:EA:7B:24:8A:
        F1:98:39:8C:66:49:5A:C5:F5:D2:67:25:17:FA:FB:17:
        8B:90:D0:5D:4A:0E:B6:76:3B:9F:AD:DE:0A:B5:34:AC:
        40:C2:2D:58:8D:CE:59:C4:5D:B9:21:8E:31:0E:D9:9F:
        92:A4:7A:E5:13:59:55:C5:8B:16:43:20:B9:25:60:8D:
        A4:00:2B:75:FB:01:EF:EC:26:91:B1:88:D6:FB:2E:3A:
        FE:8F:45:38:88:FE:06:3B:43:04:DD:C2:0E:B2:5B:EF:
        8A:E1:97:F5:F5:23:76:9F:47:3E:3B:F7:2E:47:C1:01:
        CE:70:3A:8C:11:02:43:2B:5B:26:49:6D:15:42:2E:F5:
        26:04:6B:33:EB:70:2B:18:24:C7:D9:31:3E:77:24:85
Exponent (4 bytes)   : 10001
Key Version          : A
Public Key #2 Information
-------------------------
Key Type             : Development  (Primary)
Public Key Algorithm : RSA
Modulus (256 bytes)   :
        CC:CA:40:55:8C:71:E2:4A:3A:B6:9D:5C:94:1D:02:BA:
```

```
        63:CD:F0:20:2F:C6:CB:C1:D7:3E:8F:27:E3:DA:6D:C6:
        15:EB:2F:D0:A6:66:43:D8:00:2B:E1:7F:3C:E8:5F:28:
        DF:CE:D2:99:FE:02:AB:9E:4E:E2:90:08:F7:1B:BB:AD:
        68:96:20:9C:D6:54:DA:E3:90:61:B0:F9:57:04:FC:DC:
        2F:63:61:E0:6F:2B:23:9B:75:97:0A:E9:D7:9E:39:9A:
        21:FD:AD:52:F9:DC:B4:A8:66:0F:7F:81:EA:7B:24:8A:
        F1:98:39:8C:66:49:5A:C5:F5:D2:67:25:17:FA:FB:17:
        8B:90:D0:5D:4A:0E:B6:76:3B:9F:AD:DE:0A:B5:34:AC:
        40:C2:2D:58:8D:CE:59:C4:5D:B9:21:8E:31:0E:D9:9F:
        92:A4:7A:E5:13:59:55:C5:8B:16:43:20:B9:25:60:8D:
        A4:00:2B:75:FB:01:EF:EC:26:91:B1:88:D6:FB:2E:3A:
        FE:8F:45:38:88:FE:06:3B:43:04:DD:C2:0E:B2:5B:EF:
        8A:E1:97:F5:F5:23:76:9F:47:3E:3B:F7:2E:47:C1:01:
        CE:70:3A:8C:11:02:43:2B:5B:26:49:6D:15:42:2E:F5:
        26:04:6B:33:EB:70:2B:18:24:C7:D9:31:3E:77:24:85
Exponent (4 bytes)   : 10001
Key Version          : A
```

Table 155 describes the significant fields shown in the display.

Table 155 show software authenticity running Field Descriptions

Field	Description
Public Key #	Public key number.
Key Type	Displays the key type used for image verification.
Public Key Algorithm	Displays the name of the algorithm used for public key cryptography.
Modulus	Modulus of the public key algorithm.
Exponent	Exponent of the public key algorithm
Key Version	Displays the key version used for verification.

Related Commands

Command	Description
show software authenticity file	Displays information related to software authentication for the loaded image file.
show software authenticity running	Displays information related to software authentication for the current ROM monitor (ROMMON), monitor library (monlib), and Cisco IOS image used for booting.

show software authenticity running

To display information related to software authentication for the current ROM monitor (ROMMON), monitor library (monlib), and Cisco IOS image used for booting, use the **show software authenticity running** command in privileged EXEC mode.

show software authenticity running

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced for the Cisco 1941, 2900sm, 2901, and 3900 routers.

Usage Guidelines

The information displayed by the **show software authenticity running** command about the current ROMMON, monlib and Cisco IOS image used for booting includes:

- Image credential information
- Key type used for verification
- Signing information
- Any other attributes in the signature envelope

Examples

The following example displays software authentication related information for the current ROM monitor (ROMMON), monitor library (monlib), and Cisco IOS image used for booting:

```
Router(mode-prompt)# show software authenticity running

SYSTEM IMAGE
------------------
Image type : Development
Signer Information
Common Name : CiscoSystems
Organization Unit : C2900
Organization Name : CiscoSystems
Certificate Serial Number : 4A64A00E
Hash Algorithm : SHA512
Signature Algorithm : 2048-bit RSA
Key Version : A
Verifier Information
Verifier Name : ROMMON 2
Verifier Version : System Bootstrap, Version 12.4(20090409:084310)
[BLD-xformers_dev.XFR_20090409-20090409_0101-24 103], DEVELOPMENT SOFTWARE
ROMMON 2
---------------
Image type : Development
Signer Information
```

```
Common Name : CiscoSystems
Organization Unit : C2900
Organization Name : CiscoSystems
Certificate Serial Number : 49DE2B5D
Hash Algorithm : SHA512
Signature Algorithm : 2048-bit RSA
Key Version : A
Verifier Information
Verifier Name : ROMMON 2
Verifier Version : System Bootstrap, Version 12.4(20090409:084310)
[BLD-xformers_dev.XFR_20090409-20090409_0101-24 103], DEVELOPMENT SOFTWARE
```

Table 156 describes the significant fields shown in the display.

Table 156 show software authenticity running Field Descriptions

Field	Description
SYSTEM IMAGE	Section of the output displaying the system image information.
Image type	Displays the type of image.
Common Name	Displays the name of the software manufacturer.
Organization Unit	Displays the hardware the software image is deployed on.
Organization Name	Displays the owner of the software image.
Certificate Serial Number	Displays the certificate serial number for the digital signature.
Hash Algorithm	Displays the type of hash algorithm used in digital signature verification.
Signature Algorithm	Displays the type of signature algorithm used in digital signature verification.
Key Version	Displays the key version used for verification.
Verifier Name	Name of the program responsible for performing the digital signature verification.
Verifier Version	Version of the program responsible for performing the digital signature verification.
ROMMON 2	Section of the output displaying the current ROM monitor (ROMMON) information.

Related Commands

Command	Description
show software authenticity file	Displays the software authenticity related information for the loaded image file.
show software authenticity keys	Displays the software public keys that are in the storage with the key types.

show software authenticity upgrade-status

To display software authenticity information indicating if the digitally signed software has been signed with a new production key after a production key revocation, use the **show software authenticity upgrade-status** command in privileged EXEC mode.

show software authenticity upgrade-status

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.0(M)2	This command was introduced for the Cisco 1941, 2900, and 3900 routers.
15.1(1)T	This command was integrated into Cisco IOS Release 15.1(1)T.

Usage Guidelines

The **show software authenticity upgrade-status** command is used to verify that digitally signed Cisco software, that has undergone key revocation, has been signed with the newly added key. Key revocation is the process of removing a key from operational use in digitally signed Cisco software. Key revocation takes place when a key becomes compromised or is no longer used.

The key upgrade verification verifies that ROM monitor (ROMmon) and Cisco IOS image keys have been updated.

Note The **show software authenticity upgrade-status** command will work only with a revocation image and thus the output from this command is useful only during a production key revocation process.

Examples

The following example displays the **show software authenticity upgrade-status** command being used during a production key revocation process, with sample output displayed:

```
Router> enable
Router# software authenticity key add production
Router# show software authenticity upgrade-status

The new production key version is B
The new production key is present in the primary key storage
The new production key is present in the backup key storage
The image tftp:flash0:c3900-universalk9-mz.SPB 209.165.200.224 is a netbooted image
Upgradeable rommon is Special software signed using key version B
```

The command ouput displays that the version of the new production key for the Cisco IOS image is B and that the ROMmon image is signed with a key with version B.

Related Commands

Command	Description
debug software authenticity	Enables the display of all debugging output related to software authentication events.
show software authenticity file	Displays the software authenticity related information for the loaded image file.
show software authenticity keys	Displays the software public keys that are in the key storage with the key types.
show software authenticity running	Displays information related to software authentication for the current ROMMON and Cisco IOS image used for booting.
software authenticity key add	Adds a release key to the key storage for a digitally signed software image during a key revocation process.
software authenticity key revoke	Revokes an invalidated key from the key storage for a digitally signed software image during a key revocation process.

show stacks

To monitor the stack usage of processes and interrupt routines, use the **show stacks** command in EXEC mode.

show stacks

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The display from this command includes the reason for the last system reboot. If the system was reloaded because of a system failure, a saved system stack trace is displayed. This information is of use only to your technical support representative in analyzing crashes in the field. It is included here in case you need to read the displayed statistics to an engineer over the phone.

Examples

The following is sample output from the **show stacks** command following a system failure:

```
Router# show stacks

Minimum process stacks:
Free/Size  Name
 652/1000  Router Init
 726/1000  Init
 744/1000  BGP Open
 686/1200  Virtual Exec

Interrupt level stacks:
Level    Called Free/Size  Name
  1           0 1000/1000  env-flash
  3         738  900/1000  Multiport Communications Interfaces
  5         178  970/1000  Console UART
System was restarted by bus error at PC 0xAD1F4, address 0xD0D0D1A
GS Software (GS3), Version 9.1(0.16), BETA TEST SOFTWARE
Compiled Tue 11-Aug-92 13:27 by jthomas
Stack trace from system failure:
FP: 0x29C158, RA: 0xACFD4
FP: 0x29C184, RA: 0xAD20C
FP: 0x29C1B0, RA: 0xACFD4
FP: 0x29C1DC, RA: 0xAD304
FP: 0x29C1F8, RA: 0xAF774
FP: 0x29C214, RA: 0xAF83E
FP: 0x29C228, RA: 0x3E0CA
FP: 0x29C244, RA: 0x3BD3C
```

Related Commands

Command	Description
show processes	Displays information about the active processes.

show startup-config

The **more nvram:startup-config** command has been replaced by the **show startup-config** command. See the description of the **more** command in the "Cisco IOS File System Commands" chapter for more information.

show subsys

To display the subsystem information, use the **show subsys** command in privileged EXEC mode.

show subsys [**class** *class* | **name** *name*]

Syntax Description

class *class*	(Optional) Displays the subsystems of the specified class. Valid classes are **driver**, **ehsa**, **ifs**, **kernel**, **library**, **license**, **management**, **microcode**, **pre-ehsa**, **predriver**, **protocol**, **registry**, and **sysinit**.
name *name*	(Optional) Displays the specified subsystem. Use the asterisk character (*) as a wildcard at the end of the name to list all subsystems, starting with the specified characters.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
11.1	This command was introduced.
12.3	The following classes were added: **ehsa**, **ifs**, **microcode**, **predriver**, and **sysinit**.
12.3T	The **pre-ehsa** class was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.The following classes were supported: **driver**, **ehsa**, **kernel**, **library**, **management**, **pre-driver**, **pre-ehsa**, **protocol**, and **registry**.
12.2(35)SE2	This command was integrated into Cisco IOS Release 12.2(35)SE2. The following classes were supported: **driver**, **ehsa**, **kernel**, **library**, **license**, **management**, **pre-driver**, **pre-ehsa**, **protocol**, and **registry**.

Usage Guidelines

Use the **show subsys** command to confirm that all required features are in the running image.

Examples

The following is sample output from the **show subsys** command:

```
Router# show subsys

Name                Class       Version
static_map          Kernel      1.000.001
arp                 Kernel      1.000.001
ether               Kernel      1.000.001
compress            Kernel      1.000.001
alignment           Kernel      1.000.002
monvar              Kernel      1.000.001
slot                Kernel      1.000.001
oir                 Kernel      1.000.001
atm                 Kernel      1.000.001
ip_addrpool_sys     Library     1.000.001
chat                Library     1.000.001
dialer              Library     1.000.001
```

```
flash_services      Library     1.000.001
ip_localpool_sys    Library     1.000.001
nvram_common        Driver      1.000.001
ASP                 Driver      1.000.001
sonict              Driver      1.000.001
oc3suni             Driver      1.000.001
oc12suni            Driver      1.000.001
ds3suni             Driver      1.000.001
```

The following is sample output from the **show subsys** command that includes the **license** class:

```
Router# show subsys name license

Name                Class       Version
license_mgmt_local  Management  1.000.001
license_admin_local Management  1.000.001
license_debug_core  Management  1.000.001
license_test_ui     Management  1.000.001
test_license_parser Management  1.000.001
license_ui          Management  1.000.001
license_parser      Management  1.000.001
license_registry    Registry    1.000.001
license_client      License     1.000.001
```

Table 157 describes the fields shown in the display.

Table 157 show subsys Field Descriptions

Field	Description
Name	Name of the subsystem.
Class	Class of the subsystem. Possible classes include Driver, Ehsa, Ifs, Kernel, Library, License, Management, Microcode, Pre-Ehsa, Pre-driver, Protocol, Registry, and Sysinit.
Version	Version of the subsystem.

show sup-bootflash

To display information about the sup-bootflash file system, use the **show sup-bootflash** command in privileged EXEC mode.

show sup-bootflash [**all** | **chips** | **filesys**]

Syntax Description

all	(Optional) Displays all possible Flash information.
chips	(Optional) Displays information about the Flash chip.
filesys	(Optional) Displays information about the file system.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to display a summary of bootflash information:

```
Router# show sup-bootflash

-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. image    EBC8FC4D  A7487C    6 10700796 Nov 19 1999 07:07:37 halley
2   .. unknown  C7EB077D  EE2620   25  4644130 Nov 19 1999 07:50:44 cat6000-sup_
5-3-3-CSX.bin

645600 bytes available (15345184 bytes used)
Router#
```

This example shows how to display all bootflash information:

```
Router# show sup-bootflash all

-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time------ name
1   .. image    EBC8FC4D  A7487C    6 10700796 Nov 19 1999 07:07:37 halley
2   .. unknown  C7EB077D  EE2620   25  4644130 Nov 19 1999 07:50:44 cat6000-sup_
5-3-3-CSX.bin

645600 bytes available (15345184 bytes used)

-------- F I L E   S Y S T E M   S T A T U S --------
  Device Number = 2
DEVICE INFO BLOCK: bootflash
  Magic Number          = 6887635   File System Vers = 10000    (1.0)
```

```
  Length                = 1000000   Sector Size      = 40000
  Programming Algorithm = 19        Erased State     = FFFFFFFF
  File System Offset    = 40000     Length = F40000
  MONLIB Offset         = 100       Length = F568
  Bad Sector Map Offset = 3FFF8     Length = 8
  Squeeze Log Offset    = F80000    Length = 40000
  Squeeze Buffer Offset = FC0000    Length = 40000
  Num Spare Sectors     = 0
    Spares:
STATUS INFO:
  Writable
  NO File Open for Write
  Complete Stats
  No Unrecovered Errors
  No Squeeze in progress
USAGE INFO:
  Bytes Used     = EA2620  Bytes Available = 9D9E0
  Bad Sectors    = 0       Spared Sectors  = 0
  OK Files       = 2       Bytes = EA2520
  Deleted Files  = 0       Bytes = 0
  Files w/Errors = 0       Bytes = 0

******** Intel SCS Status/Register Dump ********

COMMON MEMORY REGISTERS: Bank 0
  Intelligent ID Code  : 890089
  Compatible Status Reg: 800080

DEVICE TYPE:
  Layout                 : Paired x16 Mode
  Write Queue Size       : 64
  Queued Erase Supported : No

Router#
```

This example shows how to display information about the Flash chip:

```
Router# show sup-bootflash chips

******** Intel SCS Status/Register Dump ********

COMMON MEMORY REGISTERS: Bank 0
  Intelligent ID Code  : 890089
  Compatible Status Reg: 800080

DEVICE TYPE:
  Layout                 : Paired x16 Mode
  Write Queue Size       : 64
  Queued Erase Supported : No

Router#
```

This example shows how to display information about the file system:

```
Router# show sup-bootflash filesys

-------- F I L E   S Y S T E M   S T A T U S --------
  Device Number = 2
DEVICE INFO BLOCK: bootflash
  Magic Number          = 6887635   File System Vers = 10000    (1.0)
  Length                = 1000000   Sector Size      = 40000
  Programming Algorithm = 19        Erased State     = FFFFFFFF
  File System Offset    = 40000     Length = F40000
  MONLIB Offset         = 100       Length = F568
```

```
  Bad Sector Map Offset = 3FFF8     Length = 8
  Squeeze Log Offset    = F80000    Length = 40000
  Squeeze Buffer Offset = FC0000    Length = 40000
  Num Spare Sectors     = 0
    Spares:
STATUS INFO:
  Writable
  NO File Open for Write
  Complete Stats
  No Unrecovered Errors
  No Squeeze in progress
USAGE INFO:
  Bytes Used     = EA2620  Bytes Available = 9D9E0
  Bad Sectors    = 0       Spared Sectors  = 0
  OK Files       = 2       Bytes = EA2520
  Deleted Files  = 0       Bytes = 0
  Files w/Errors = 0       Bytes = 0

Router#
```

show sysctrl

To display system controller information, use the **show sysctrl** command in user EXEC or privileged EXEC mode.

show sysctrl

Syntax Description

This command has no arguments or keywords.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.4(24)T	This command was introduced in a release earlier than Cisco IOS Release 12.4(24)T on the Cisco 3845 series router.

Examples

The following is sample output from the **show sysctrl** command:

```
Router# show sysctrl

BCM1250 HT Host Bridge, handle=0
BCM bridge, config=0x0
(0x00):dev, vendor id               = 0x0002166D
(0x04):status, command              = 0x00100107
(0x08):class code, revid            = 0x06000003
(0x0C):hdr, lat timer, cls          = 0x00010000
(0x18):bus id registers             = 0x00250100
(0x1C):secondary status             = 0x00000141
(0x20):mem base/limit               = 0x5DF05000
(0x30):io upper limit/base          = 0x00010001
(0x34):capabilities ptr             = 0x00000040
(0x38):expansion rom bar            = 0x00000000
(0x3C):bridge ctrl                  = 0x00020000
(0x40):LDT cmd, cap id,             = 0x20000008
(0x44):Link config/control          = 0x00000020
(0x48):Link frequency               = 0x801F0423
(0x50):SRIcmd, srirxden, sritxden   = 0x50211010
(0x54):SRI tx numerator             = 0x0000FFFF
(0x58):SRI rx numerator             = 0x0000FFFF
(0x68):Error status/control         = 0x00009A49
(0x6C):Tx ctrl, databufalloc        = 0x00041515
(0xC8):Tx buffer count max          = 0x00FFFFFF
(0xDC):Rx CRC expected              = 0xFB5FF7F7
(0xF0):Rx CRC received              = 0xEDDF7FE3

BCM PCI Host Bridge:
bus_no=0, device_no=0
DeviceID=0x0001, VendorID=0x166D, Cmd=0x0146, Status=0x02A0
Cls=0x06/0x00/0x00, Rev=0x03, LatencyTimer=0x2C, CacheLineSize=0x10
BaseAddr0=0x60000008, BaseAddr1=0x00000000, MaxLat=0x00, MinGnt=0x00
SubsysDeviceID=0x0000, SubsysVendorID=0xFFFF, ErrorAddr=0x2E173900
Additional Status = 0x00000020
```

```
Bus Watcher Counters
cor_l2cache_data_ecc_count = 0
bad_l2cache_data_ecc_count = 0
cor_l2cache_tag_ecc_count  = 0
bad_l2cache_tag_ecc_count  = 0
cor_memory_data_ecc_count  = 0
bad_memory_data_ecc_count  = 0
bus_errors                 = 0

BCM Status Registers
A_SCD_BUS_ERR_STATUS  = 0000000080000000
A_BUS_ERR_DATA_0      = FFFDFFD7B3FB3FFF
A_BUS_ERR_DATA_1      = BF6CF8DF3FBFBFBE
A_BUS_ERR_DATA_2      = DFDF1F7B3DFDCB7C
A_BUS_ERR_DATA_3      = FF7FF7CFCBFF7DEE
A_SCD_SYSTEM_REVISION = 00000001112423FF
A_IO_INTERRUPT_STATUS = 0000000000000000
A_IO_INTERRUPT_ADDR0  = 0000000000000000
A_IO_INTERRUPT_ADDR1  = 0000000000000000

Data Mover Channel 1 (Packet moving DMA engine 1):
 channel=0x6860D0E4, ring=0x2D200080, context=0x7004BC84, entries=1024
 dma_used=0, dma_head=0, dma_tail=0 exhausted_dma_entries=0

Data Mover Channel 2 (Packet moving DMA engine 2):
 channel=0x6860D158, ring=0x2D2040C0, context=0x6860E968, entries=1024
 dma_used=0, dma_head=0, dma_tail=0 exhausted_dma_entries=0
```

Table 151 describes the significant fields shown in the display.

Table 158 show sysctlr Field Descriptions

Field	Description
bus id registers	Location of the bus ID registers.
secondary status	Location where the secondary status is available.
mem base/limit	Memory limit.
io upper limit/base	Upper limit of the input output.
capabilities ptr	Location of the capabilities pointer.
bridge ctrl	Location of the bridge control.
SRI tx numerator	SRI transmitter numerator.
SRI rx numerator	SRI receiver numerator.
Tx buffer count max	Maximum transmitter buffer count.
Rx CRC expected	Number of cyclic redundancy checks (CRC) expected on a receiver.
Rx CRC received	Number of CRCs received on a receiver.
bus_no	Identification number of the bus.
device_no	Identification number of the device.
DeviceID	Identification number of the device.
VendorID	Identification number of the vendor.
Cmd	Location where the command details are stored.

Table 158 show sysctlr Field Descriptions (continued)

Field	Description
Status	Location where the status is stored.
Cls	Location of the call details.
LatencyTimer	Location of the Latency timer.
BaseAddr0	Base address 0 pointer.
BaseAddr1	Base address 1 pointer.
MaxLat	Maximum latency.
SubsysDeviceID	Identification number of the subsystem device.
SubsysVendorID	Identification number of the subsystem vendor.
ErrorAddr	Location where the error message is stored.
Additional Status	Location where additional status information is stored.
bus_errors	Number of errors related to the bus.
A_SCD_BUS_ERR_STATUS	Error status of the SCD bus.
A_IO_INTERRUPT_STATUS	Input output interruption status.
A_IO_INTERRUPT_ADDR0	Input output interruption address 0.
A_IO_INTERRUPT_ADDR1	Input output interruption address 1.
channel	Location of the channel.
ring	Location of the ring.
entries	Total number of entries.
dma_used	Total number of Data Migration Assistant (DMA) entries used.
exhausted_dma_entries	Total number of DMA entries exhausted.

Related Commands

Command	Description
syscon monitor	Specifies attributes for the health monitor on the system controller to monitor.

show system jumbomtu

To display the global maximum transmission unit (MTU) setting, use the **show system jumbomtu** command in privileged EXEC mode.

show system jumbomtu

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

This example shows how to display the global MTU setting:

```
Router# show system jumbomtu

Global Ethernet MTU is 1550 bytes.
Router#
```

Related Commands

Command	Description
system jumbomtu	Sets the maximum size of the Layer 2 and Layer 3 packets.

show tech-support

To display general information about the router when it reports a problem, use the **show tech-support** command in privileged EXEC mode.

show tech-support [**page**] [**password**] [**cef** | **ipc** | **ipmulticast** [**vrf** *vrf-name*] | **isis** | **mpls** | **ospf** [*process-id* | **detail**] | **rsvp | voice | wccp**]

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show tech-support [**cef** | **ipmulticast** [**vrf** *vrf-name*] | **isis** | **password** [**page**] | **platform** | **page** | **rsvp**]

Syntax Description

page	(Optional) Causes the output to display a page of information at a time.
password	(Optional) Leaves passwords and other security information in the output.
cef	(Optional) Displays **show** command output specific to Cisco Express Forwarding.
ipc	(Optional) Displays **show** command output specific to Inter-Process Communication (IPC).
ipmulticast	(Optional) Displays **show** command output related to the IP Multicast configuration, including Protocol Independent Multicast (PIM) information, Internet Group Management Protocol (IGMP) information, and Distance Vector Multicast Routing Protocol (DVMRP) information.
vrf *vrf-name*	(Optional) Specifies a multicast Virtual Private Network (VPN) routing and forwarding instance (VRF).
isis	(Optional) Displays **show** command output specific to Connectionless Network Service (CLNS) and Intermediate System-to-Intermediate System Protocol (IS-IS).
mpls	(Optional) Displays **show** command output specific to Multiprotocol Label Switching (MPLS) forwarding and applications.
ospf [*process-id* | **detail**]	(Optional) Displays **show** command output specific to Open Shortest Path First Protocol (OSPF) networking.
rsvp	(Optional) Displays **show** command output specific to Resource Reservation Protocol (RSVP) networking.
voice	(Optional) Displays **show** command output specific to voice networking.
wccp	(Optional) Displays **show** command output specific to Web Cache Communication Protocol (WCCP).
platform	(Optional) Displays platform-specific **show** command output.

Defaults

The output scrolls without page breaks.
Passwords and other security information are removed from the output.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
11.2	This command was introduced.
11.3(7), 11.2(16)	The output for this command was expanded to show additional information for **boot**, **bootflash**, **context**, and **traffic** for all enabled protocols.
12.0	The output for this command was expanded to show additional information for **boot**, **bootflash**, **context**, and **traffic** for all enabled protocols. The **cef**, **ipmulticast**, **isis**, **mlps**, and **ospf** keywords were added to this command.
12.2(13)T	Support for AppleTalk EIGRP, Apollo Domain, Banyan VINES, Novell Link-State Protocol, and XNS was removed from Cisco IOS software.
12.2(14)SX	Support for this command was added for the Supervisor Engine 720.
12.3(4)T	The output of this command was expanded to include the output from the **show inventory** command.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(30)S	The **show tech-support ipmulticast** command was changed as follows: • Support for bidirectional PIM and Multicast VPN (MVPN) was added. • The **vrf** *vrf-name* option was added. The output of the **show tech-support ipmulticast** command (without the **vrf** *vrf-name* keyword and argument) was changed to include the output from these commands: • **show ip pim int df** • **show ip pim mdt** • **show ip pim mdt bgp** • **show ip pim rp metric**
12.3(16)	This command was integrated into Cisco IOS Release 12.3(16).
12.2(18)SXF	The **show tech-support ipmulticast** command was changed as follows: • Support for bidirectional PIM and MVPN was added. • The **vrf** *vrf-name* option was added. The output of the **show tech-support ipmulticast vrf** command was changed to include the output from these commands: • **show mls ip multicast rp-mapping gm-cache** • **show mmls gc process** • **show mmls msc rpdf-cache** The output of the **show tech-support ipmulticast** command (without the **vrf** *vrf-name* keyword and argument) was changed to include the output from these commands: • **show ip pim int df** • **show ip pim mdt** • **show ip pim mdt bgp** • **show ip pim rp metric** Support to interrupt and terminate the **show tech-support** output was added.

Release	Modification
12.4(4)T	This command was integrated into Cisco IOS Release 12.4(4)T.
12.4(7)	This command was integrated into Cisco IOS Release 12.4(7).
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(9)T	The output of this command was expanded to include partial **show dmvpn details** command output.
15.0(1)M	This command was modified. The **wccp** and **voice** keywords were added.
12.2(33)SRE	This command was modified. The **wccp** keyword was added.

Usage Guidelines

To interrupt and terminate the **show tech-support** output, simultaneously press and release the **CTRL**, **ALT**, and **6** keys.

Press the **Return** key to display the next line of output, or press the **Spacebar** to display the next page of information. If you do not enter the **page** keyword, the output scrolls (that is, it does not stop for page breaks).

If you do not enter the **password** keyword, passwords and other security-sensitive information in the output are replaced with the label "<removed>."

The **show tech-support** command is useful for collecting a large amount of information about your routing device for troubleshooting purposes. The output of this command can be provided to technical support representatives when reporting a problem.

Note This command can generate a very large amount of output. You may want to redirect the output to a file using the **show inventory | redirect** *url* command syntax extension. Redirecting the output to a file also makes sending this output to your technical support representative easier. See the command documentation for **show <command> | redirect** for more information on this option.

The **show tech-support** command displays the output of a number of **show** commands at once. The output from this command varies depending on your platform and configuration. For example, access servers display voice-related **show** command output. Additionally, the **show** *protocol* **traffic** commands are displayed for only the protocols enabled on your device. For a sample display of the output of the **show tech-support** command, see the individual **show** command listed.

If you enter the **show tech-support** command without arguments, the output displays, but is not limited to, the equivalent of these **show** commands:

- **show appletalk traffic**
- **show bootflash**
- **show bootvar**
- **show buffers**
- **show cdp neighbors**
- **show cef**
- **show clns traffic**
- **show context**
- **show controllers**
- **show decnet traffic**

- **show disk0: all**
- **show dmvpn details**
- **show environment**
- **show fabric channel-counters**
- **show file systems**
- **show interfaces**
- **show interfaces switchport**
- **show interfaces trunk**
- **show ip interface**
- **show ip traffic**
- **show logging**
- **show mac-address-table**
- **show module**
- **show power**
- **show processes cpu**
- **show processes memory**
- **show running-config**
- **show spanning-tree**
- **show stacks**
- **show version**
- **show vlan**

Note Crypto information is not duplicated by the **show dmvpn details** command output.

When the **show tech-support** command is entered on a virtual switch (VS), the output displays the output of the **show module** command and the **show power** command for both the active and standby switches.

Use of the optional **cef**, **ipc**, **ipmulticast**, **isis**, **mpls**, **ospf**, or **rsvp** keywords provides a way to display a number of **show** commands specific to a particular protocol or process in addition to the **show** commands listed previously.

For example, if your Technical Assistance Center (TAC) support representative suspects that you may have a problem in your Cisco Express Forwarding (CEF) configuration, you may be asked to provide the output of the **show tech-support cef** command. The **show tech-support** [**page**] [**password**] **cef** command will display the output from the following commands in addition to the output for the standard **show tech-support** command:

- **show adjacency summary**
- **show cef drop**
- **show cef events**
- **show cef interface**
- **show cef not-cef-switched**

- **show cef timers**
- **show interfaces stats**
- **show ip cef events summary**
- **show ip cef inconsistency records detail**
- **show ip cef summary**

If you enter the **ipmulticast** keyword, the output displays, but is not limited to, these **show** commands:

- **show ip dvmrp route**
- **show ip igmp groups**
- **show ip igmp interface**
- **show ip mcache**
- **show ip mroute**
- **show ip mroute count**
- **show ip pim interface**
- **show ip pim interface count**
- **show ip pim interface df**
- **show ip pim mdt**
- **show ip pim mdt bgp**
- **show ip pim neighbor**
- **show ip pim rp**
- **show ip pim rp metric**
- **show mls ip multicast rp-mapping gm-cache**
- **show mmls gc process**
- **show mmls msc rpdf-cache**

If you enter the **wccp** keyword, the output displays, but is not limited to, these **show** commands:

- **show ip wccp** *service-number*
- **show ip wccp interfaces cef**

Examples

For a sample display of the output from the **show tech-support** command, refer to the documentation for the **show** commands listed in the "Usage Guidelines" section.

Related Commands

Command	Description
dir	Displays a list of files on a file system.
show appletalk traffic	Displays statistics about AppleTalk traffic, including MAC IP traffic.
show bootflash	Displays the contents of boot flash memory.

Command	Description
show bootvar	Displays the contents of the BOOT environment variable, the name of the configuration file pointed to by the CONFIG_FILE environment variable, the contents of the BOOTLDR environment variable, and the configuration register setting.
show buffers	Displays statistics for the buffer pools on the network server.
show cdp neighbors	Displays detailed information about neighboring devices discovered using Cisco Discovery Protocol.
show cef	Displays information about packets forwarded by Cisco Express Forwarding.
show clns traffic	Displays a list of the CLNS packets this router has seen.
show <*command*> **| redirect**	Redirects the output of any **show** command to a file.
show context	Displays context data.
show controllers	Displays information that is specific to the hardware.
show controllers tech-support	Displays general information about a VIP card for problem reporting.
show decnet traffic	Displays the DECnet traffic statistics (including datagrams sent, received, and forwarded).
show disk:0	Displays flash or file system information for a disk located in slot 0:
show dmvpn details	Displays detail DMVPN information for each session, including Next Hop Server (NHS) and NHS status, crypto session information, and socket details.
show environment	Displays temperature, voltage, and blower information on the Cisco 7000 series routers, Cisco 7200 series routers, Cisco 7500 series routers, Cisco 7600 series routers, Cisco AS5300 series access servers, and the Gigabit Switch Router.
show fabric channel counters	Displays the fabric channel counters for a module.
show file system	Lists available file systems.
show interfaces	Displays statistics for all interfaces configured on the router or access server.
show interfaces switchport	Displays the administrative and operational status of a switching (nonrouting) port.
show interfaces trunk	Displays the interface-trunk information.
show inventory	Displays the product inventory listing and UDI of all Cisco products installed in the networking device.
show ip interface	Displays the usability status of interfaces configured for IP.
show ip traffic	Displays statistics about IP traffic.
show ip wccp	Displays global statistics related to WCCP.
show logging	Displays the state of syslog and the contents of the standard system logging buffer.
show mac-address table	Displays the MAC address table.
show module	Displays module status and information.
show power	Displays the current power status of system components.
show processes cpu	Displays information about the active processes.
show processes memory	Displays the amount of memory used.

Command	Description
show running-config	Displays the current configuration of your routing device.
show spanning-tree	Displays information about the spanning tree state.
show stacks	Displays the stack usage of processes and interrupt routines.
show version	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.
show vlan	Displays VLAN information.

show template

To display template information, use the **show template** command in user EXEC or privileged EXEC mode.

show template [*template-name*]

Syntax Description

template-name	(Optional) The template name.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.2(33)SRE	This command was introduced in a release earlier than Cisco IOS Release 12.2(33)SRE.
12.2(33)SXI	This command was introduced in a release earlier than Cisco IOS Release 12.2(33)SXI.
12.4(24)T	This command was introduced in a release earlier than Cisco IOS Release 12.4(24)T.
Cisco IOS 2.1 XE	This command was integrated into Cisco IOS XE Release 2.1 on the Cisco ASR 1000 Series Aggregation Services Router.

Examples

The following is sample output from the **show template** command displaying template information. The fields are self-explanatory.

```
Router# show template

Template class/type Component(s)
template1 owner ppp peer dialer
```

Related Commands

Command	Description
template	Configures a particular customer profile template.

show usb controllers

To display USB host controller information, use the **show usb controllers** command in privileged EXEC mode.

show usb controllers [*controller-number*]

Syntax Description

controller-number	(Optional) Displays information only for the specified controller.

Defaults

Information about all controllers on the system are displayed.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(11)T	This command was integrated into the Cisco 7200VXR NPE-G2 platform.

Usage Guidelines

Use the **show usb controllers** command to display content such as controller register specific information, current asynchronous buffer addresses, and period scheduling information. You can also use this command to verify that copy operations are occurring successfully onto a USB flash module.

Examples

The following example is sample output from the **show usb controllers** command:

```
Router# show usb controllers

Name:1362HCD
Controller ID:1
Controller Specific Information:
    Revision:0x11
    Control:0x80
    Command Status:0x0
    Hardware Interrupt Status:0x24
    Hardware Interrupt Enable:0x80000040
    Hardware Interrupt Disable:0x80000040
    Frame Interval:0x27782EDF
    Frame Remaining:0x13C1
    Frame Number:0xDA4C
    LSThreshold:0x628
    RhDescriptorA:0x19000202
    RhDescriptorB:0x0
    RhStatus:0x0
    RhPort1Status:0x100103
    RhPort2Status:0x100303
    Hardware Configuration:0x3029
    DMA Configuration:0x0
    Transfer Counter:0x1
    Interrupt:0x9
```

```
    Interrupt Enable:0x196
    Chip ID:0x3630
    Buffer Status:0x0
    Direct Address Length:0x80A00
    ATL Buffer Size:0x600
    ATL Buffer Port:0x0
    ATL Block Size:0x100
    ATL PTD Skip Map:0xFFFFFFFF
    ATL PTD Last:0x20
    ATL Current Active PTD:0x0
    ATL Threshold Count:0x1
    ATL Threshold Timeout:0xFF

Int Level:1
Transfer Completion Codes:
         Success              :920             CRC              :0
         Bit Stuff            :0               Stall            :0
         No Response          :0               Overrun          :0
         Underrun             :0               Other            :0
         Buffer Overrun       :0               Buffer Underrun :0
Transfer Errors:
         Canceled Transfers   :2               Control Timeout :0
Transfer Failures:
         Interrupt Transfer   :0               Bulk Transfer   :0
         Isochronous Transfer :0               Control Transfer:0
Transfer Successes:
         Interrupt Transfer   :0               Bulk Transfer   :26
         Isochronous Transfer :0               Control Transfer:894

USBD Failures:
         Enumeration Failures :0               No Class Driver Found:0
         Power Budget Exceeded:0

USB MSCD SCSI Class Driver Counters:
         Good Status Failures :3               Command Fail    :0
         Good Status Timed out:0               Device not Found:0
         Device Never Opened  :0               Drive Init Fail :0
         Illegal App Handle   :0               Bad API Command :0
         Invalid Unit Number  :0               Invalid Argument:0
         Application Overflow :0               Device in use   :0
         Control Pipe Stall   :0               Malloc Error    :0
         Device Stalled       :0               Bad Command Code:0
         Device Detached      :0               Unknown Error   :0
         Invalid Logic Unit Num:0

USB Aladdin Token Driver Counters:
         Token Inserted       :1               Token Removed   :0
         Send Insert Msg Fail :0               Response Txns   :434
         Dev Entry Add Fail   :0               Request Txns    :434
         Dev Entry Remove Fail:0               Request Txn Fail:0
         Response Txn Fail    :0               Command Txn Fail:0
         Txn Invalid Dev Handle:0

USB Flash File System Counters:
         Flash Disconnected   :0               Flash Connected :1
         Flash Device Fail    :0               Flash Ok        :1
         Flash startstop Fail :0               Flash FS Fail   :0

USB Secure Token File System Counters:
         Token Inserted       :1               Token Detached  :0
         Token FS success     :1               Token FS Fail   :0
         Token Max Inserted   :0               Create Talker Failures:0
         Token Event          :0               Destroy Talker Failures:0
         Watched Boolean Create Failures:0
```

show usb device

To display USB device information, use the **show usb device** command in privileged EXEC mode.

show usb device [*controller-ID* [*device-address*]]

Syntax Description

controller-ID	(Optional) Displays information only for the devices under the specified controller.
device-address	(Optional) Displays information only for the device with the specified address.

Defaults

Information for all devices attached to the system are displayed.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(11)T	This command was integrated into the Cisco 7200VXR NPE-G2 platform.

Usage Guidelines

Use the **show usb device** command to display information for either a USB flash drive or a USB eToken, as appropriate.

Examples

The following example is sample output from the **show usb device** command:

```
Router# show usb device

Host Controller:1
Address:0x1
Device Configured:YES
Device Supported:YES
Description:DiskOnKey
Manufacturer:M-Sys
Version:2.0
Serial Number:0750D84030316868
Device Handle:0x1000000
USB Version Compliance:2.0
Class Code:0x0
Subclass Code:0x0
Protocol:0x0
Vendor ID:0x8EC
Product ID:0x15
Max. Packet Size of Endpoint Zero:64
Number of Configurations:1
Speed:Full
Selected Configuration:1
Selected Interface:0
```

```
Configuration:
    Number:1
    Number of Interfaces:1
    Description:
    Attributes:None
    Max Power:140 mA

    Interface:
        Number:0
        Description:
        Class Code:8
        Subclass:6
        Protocol:80
        Number of Endpoints:2

        Endpoint:
            Number:1
            Transfer Type:BULK
            Transfer Direction:Device to Host
            Max Packet:64
            Interval:0

        Endpoint:
            Number:2
            Transfer Type:BULK
            Transfer Direction:Host to Device
            Max Packet:64
            Interval:0

Host Controller:1
Address:0x11
Device Configured:YES
Device Supported:YES
Description:eToken Pro 4254
Manufacturer:AKS
Version:1.0
Serial Number:
Device Handle:0x1010000
USB Version Compliance:1.0
Class Code:0xFF
Subclass Code:0x0
Protocol:0x0
Vendor ID:0x529
Product ID:0x514
Max. Packet Size of Endpoint Zero:8
Number of Configurations:1
Speed:Low
Selected Configuration:1
Selected Interface:0

Configuration:
    Number:1
    Number of Interfaces:1
    Description:
    Attributes:None
    Max Power:60 mA

    Interface:
        Number:0
        Description:
        Class Code:255
        Subclass:0
        Protocol:0
        Number of Endpoints:0
```

Table 159 describes the significant fields shown in the display.

Table 159 show usb device Field Descriptions

Field	Description
Device handle	Internal memory handle allocated to the device.
Device Class code	The class code supported by the device. This number is allocated by the USB-IF. If this field is reset to 0, each interface within a configuration specifies its own class information, and the various interfaces operate independently. If this field is set to a value between 1 and FEH, the device supports different class specifications on different interfaces, and the interfaces may not operate independently. This value identifies the class definition used for the aggregate interfaces. If this field is set to FFH, the device class is vendor-specific.
Device Subclass code	The subclass code supported by the device. This number is allocated by the USB-IF.
Device Protocol	The protocol supported by the device. If this field is set to 0, the device does not use class-specific protocols on a device basis. If this field is set to 0xFF, the device uses a vendor-specific protocol on a device basis.
Interface Class code	The class code supported by the interface. If the value is set to 0xFF, the interface class is vendor specific. All other values are allocated by the USB-IF.
Interface Subclass code	The subclass code supported by the interface. All values are allocated by the USB-IF.
Interface Protocol	The protocol code supported by the interface. If this field is set to 0, the device does not use a class-specific protocol on this interface. If this field is set to 0xFF, the device uses a vendor-specific protocol for this interface.
Max Packet	Maximum data packet size, in bytes.

show usb driver

To display information about registered USB class drivers and vendor-specific drivers, use the **show usb driver** command in privileged EXEC mode.

show usb driver [*index*]

Syntax Description

index	(Optional) Displays information only for drivers on the specified index.

Defaults

Information about all drivers is displayed.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(11)T	This command was integrated into the Cisco 7200VXR NPE-G2 platform.

Examples

The following example is sample output for the **show usb driver** command:

```
Router# show usb driver

Index:0
Owner Mask:0x6
Class Code:0x0
Subclass Code:0x0
Protocol:0x0
Interface Class Code:0x8
Interface Subclass Code:0x6
Interface Protocol Code:0x50
Product ID:0x655BD598
Vendor ID:0x64E90000
Attached Devices:
    Controller ID:1, Device Address:1

Index:1
Owner Mask:0x1
Class Code:0x0
Subclass Code:0x0
Protocol:0x0
Interface Class Code:0x0
Interface Subclass Code:0x0
Interface Protocol Code:0x0
Product ID:0x514
Vendor ID:0x529
Attached Devices:
    Controller ID:1, Device Address:17

Index:2
Owner Mask:0x5
Class Code:0x9
```

```
Subclass Code:0x6249BD58
Protocol:0x2
Interface Class Code:0x5DC0
Interface Subclass Code:0x5
Interface Protocol Code:0xFFFFFFFF
Product ID:0x2
Vendor ID:0x1
Attached Devices:
    None

Index:3
Owner Mask:0x10
Class Code:0x0
Subclass Code:0x0
Protocol:0x0
Interface Class Code:0x0
Interface Subclass Code:0x0
Interface Protocol Code:0x0
Product ID:0x0
Vendor ID:0x0
Attached Devices:
    None
```

Table 160 describes the significant field shown in the display.

Table 160 show usb driver Field Descriptions

Field	Description
Owner Mask	Indicates the fields that are used in enumeration comparison. The driver can own different devices on the basis of their product or vendor IDs and device or interface class, subclass, and protocol codes.

show usb port

To sisplay USB root hub port information, use the **show usb port** command in privileged EXEC mode.

show usb port [*port-number*]

Syntax Description

port-number	(Optional) Displays information only for a specified. If the *port-number* is not issued, information for all root ports will be displayed.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.

Examples

The following sample from the **show usb port** command shows the status of the port 1 on the router:

```
Router# show usb port

Port Number:0
Status:Enabled
Connection State:Connected
Speed:Full
Power State:ON

Port Number:1
Status:Enabled
Connection State:Connected
Speed:Low
Power State:ON
```

show usb tree

To display information about the port state and all attached devices, use the **show usb tree** command in privileged EXEC mode.

show usb tree

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.

Examples

The following example is sample output from the **show usb tree** command. This output shows that both a USB flash module and a USB eToken are currently enabled.

```
Router# show usb tree

[Host Id:1, Host Type:1362HCD, Number of RH-Port:2]
<Root Port0:Power=ON      Current State=Enabled>
  Port0:(DiskOnKey) Addr:0x1 VID:0x08EC PID:0x0015 Configured (0x1000000)
<Root Port1:Power=ON      Current State=Enabled>
  Port1:(eToken Pro 4254) Addr:0x11 VID:0x0529 PID:0x0514 Configured (0x1010000)
```

show usbtoken

To display information about the USB eToken (such as the eToken ID), use the **show usbtoken** command in privileged EXEC mode.

show usbtoken[**0**-**9**]**:**[**all** | *filesystem*]

Syntax Description

0-9	(Optional) One of the ten available flash drives you can choose from; valid values: 0-9. If you do not specify a number, 0 is used by default
all	(Optional) All configuration files stored on the eToken.
filesystem	(Optional) Name of a configuration file.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(14)T	This command was introduced.
12.4(11)T	This command was integrated into the Cisco 7200VXR NPE-G2 platform.

Usage Guidelines

Use the **show usbtoken** command to verify whether a USB eToken is inserted in the router.

Examples

The following example is sample output from the **show usbtoken** command:

```
Router# show usbtoken0

Token ID            :43353334
Token device name   : token0
Vendor name         : Vendor34
Product Name        :Etoken Pro
Serial number       : 22273a334353
Firmware version    :   4.1.3.2
Total memory size   : 32 KB
Free memory size    : 16 KB
FIPS version        :  Yes/No
Token state         :  "Active" | "User locked" | "Admin locked" | "System Error" |
"Uknown"
ATR (Answer To Reset) :"3B F2 98 0  FF C1 10 31 FE 55 C8 3"
```

Table 161 describes the significant fields shown in the display.

Table 161 show usbtoken Field Descriptions

Field	Description
Token ID	Token identifier.

Table 161 show usbtoken Field Descriptions (continued)

Field	Description
Token device name	A unique name derived by the token driver.
ATR (Answer to Reset)	Information replied by Smart cards when a reset command is issued.

show version

To display information about the currently loaded software along with hardware and device information, use the **show version** command in user EXEC, privileged EXEC, or diagnostic mode.

show version

Cisco ASR 1000 Series Routers

show version [*rp-slot*] [**installed** [**user-interface**] **| provisioned | running**]

Cisco Catalyst 6500 Series Routers

show version [**epld** *slot*]

Syntax Description

rp-slot	Specifies the software of the RP in a specific RP slot of a Cisco ASR 1000 Series Router. Options include: • **r0**—the RP in RP slot 0. • **r1**—the RP in RP slot 1. • **rp active**—the active RP. • **rp standby**—the standby RP.
installed	Specifies information on the software installed on the RP
user-interface	Specifies information on the files related to the user-interface.
provisioned	Specifies information on the software files that are provisioned.
running	Specifies information on the files currently running.
epld *slot*	(Optional) Specifies the software of the EPLD slot of a Cisco Catalyst 6500 Series Router.

Defaults

No default behavior or values.

Command Modes

User EXEC (>)
Privileged EXEC (#)
Diagnostic (diag)—Cisco ASR 1000 Series Routers only

Command History

Release	Modification
9.0	This command was introduced.
12.1EC	This command was integrated into Cisco IOS Release 12.1EC.
12.1(1a)T1	This command was modified to include information about the clock card on CMTS routers.
12.3BC	This command was integrated into Cisco IOS Release 12.3BC.
12.3(4)T	The output format of this command was updated.
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.

Release	Modification
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to 12.2(17d)SXB.
12.2(25)S	The output format of this command was updated.
12.2(33)SCA	This command was integrated into Cisco IOS Release 12.2(33)SCA. Support for the Cisco uBR7225VXR router was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers, and the following enhancements were introduced: • the command became available in diagnostic mode. • the *rp-slot*, **installed**, **user-interface**, **provisioned**, and **running** options all became available for the first time.
12.2(18)SX	Added ELPD keyword and output for the Cisco Catalyst 6500 Series Router.

Usage Guidelines

This command displays information about the Cisco IOS software version currently running on a routing device, the ROM Monitor and Bootflash software versions, and information about the hardware configuration, including the amount of system memory. Because this command displays both software and hardware information, the output of this command is the same as the output of the **show hardware** command. (The **show hardware** command is a command alias for the **show version** command.)

Specifically, the **show version** command provides the following information:

- Software information
  - Main Cisco IOS image version
  - Main Cisco IOS image capabilities (feature set)
  - Location and name of bootfile in ROM
  - Bootflash image version (depending on platform)
- Device-specific information
  - Device name
  - System uptime
  - System reload reason
  - Config-register setting
  - Config-register settings for after the next reload (depending on platform)
- Hardware information
  - Platform type
  - Processor type
  - Processor hardware revision
  - Amount of main (processor) memory installed
  - Amount I/O memory installed
  - Amount of Flash memory installed on different types (depending on platform)
  - Processor board ID

The output of this command uses the following format:

```
Cisco IOS Software, <platform> Software (<image-id>), Version <software-version>,
<software-type>
Technical Support: http://www.cisco.com/techsupport
Copyright (c) <date-range> by Cisco Systems, Inc.
Compiled <day> <date> <time> by <compiler-id>

ROM: System Bootstrap, Version <software-version>,  <software-type>
BOOTLDR: <platform> Software (image-id), Version <software-version>,  <software-type>

<router-name> uptime is <w> weeks, <d> days, <h> hours, <m> minutes
System returned to ROM by reload at <time> <day> <date>
System image file is "<filesystem-location>/<software-image-name>"
Last reload reason: <reload-reason>

Cisco <platform-processor-type> processor (revision <processor-revision-id>) with
<free-DRAM-memory>K/<packet-memory>K bytes of memory.
Processor board ID <ID-number>
<CPU-type> CPU at <clock-speed>Mhz, Implementation <number>, Rev <Revision-number>,
<kilobytes-Processor-Cache-Memory>KB <cache-Level> Cache
```

See the Examples section for descriptions of the fields in this output.

Cisco ASR 1000 Series Routers

Entering **show version** without any of the options on the Cisco ASR 1000 Series Router will generate output similar to **show version** on other Cisco routers.

In order to understand the **show version** output on Cisco ASR 1000 Series Routers, it is important to understand that the individual sub-packages run the processes on the router. Among other things, the output of this command provides information on where various individual sub-packages are stored on the router, and which processes these individual sub-packages are and are not currently running.

More specifically, the **show version installed** command displays each individual sub-package file on the router, the hardware where the sub-package could be running, and whether the sub-package is currently being run on that hardware.

The **show version provisioned** command displays only the individual sub-packages that can be provisioned, which are the RP-specific sub-packages (RP Access, RP Base, RP Control, and RP IOS) and the provisioning file. The output includes the individual sub-package file, the hardware where the sub-package could be running, and whether the sub-package is currently being run on that hardware.

The **show version running** command displays only the individual sub-packages that are currently active. The output includes the individual sub-package file and the hardware where the sub-package is running.

Examples

Cisco 3660 Router

The following is sample output from the **show version** command issued on a Cisco 3660 running Cisco IOS Release 12.3(4)T:

```
Router# show version

Cisco IOS Software, 3600 Software (C3660-I-M), Version 12.3(4)T
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2003 by Cisco Systems, Inc.
Compiled Thu 18-Sep-03 15:37 by ccai

ROM: System Bootstrap, Version 12.0(6r)T, RELEASE SOFTWARE (fc1)
ROM:

C3660-1 uptime is 1 week, 3 days, 6 hours, 41 minutes
```

```
System returned to ROM by power-on
System image file is "slot0:tftpboot/c3660-i-mz.123-4.T"

Cisco 3660 (R527x) processor (revision 1.0) with 57344K/8192K bytes of memory.
Processor board ID JAB055180FF
R527x CPU at 225Mhz, Implementation 40, Rev 10.0, 2048KB L2 Cache


3660 Chassis type: ENTERPRISE
2 FastEthernet interfaces
4 Serial interfaces
DRAM configuration is 64 bits wide with parity disabled.
125K bytes of NVRAM.
16384K bytes of processor board System flash (Read/Write)

Flash card inserted. Reading filesystem...done.
20480K bytes of processor board PCMCIA Slot0 flash (Read/Write)

Configuration register is 0x2102
```

Cisco 7200 Router

The following is sample output from the **show version** command issued on a Cisco 7200 router running Cisco IOS Release 12.4(4)T. This output shows the total bandwidth capacity and the bandwith capacity that is configured on the Cisco 7200. Displaying bandwidth capacity is available in Cisco IOS Release 12.2 and later releases.

```
Router# show version

Cisco IOS Software, 7200 Software (C7200-JS-M), Version 12.4(4)T, RELEASE SOFTW)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Thu 27-Oct-05 05:58 by ccai

ROM: System Bootstrap, Version 12.1(20000710:044039) [nlaw-121E_npeb 117], DEVEE
BOOTLDR: 7200 Software (C7200-KBOOT-M), Version 12.3(16), RELEASE SOFTWARE (fc4)

router uptime is 5 days, 18 hours, 2 minutes
System returned to ROM by reload at 02:45:12 UTC Tue Feb 14 2006
System image file is "disk0:c7200-js-mz.124-4.T"
Last reload reason: Reload Command


Cisco 7206VXR (NPE400) processor (revision A) with 491520K/32768K bytes of memo.
Processor board ID 26793934
R7000 CPU at 350MHz, Implementation 39, Rev 3.2, 256KB L2 Cache
6 slot VXR midplane, Version 2.6

Last reset from power-on

PCI bus mb0_mb1 (Slots 0, 1, 3 and 5) has a capacity of 600 bandwidth points.
Current configuration on bus mb0_mb1 has a total of 440 bandwidth points.
This configuration is within the PCI bus capacity and is supported.

PCI bus mb2 (Slots 2, 4, 6) has a capacity of 600 bandwidth points.
Current configuration on bus mb2 has a total of 390 bandwidth points
This configuration is within the PCI bus capacity and is supported.

Please refer to the following document "Cisco 7200 Series Port Adaptor
Hardware Configuration Guidelines" on Cisco.com <http://www.cisco.com>
for c7200 bandwidth points oversubscription and usage guidelines.
```

```
4 Ethernet interfaces
2 FastEthernet interfaces
2 ATM interfaces
125K bytes of NVRAM.

62976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
125952K bytes of ATA PCMCIA card at slot 1 (Sector size 512 bytes).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2002

Router#
```

For information about PCI buses and bandwidth calculation, go to http://www.cisco.com/univercd/cc/td/doc/product/core/7206/port_adp/config/3875in.htm#wp1057192.

Table 162 describes the significant fields shown in the display.

Table 162 show version Field Descriptions

Field	Description
Cisco IOS Software, *platform* Software (*image-id*), Version *software-version*, *release-type* For example: Cisco IOS Software, 7200 Software (C7200-G4JS-M), Version 12.3(4)T	*platform*—Cisco hardware device name. *image-id*—The coded software image identifier, in the format *platform-features-format* (for example, “c7200-g4js-mz”. *software-version*—The Cisco IOS software release number, in the format *x.y*(*z*)*A*, where *x.y* is the main release identifier, *z* is the maintenance release number, and *A*, where applicable, is the special release train identifier. For example, 12.3(4)T indicates the fourth maintenance release of the 12.3T special technology release train. **Note** In the full software image filename, 12.3(4)T appears as 123-4.T. In the IOS Upgrade Planner, 12.3(4)T appears as 12.3.4T (ED). *release-type*—The description of the release type. Possible values include MAINTENANCE [for example, 12.3(3)] or INTERIM [for example, 12.3(3.2)]. **Tip** Refer to “The ABC’s of Cisco IOS Networking” (available on Cisco.com) for more information on Cisco IOS software release numbering and software versions. Cisco IOS is a registered trademark (R) of Cisco Systems, Inc.
Technical Support: http://www.cisco.com/techsupport Copyright (c) *date-range* by Cisco Systems, Inc.	The Cisco Technical Support & Documentation website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content. Cisco IOS software, including the source code, user-help, and documentation, is copyrighted by Cisco Systems, Inc. It is Cisco’s policy to enforce its copyrights against any third party who infringes on its copyright.

Table 162 show version Field Descriptions (continued)

Field	Description
ROM: System Bootstrap, Version 12.0(6r)T, RELEASE SOFTWARE (fc1)	The system "bootstrap" software, stored in ROM memory.
BOOTFLASH:	The system "bootflash" software, stored in Flash memory (if applicable).
device uptime is ... For example: C3660-1 uptime is 1 week, 3 days, 6 hours, 41 minutes	The amount of time the system has been up and running.
System returned to ROM by *reload-reason* at *time day date* For example: System returned to ROM by reload at 20:56:53 UTC Tue Nov 4 2003	Shows the last recorded reason for a system reload, and time of last reload.
Last reload reason: *reload-reason* For example: Last reload reason: Reload command	Shows the last recorded reason for a system reload.
Last reset from *reset-reason* For example: Last reset from power-on	Shows the last recorded reason for a system reset. Possible *reset-reason* values include: • power-on—System was reset with the initial power on or a power cycling of the device. • s/w peripheral—System was reset due to a software peripheral. • s/w nmi—System was reset by a nonmaskable interrupt (NMI) originating in the system software. For example, on some systems, you can configure the device to reset automatically if two or more fans fail. • push-button—System was reset by manual activation of a RESET push-button (also called a hardware NMI). • watchdog—System was reset due to a watchdog process. • unexpected value—May indicate a bus error, such as for an attempt to access a nonexistent address (for example, "System restarted by bus error at PC 0xC4CA, address 0x210C0C0"). (This field was formerly labeled as the "System restarted by" field.")

Table 162 show version Field Descriptions (continued)

Field	Description
System image file is "*file-location/file-name*" For example: System image file is "slot0:tftpboot/c3660-i-mz.123-3.9.T2"	Displays the file location (local or remote filesystem) and the system image name.

Table 162 show version Field Descriptions (continued)

Field	Description
Cisco *platform* (*processor-type*) processor (revision *processor-revision-id*) with *free-DRAM-memory* K/ *packet-memory* K bytes of memory. Example—Separate DRAM and Packet Memory: Cisco RSP4 (R5000) processor with 65536K/2072K bytes of memory Example—Combined DRAM and Packet Memory: Cisco 3660 (R527x) processor (revision 1.0) with 57344K/8192K bytes of memory.	This line can be used to determine how much Dynamic RAM (DRAM) is installed on your system, in order to determine if you meet the "Min. Memory" requirement for a software image. DRAM (including SDRAM) is used for system processing memory and for packet memory. Two values, separated by a slash, are given for DRAM: The first value tells you how DRAM is available for system processing, and the second value tells you how much DRAM is being used for Packet memory. The first value, Main Processor memory, is either: • The amount of DRAM available for the processor, or • The total amount of DRAM installed on the system. The second value, Packet memory, is either: • The total physical input/output (I/O) memory (or "Fast memory") installed on the router (Cisco 4000, 4500, 4700, and 7500 series), or • The amount of "shared memory" used for packet buffering. In the shared memory scheme (Cisco 2500, 2600, 3600, and 7200 Series), a percentage of DRAM is used for packet buffering by the router's network interfaces. **Note** The terms "I/O memory" or "iomem"; "shared memory"; "Fast memory" and "PCI memory" all refer to "Packet Memory". Packet memory is either separate physical RAM or shared DRAM. **Separate DRAM and Packet Memory** The 4000, 4500, 4700, and 7500 series routers have separate DRAM and Packet memory, so you only need to look at the first number to determine total DRAM. In the example to the left for the Cisco RSP4, the first value shows that the router has 65536K (65,536 kilobytes, or 64 megabytes) of DRAM. The second value, 8192K, is the Packet memory. **Combined DRAM and Packet Memory** The 2500, 2600, 3600, and 7200 series routers require a minimum amount of I/O memory to support certain interface processors. The 1600, 2500, 2600, 3600, and 7200 series routers use a fraction of DRAM as Packet memory, so you need to add both numbers to find out the real amount of DRAM. In the example to the left for the Cisco 3660, the router has 57,344 kilobytes (KB) of free DRAM and 8,192 KB dedicated to Packet memory. Adding the two numbers together gives you 57,344K + 8,192K = 65,536K, or 64 megabytes (MB) of DRAM.

Table 162 show version Field Descriptions (continued)

Field	Description
	For more details on memory requirements, see the document "How to Choose a Cisco IOS® Software Release" on Cisco.com.
Configuration register is *value* For example: Configuration register is 0x2142 (will be 0x2102 at next reload)	Shows the current configured hex value of the software configuration register. If the value has been changed with the **config-register** command, the register value that will be used at the next reload is displayed in parenthesis. The boot field (final digit) of the software configuration register dictates what the system will do after a reset. For example, when the boot field of the software configuration register is set to 00 (for example, 0x0), and you press the NMI button on a Performance Route Processor (PRP), the user-interface remains at the ROM monitor prompt (rommon>) and waits for a user command to boot the system manually. But if the boot field is set to 01 (for example, 0x1), the system automatically boots the first Cisco IOS image found in the onboard Flash memory SIMM on the PRP. The factory-default setting for the configuration register is 0x2102. This value indicates that the router will attempt to load a Cisco IOS software image from Flash memory and load the startup configuration file.

Catalyst 6500 Series Switches and Cisco 7600 Series Routers

This example shows how to display the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images:

```
Router# show version
Cisco Internetwork Operating System Software
IOS (tm) c6sup2_rp Software (c6sup2_rp-JSV-M), Version 12.1 (nightly.E020626) NIG
HTLY BUILD
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Wed 26-Jun-02 06:20 by
Image text-base: 0x40008BF0, data-base: 0x419BA000

ROM: System Bootstrap, Version 12.1(11r)E1, RELEASE SOFTWARE (fc1)

Router uptime is 2 weeks, 8 hours, 48 minutes
Time since Router switched to active is 1 minute
System returned to ROM by power-on (SP by power-on)
System image file is "sup-bootflash:c6sup22-jsv-mz"

cisco Catalyst 6000 (R7000) processor with 112640K/18432K bytes of memory.
Processor board ID SAD06210067
R7000 CPU at 300Mhz, Implementation 39, Rev 3.3, 256KB L2, 1024KB L3 Cache
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
3 Virtual Ethernet/IEEE 802.3  interface(s)
48 FastEthernet/IEEE 802.3 interface(s)
381K bytes of non-volatile configuration memory.

16384K bytes of Flash internal SIMM (Sector size 512K).
```

```
Configuration register is 0x2102
Router#
```

Table 163 describes the fields that are shown in the example.

Table 163 show version Field Descriptions

Field	Description
IOS (tm) c6sup2_rp Software (c6sup2_rp-JSV-M), Version 12.1(nightly.E020626) NIGHTLY BUILD	Version number. Always specify the complete version number when reporting a possible software problem. In the example output, the version number is 12.1.
ROM: System Bootstrap, Version 12.1(11r)E1, RELEASE SOFTWARE (fc1)	Bootstrap version string.
BOOTFLASH: 7200 Software (C7200-BOOT-M), Version 11.1(472), RELEASE SOFTWARE	Boot version string.
Router uptime is	Amount of time that the system has been up and running.
Time since Router switched to active	Amount of time since switchover occurred.
System restarted by	Log of how the system was last booted, both as a result of normal system startup and of system error. For example, information can be displayed to indicate a bus error that is typically the result of an attempt to access a nonexistent address, as follows: System restarted by bus error at PC 0xC4CA, address 0x210C0C0
System image file is	If the software was booted over the network, the Internet address of the boot host is shown. If the software was loaded from onboard ROM, this line reads “running default software.”
cisco Catalyst 6000 (R7000) processor with 112640K/18432K bytes of memory.	Remaining output in each display that shows the hardware configuration and any nonstandard software options.
Configuration register is	Configuration register contents that are displayed in hexadecimal notation.

The output of the **show version** EXEC command can provide certain messages, such as bus error messages. If such error messages appear, report the complete text of this message to your technical support specialist.

This example shows how to display the ELPD version information of a slot:

```
Router# show version epld 4
Module 4 EPLD's:
Number of EPLD's: 6
EPLD A : 0x5
EPLD B : 0x2
EPLD C : 0x1
EPLD D : 0x1
EPLD E : 0x1
Router#
```

Cisco uBR7246VXR Router

The following is sample output from the **show version** command for a Cisco uBR7246 VXR with the cable clock card installed:

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (UBR7200-P-M), Version 12.1(10)EC, RELEASE SOFTWARE
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Wed 02-Feb-00 16:49 by ccai
Image text-base:0x60008900, data-base:0x61192000

ROM:System Bootstrap, Version 12.0(15)SC, RELEASE SOFTWARE

VXR1 uptime is 2 days, 1 hour, 24 minutes
System returned to ROM by power-on at 10:54:38 PST Sat Feb 5 2000
System restarted at 11:01:08 PST Sat Feb 5 2000
System image file is "slot1:ubr7200-p-mz.121-0.8.T"

cisco uBR7246VXR (NPE300) processor (revision B) with 122880K/40960K bytes of memory.
Processor board ID SAB0329005N
R7000 CPU at 262Mhz, Implementation 39, Rev 1.0, 256KB L2, 2048KB L3 Cache
6 slot VXR midplane, Version 2.0

Last reset from power-on
X.25 software, Version 3.0.0.
National clock card with T1 controller
1 FastEthernet/IEEE 802.3 interface(s)
2 Cable Modem network interface(s)
125K bytes of non-volatile configuration memory.

16384K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
20480K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0

Router#
```

Table 0-164 describes significant fields shown in these displays.

Table 0-164 show version Field Descriptions

Field	Description
IOS (tm) 7200 Software (UBR7200-P-M), Version xx.x	Always specify the complete version number when reporting a possible software problem. In the example, the version number is Cisco IOS Release 12.1(10)EC.
ROM: System Bootstrap	Bootstrap version string.
Router uptime is	The amount of time the system has been up and running.
System restarted at	Also displayed is a log of how the system was last booted, as a result of normal system startup or system error.
System image file is	If the software was booted over the network, the Internet address of the boot host is shown. If the software was loaded from onboard ROM, this line reads “running default software.”

Table 0-164 show version Field Descriptions

Field	Description
cisco uBR7246VXR (NPE300) processor	The remaining output in each display shows the hardware configuration and any nonstandard software options.
Configuration register is	The configuration register contents, displayed in hexadecimal notation.

The output of the **show version** command can also provide certain messages, such as bus error messages. If such error messages appear, report the complete text of this message to your technical support specialist.

Cisco uBR10012 Router

The following example shows sample output from the show version command on a Cisco uBR10012 universal broadband router running Cisco IOS Release 12.3(17b)BC4:

```
Router> show version
Cisco Internetwork Operating System Software
IOS (tm) 10000 Software (UBR10K2-K9P6U2-M), Version 12.3(17b)BC4, RELEASE SOFTWA
RE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2006 by cisco Systems, Inc.
Compiled Wed 22-Nov-06 11:41 by tinhuang
Image text-base: 0x60010F0C, data-base: 0x62480000

ROM: System Bootstrap, Version 12.0(20020314:211744) [REL-pulsar_sx.ios-rommon 1
12], DEVELOPMENT SOFTWARE

ubr10k uptime is 2 days, 22 hours, 13 minutes
System returned to ROM by reload at 01:34:58 UTC Sun Jun 8 2008
System image file is "disk0:ubr10k2-k9p6u2-mz.123-17b.BC4"
Last reload reason: Reload command



This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.

cisco uBR10000 (PRE2-RP) processor with 946175K/98304K bytes of memory.
Processor board ID TBA05380380
R7000 CPU at 500MHz, Implementation 39, Rev 4.1, 256KB L2, 8192KB L3 Cache
Backplane version 1.1, 8 slot

Last reset from register reset
PXF processor tmc0 is running.
PXF processor tmc1 is running.
PXF processor tmc2 is running.
```

```
PXF processor tmc3 is running.
1 TCCplus card(s)
1 FastEthernet/IEEE 802.3 interface(s)
3 Gigabit Ethernet/IEEE 802.3 interface(s)
24 Cable Modem network interface(s)
2045K bytes of non-volatile configuration memory.

125440K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
125440K bytes of ATA PCMCIA card at slot 1 (Sector size 512 bytes).
65536K bytes of Flash internal SIMM (Sector size 512KB).
Secondary is up.
Secondary has 1044480K bytes of memory.

Configuration register is 0x2102
```

Cisco ASR 1000 Series Routers

In the following example, the **show version installed** command is entered on a Cisco ASR 1000 Series Router in diagnostic mode. Note that the output shows what every file that can be found in the consolidated package is or is not currently running (provisioning file, RP Access, RP Base, RP Control, RP IOS, ESP Base, SIP Base, SIP SPA).

```
Router#show version installed
Package: Provisioning File, version: n/a, status: active
  File: bootflash:packages.conf, on: RP0
  Built: n/a, by: n/a
  File SHA1 checksum: 0b9f2c7c3d81d8455a918f285c078463c04a0cab

Package: rpbase, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpbase.v122_33_xn_asr_rls0_throttle.pkg, on: RP0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 193c4810becc2a6097645f0b68f5684004bd3ab3

Package: rpaccess-k9, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpaccess-k9.v122_33_xn_asr_rls0_throttle.pkg, on: RP0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 328c3d1e10f006304ce9543ab68e914b43c41b1e

Package: rpcontrol, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle.pkg, on: RP0/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: e4152b7fe3c2b8aca07ce1e8ad6d5a54d6d20689

Package: rpios-advipservicesk9, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle.pkg, on:
RP0/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 7f7f87f2c198c38e7b58214478c5b28ee3c7b567

Package: rpcontrol, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle.pkg, on: RP0/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: e4152b7fe3c2b8aca07ce1e8ad6d5a54d6d20689

Package: rpios-advipservicesk9, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle.pkg, on:
RP0/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 7f7f87f2c198c38e7b58214478c5b28ee3c7b567

Package: rpbase, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpbase.v122_33_xn_asr_rls0_throttle.pkg, on: RP1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 193c4810becc2a6097645f0b68f5684004bd3ab3
```

```
Package: rpaccess-k9, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpaccess-k9.v122_33_xn_asr_rls0_throttle.pkg, on: RP1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 328c3d1e10f006304ce9543ab68e914b43c41b1e

Package: rpcontrol, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle.pkg, on: RP1/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: e4152b7fe3c2b8aca07ce1e8ad6d5a54d6d20689

Package: rpios-advipservicesk9, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle.pkg, on:
RP1/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 7f7f87f2c198c38e7b58214478c5b28ee3c7b567

Package: rpcontrol, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle.pkg, on: RP1/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: e4152b7fe3c2b8aca07ce1e8ad6d5a54d6d20689

Package: rpios-advipservicesk9, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle.pkg, on:
RP1/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 7f7f87f2c198c38e7b58214478c5b28ee3c7b567

Package: espbase, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-espbase.v122_33_xn_asr_rls0_throttle.pkg, on: FP0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: b1c004ed151cf60f0ce250f6ea710f43707fb010

Package: espbase, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-espbase.v122_33_xn_asr_rls0_throttle.pkg, on: FP1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: b1c004ed151cf60f0ce250f6ea710f43707fb010

Package: sipbase, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle.pkg, on: CC0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: bd34a8a23d001f9cefcac8853a31b62ffd8272a4

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC0/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC0/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC0/2
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC0/3
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipbase, version: v122_33_xn_asr_rls0_throttle, status: active
```

```
  File: bootflash:asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle.pkg, on: CC1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: bd34a8a23d001f9cefcac8853a31b62ffd8272a4

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC1/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC1/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC1/2
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC1/3
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipbase, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle.pkg, on: CC2
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: bd34a8a23d001f9cefcac8853a31b62ffd8272a4

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC2/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC2/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC2/2
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC2/3
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Router#
```

In the following example, the **show version provisioned** command is entered to gather information on which sub-packages are provisioning which components on the router.

```
Router#show version provisioned
Package: Provisioning File, version: n/a, status: active
  File: bootflash:packages.conf, on: RP0
  Built: n/a, by: n/a
  File SHA1 checksum: 0b9f2c7c3d81d8455a918f285c078463c04a0cab

Package: rpbase, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpbase.v122_33_xn_asr_rls0_throttle.pkg, on: RP0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 193c4810becc2a6097645f0b68f5684004bd3ab3
```

```
Package: rpaccess-k9, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpaccess-k9.v122_33_xn_asr_rls0_throttle.pkg, on: RP0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 328c3d1e10f006304ce9543ab68e914b43c41b1e

Package: rpcontrol, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle.pkg, on: RP0/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: e4152b7fe3c2b8aca07ce1e8ad6d5a54d6d20689

Package: rpios-advipservicesk9, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle.pkg, on:
RP0/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 7f7f87f2c198c38e7b58214478c5b28ee3c7b567

Package: rpcontrol, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle.pkg, on: RP0/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: e4152b7fe3c2b8aca07ce1e8ad6d5a54d6d20689

Package: rpios-advipservicesk9, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle.pkg, on:
RP0/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 7f7f87f2c198c38e7b58214478c5b28ee3c7b567

Package: rpbase, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpbase.v122_33_xn_asr_rls0_throttle.pkg, on: RP1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 193c4810becc2a6097645f0b68f5684004bd3ab3

Package: rpaccess-k9, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpaccess-k9.v122_33_xn_asr_rls0_throttle.pkg, on: RP1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 328c3d1e10f006304ce9543ab68e914b43c41b1e

Package: rpcontrol, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle.pkg, on: RP1/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: e4152b7fe3c2b8aca07ce1e8ad6d5a54d6d20689

Package: rpios-advipservicesk9, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle.pkg, on:
RP1/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 7f7f87f2c198c38e7b58214478c5b28ee3c7b567

Package: rpcontrol, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle.pkg, on: RP1/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: e4152b7fe3c2b8aca07ce1e8ad6d5a54d6d20689

Package: rpios-advipservicesk9, version: v122_33_xn_asr_rls0_throttle, status: inactive
  File: bootflash:asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle.pkg, on:
RP1/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 7f7f87f2c198c38e7b58214478c5b28ee3c7b567

Package: rpios-advipservicesk9, version: unknown, status: active
  File: unknown, on: FP0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown
```

```
Package: rpios-advipservicesk9, version: unknown, status: inactive
  File: unknown, on: FP1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: active
  File: unknown, on: CC0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: active
  File: unknown, on: CC0/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: active
  File: unknown, on: CC0/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: active
  File: unknown, on: CC0/2
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: inactive
  File: unknown, on: CC0/3
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: active
  File: unknown, on: CC1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: active
  File: unknown, on: CC1/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: active
  File: unknown, on: CC1/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: active
  File: unknown, on: CC1/2
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: inactive
  File: unknown, on: CC1/3
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: inactive
  File: unknown, on: CC2
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: inactive
  File: unknown, on: CC2/0
  Built: 2007-11-11_17.16, by: mcpre
```

```
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: inactive
  File: unknown, on: CC2/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: inactive
  File: unknown, on: CC2/2
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Package: rpios-advipservicesk9, version: unknown, status: inactive
  File: unknown, on: CC2/3
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: unknown

Router#
```

In the following example, the **show version running** command is entered to view which sub-packages are active on which hardware elements on the router.

```
Router#show version running
Package: Provisioning File, version: n/a, status: active
  File: bootflash:packages.conf, on: RP0
  Built: n/a, by: n/a
  File SHA1 checksum: 0b9f2c7c3d81d8455a918f285c078463c04a0cab

Package: rpbase, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpbase.v122_33_xn_asr_rls0_throttle.pkg, on: RP0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 193c4810becc2a6097645f0b68f5684004bd3ab3

Package: rpaccess-k9, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpaccess-k9.v122_33_xn_asr_rls0_throttle.pkg, on: RP0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 328c3d1e10f006304ce9543ab68e914b43c41b1e

Package: rpcontrol, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle.pkg, on: RP0/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: e4152b7fe3c2b8aca07ce1e8ad6d5a54d6d20689

Package: rpios-advipservicesk9, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle.pkg, on:
RP0/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 7f7f87f2c198c38e7b58214478c5b28ee3c7b567

Package: espbase, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-espbase.v122_33_xn_asr_rls0_throttle.pkg, on: FP0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: b1c004ed151cf60f0ce250f6ea710f43707fb010

Package: sipbase, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle.pkg, on: CC0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: bd34a8a23d001f9cefcac8853a31b62ffd8272a4

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC0/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897
```

```
Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC0/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC0/2
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipbase, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle.pkg, on: CC1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: bd34a8a23d001f9cefcac8853a31b62ffd8272a4

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC1/0
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC1/1
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Package: sipspa, version: v122_33_xn_asr_rls0_throttle, status: active
  File: bootflash:asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg, on: CC1/2
  Built: 2007-11-11_17.16, by: mcpre
  File SHA1 checksum: 6ad199569dad7d8b35beac2c8a72b080f9662897

Router#
```

Table 165 show version installed, provisioned, and running Field Descriptions

Field	Description
`Package:`	The individual sub-package name.
`version:`	The consolidated package version of the individual sub-package.
`status:`	Reveals if the sub-package is active or inactive for the specific hardware component only.
`File:`	The location and filename of the individual sub-package file.
`on:`	The hardware component.
`Built:`	The date the individual sub-package was built.
`File SHA1 checksum:`	The SHA1 sum for the file. This sum can be compared against a SHA1 sum generated by any SHA1 sum-generating tool.

Related Commands

Command	Description
show diag	Displays hardware and diagnostic information for a networking device, a line card, a processor, a jacket card, a chassis, or a network module.
show inventory	Displays the Cisco Unique Device Identifier information, including the Product ID, the Version ID, and the Serial Number, for the hardware device and hardware components.

show warm-reboot

To display the statistics for attempted warm reboots, use the **show warm-reboot** command in privileged EXEC mode.

show warm-reboot

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(2)T	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Relase 12.2(18)S.
12.2(28)SB	This command was integrated into Cisco IOS Relase 12.2(28)SB.

Usage Guidelines

Use the **show warm-reboot** command to see if warm rebooting is enabled, and, if so, how many warm reloads have occurred and how much space in kilobytes (KB) is consumed by warm-reboot storage, which is the RAM area used to store the data segment that enables warm reloading to function.

Examples

The following example is sample output from the **show warm-reboot** command:

```
Router# show warm-reboot

Warm Reboot is enabled

Statistics:
10 warm reboots have taken place since the last cold reboot
XXX KB taken up by warm reboot storage
```

Related Commands

Command	Description
warm-reboot	Enables a router to warm-reboot.

show whoami

To display information about the terminal line of the current user, including host name, line number, line speed, and location, use the **show whoami** command in EXEC mode.

show whoami [*text*]

Syntax Description

text	(Optional) Additional data to print to the screen.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If text is included as an argument in the command, that text is displayed as part of the additional data about the line.

To prevent the information from being lost if the menu display clears the screen, this command always displays a --More-- prompt before returning. Press the space bar to return to the prompt.

Examples

The following example is sample output from the **show whoami** command:

```
Router> show whoami


Comm Server "Router", Line 0 at 0bps.  Location "Second floor, West"

--More--
Router>
```

showmon

To show both the ReadOnly and the Upgrade ROMmon image versions when you are in ROMmon mode, as well as which ROMmon image is running on the Cisco 7200 VXR or Cisco 7301 router, use the **showmon** command in ROM monitor mode.

showmon

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values

Command Modes

ROM monitor mode

Command History

Release	Modification
12.0(28)S	This command was introduced on the Cisco 7200 VXR router. It was introduced in ROMmon version 12.3(4r)T1 for the Cisco 7200 VXR router.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T and supported on the Cisco 7200 VXR router and Cisco 7301 router. It was introduced in ROMmon version 12.3(4r)T2 for the Cisco 7301 router.
12.3(9)	This command was integrated into Cisco IOS Release 12.3(9) and supported on the Cisco 7200 VXR router and Cisco 7301 router.

Usage Guidelines

Use the **showmon** command when you are in ROM monitor mode. Use the **show rom-monitor** command when you are in Cisco IOS.

Examples

The following example, applicable to both the Cisco 7200 VXR and Cisco 7301 routers, uses the **showmon** command in ROMmon to display both ROMmon images and to verify that the Upgrade ROMmon image is running:

```
rommon 1 > showmon

ReadOnly ROMMON version is:
System Bootstrap, Version 12.2(20031011:151758) [biff]
Copyright (c) 2004 by Cisco Systems, Inc.


Upgrade ROMMON version is:
System Bootstrap, Version 12.2(20031011:151758) [biff]
Copyright (c) 2004 by Cisco Systems, Inc.

Upgrade ROMMON currently running
Upgrade ROMMON is selected for next boot
rommon 2 >
```

Related Commands

Command	Description
rommon-pref	Selects a ReadOnly or Upgrade ROMmon image to be booted on the next reload of a Cisco 7200 VXR or Cisco 7301 when you are in ROMmon.

slave auto-sync config

To turn on automatic synchronization of configuration files for a Cisco 7507 or Cisco 7513 router that is configured for High System Availability (HSA) using Dual RSP Cards, use the **slave auto-sync config** global configuration command. To turn off automatic synchronization, use the **no** form of the command.

slave auto-sync config

no slave auto-sync config

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
11.1	The command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command for a Cisco 7507 or Cisco 7513 router that is configured for dual RSP cards. On the Cisco 7507 and Cisco 7513 router, you can install two RSP cards in a single router to improve system availability. Dual RSP Cards is a High System Availability (HSA) feature.

In automatic synchronization mode, when you issue a **copy** EXEC command that specifies the master's startup configuration (**nvram:startup-config**) as the target, the master also copies the same file to the slave's startup configuration (**slavenvram:startup-config**). Use this command when implementing HSA for simple hardware backup or for software error protection to ensure that the master and slave RSP contain the same configuration files.

Examples

The following example turns on automatic configuration file synchronization. When the **copy system:running-config nvram:startup-config** command is entered, the running configuration is saved to the startup configurations of both the master RSP and the slave RSP.

```
Router(config)# slave auto-sync config
Router(config)# end
Router# copy system:running-config nvram:startup-config
```

Related Commands

Command	Description
show controller cbus	Displays detailed information on the cards connected to the CBus controller.
show stacks	Displays the stack trace and version information of the master and slave RSP cards.

Command	Description
show version	Displays the software version running on the master and slave RSP cards.
slave sync config	Manually synchronizes configuration files on the master and slave RSP cards of a Cisco 7507 or Cisco 7513 router.

slave default-slot

To specify the default slave Route Switch Processor (RSP) card on a Cisco 7507 or Cisco 7513 router, use the **slave default-slot** global configuration command.

slave default-slot *processor-slot-number*

Syntax Description

processor-slot-number	Number of a processor slot that contains the default slave RSP. On the Cisco 7507 router, valid values are 2 or 3. On the Cisco 7513 router, valid values are 6 or 7. The default is the higher number processor slot.

Defaults

The default slave is the RSP card located in the higher number processor slot. On the Cisco 7507 router, processor slot 3 contains the default slave RSP. On the Cisco 7513 router, processor slot 7 contains the default slave RSP.

Command Modes

Global configuration

Command History

Release	Modification
11.1	The command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command for a Cisco 7507 or Cisco 7513 router that is configured for Dual RSP Cards. On the Cisco 7507 and Cisco 7513 router, you can install two RSP cards in a single router to improve system availability. Dual RSP Cards is a High System Availability (HSA) feature.

The router uses the default slave information when booting as follows:

- If a system boot is due to powering up the router or using the **reload** EXEC command, then the specified default slave will be the slave RSP.
- If a system boot is due to a system crash or hardware failure, then the system ignores the default slave designation, and makes the crashed or faulty RSP card the slave RSP.

Examples

In the following example, the user sets the default slave RSP to processor slot 2 on a Cisco 7507 router:

```
c7507(config)# slave default-slot 2
```

Related Commands

Command	Description
reload	Reloads the operating system.
show controller cbus	Displays detailed information on the cards connected to the CBus controller.

Command	Description
show stacks	Displays the stack trace and version information of the master and slave RSP cards.
show version	Displays the software version running on the master and slave RSP cards.

slave image

To specify the image that the slave Route Switch Processor (RSP) runs on a Cisco 7507 or Cisco 7513 router, use the **slave image** command in global configuration mode.

slave image {**system** | *file-url*}

Syntax Description

system	Loads the slave image that is bundled with the master system image. This is the default.
file-url	The specified file in Flash file system from which the slave image will be load. If you do not specify a filename, the first file in the specified Flash file system is the default file.

Defaults

The default is to load the image from the system bundle.

Command Modes

Global configuration (config)

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command for a Cisco 7507 or Cisco 7513 router that is configured for Dual RSP Cards. On the Cisco 7507 and Cisco 7513 router, you can install two RSP cards in a single router to improve system availability. Dual RSP Cards is a High System Availability (HSA) feature.

Use the **slave image** command to override the slave image that is bundled with the master image.

When using HSA for simple hardware backup, ensure that the slave image is in the same location on the master and the slave RSP card. Thus, if the slave RSP card becomes the master, it will be able to find the slave image and download it to the new slave.

Note The default length of the bootstring filename is 64 characters. Depending on the platform a longer bootstring filename can be used and supported.

Examples

In the following example, the slave RSP is specified to run the rsp-dw-mz.ucode.111-3.2 image from slot 0:

```
Router(config)# slave image slot0:rsp-dw-mz.ucode.111-3.2
```

Related Commands

Command	Description
show controller cbus	Displays detailed information on the cards connected to the CBus controller.
show stacks	Displays the stack trace and version information of the master and slave RSP cards.
show version	Displays the software version running on the master and slave RSP cards.
slave reload	Forces a reload of the image that the slave RSP card is running on a Cisco 7507 or Cisco 7513 router.

slave reload

To force a reload of the image that the slave Route Switch Processor (RSP) card is running on a Cisco 7507 or Cisco 7513 router, use the **slave reload** global configuration command.

slave reload

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
11.1	The command was introduced.
12.2913)T	This command is no longer supported in Cisco IOS Mainline or Technology-based releases. It may appear in 12.2S-family releases.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command for a Cisco 7507 or Cisco 7513 router that is configured for Dual RSP Cards. On the Cisco 7507 and Cisco 7513 router, you can install two RSP cards in a single router to improve system availability. Dual RSP Cards is a High System Availability (HSA) feature.

After using the **slave image** global configuration command to specify the image that the slave RSP runs on a Cisco 7507 or Cisco 7513 router, use the **slave reload** command to reload the slave with the new image. The **slave reload** command can also be used to force the slave to reboot its existing image.

Examples

In the following example, an inactive slave RSP card is reloaded. If the slave reloads, it will return to an active slave state. If the master RSP fails, the slave RSP will become the master.

```
c7507(config)# slave reload
```

Related Commands

Command	Description
show controller cbus	Displays detailed information on the cards connected to the CBus controller.
show stacks	Displays the stack trace and version information of the master and slave RSP cards.
show version	Displays the software version running on the master and slave RSP cards.
slave image	Specifies the image that the slave RSP runs on a Cisco 7507 or Cisco 7513 router.

slave sync config

To manually synchronize configuration files on the master and slave Route Switch Processor (RSP) cards of a Cisco 7507 or Cisco 7513 router, use the **slave sync config** privileged EXEC command.

slave sync config

Syntax Description

This command has no arguments or keywords.

Defaults

Automatic synchronization is turned on.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	The command was introduced.
12.2(13)T	This command is no longer supported in Cisco IOS Mainline or Technology-based releases. It may appear in 12.2S-family releases.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command for a Cisco 7507 or Cisco 7513 router that is configured for Dual RSP Cards. On the Cisco 7507 and Cisco 7513 router, you can install two RSP cards in a single router to improve system availability. Dual RSP Cards is a High System Availability (HSA) feature.

This command allows you to synchronize the configuration files of the master and slave RSP cards on a case-by-case basis when you do not have automatic synchronization turned on. This command copies the master's configuration file to the slave RSP card.

Note You *must* use this command when you insert a new slave RSP card into a Cisco 7507 or Cisco 7513 router for the first time to ensure that the new slave is configured consistently with the master.

Examples

In the following example, the configuration files on the master and slave RSP card are synchronized:

```
c7507(config)# slave sync config
```

Related Commands

Command	Description
show controller cbus	Displays detailed information on the cards connected to the CBus controller.
show stacks	Displays the stack trace and version information of the master and slave RSP cards.

Command	Description
show version	Displays the software version running on the master and slave RSP cards.
slave auto-sync config	Turns on automatic synchronization of configuration files for a Cisco 7507 or Cisco 7513 router that is configured for HSA.

slave terminal

To enable access to the slave Route Switch Processor (RSP) console, use the **slave terminal** global configuration command. To disable access to the slave RSP console, use the **no** form of this command.

slave terminal

no slave terminal

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Global configuration

Command History

Release	Modification
11.1	The command was introduced.
12.2(13)T	This command is no longer supported in Cisco IOS Mainline or Technology-based releases. It may appear in 12.2S-family releases.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The slave console does not have enable password protection. Thus, an individual connected to the slave console port can enter privileged EXEC mode and view or erase the configuration of the router. Use the **no slave terminal** command to disable slave console access and prevent security problems. When the slave console is disabled, users cannot enter commands.

If slave console access is disabled, the following message appears periodically on the slave console:

```
%%Slave terminal access is disabled. Use "slave terminal" command in master RSP
configuration mode to enable it.
```

Examples

In the following example, the user disables console access to the slave RSP:

```
c7507(config)# no slave terminal
```

Related Commands

Command	Description
show controller cbus	Displays detailed information on the cards connected to the CBus controller.
show stacks	Displays the stack trace and version information of the master and slave RSP cards.
show version	Displays the software version running on the master and slave RSP cards.
slave auto-sync config	Turns on automatic synchronization of configuration files for a Cisco 7507 or Cisco 7513 router that is configured for Dual RSP Cards.

special-character-bits

To configure the number of data bits per character for special characters such as software flow control characters and escape characters, use the **special-character-bits** command in line configuration mode. To restore the default value, use the **no** form of this command.

special-character-bits {**7** | **8**}

no special-character-bits

Syntax Description

7	Selects the 7-bit ASCII character set. This is the default.
8	Selects the full 8-bit character set for special characters.

Defaults

7-bit ASCII character set

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Setting the special character bits to 8 allows you to use twice as many special characters as with the 7-bit ASCII character set. The special characters affected by this setting are the escape, hold, stop, start, disconnect, and activation characters.

Examples

The following example allows the full 8-bit international character set for special characters on line 5:

```
Router(config)# line 5
Router(config-line)# special-character-bits 8
```

Related Commands

Command	Description
default-value exec-character-bits	Defines the EXEC character width for either 7 bits or 8 bits.
default-value special-character-bits	Configures the flow control default value from a 7-bit width to an 8-bit width.
exec-character-bits	Configures the character widths of EXEC and configuration command characters.
terminal exec-character-bits	Locally changes the ASCII character set used in EXEC and configuration command characters for the current session.
terminal special-character-bits	Changes the ASCII character widths to accept special characters for the current terminal line and session.

squeeze

To permanently erase files tagged as “deleted” or “error” on Class A flash file systems, use the **squeeze** command in privileged EXEC mode.

squeeze [**/nolog**] [**/quiet**] *filesystem***:**

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squeeze *filesystem*:

Syntax Description

/nolog	(Optional) Disables the squeeze log (recovery data) and accelerates the squeeze process.
/quiet	(Optional) Disables status messages during the squeeze process.
*filesystem***:**	The flash file system, followed by a colon. For the Cisco 7600 series router, the valid values for the flash file system are **bootflash:** and **flash:**.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	This command was introduced.
12.2(1)	This command was implemented on the Cisco 2600 and Cisco 3600 series routers.
12.0(17)S	This command was integrated into Cisco IOS Release 12.0(17)S, and the **/nolog** and **/quiet** keywords were added.
12.2(1a)	The **/nolog** and **/quiet** keywords were added.
12.0(17)ST	This command was integrated into Cisco IOS Release 12.0(17)ST.
12.1(9)E	This command was integrated into Cisco IOS Release 12.1(9)E.
12.2(2)B	This command was integrated into Cisco IOS Release 12.2(2)B.
12.2(4)XL	This command was implemented on the Cisco 1700 series routers.
12.2(14)SX	Support for this command was implemented on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was integrated into Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

When flash memory is full, you might need to rearrange the files so that the space used by the files marked “deleted” can be reclaimed. (This “squeeze” process is required for linear flash memory cards to make sectors contiguous; the free memory must be in a “block” to be usable.)

When you enter the **squeeze** command, the router copies all valid files to the beginning of flash memory and erases all files marked “deleted.” After the squeeze process is completed, you can write to the reclaimed flash memory space.

Caution After performing the squeeze process, you cannot recover deleted files using the **undelete** EXEC mode command.

In addition to removing deleted files, use the **squeeze** command to remove any files that the system has marked as "error". An error file is created when a file write fails (for example, the device is full). To remove error files, you must use the **squeeze** command.

Rewriting flash memory space during the squeeze operation may take several minutes.

Using the **/nolog** keyword disables the log for the squeeze process. In most cases, this process will speed up the squeeze process. However, if power is lost or the flash card is removed during the squeeze process, all the data on the flash card will be lost, and the device will have to be reformatted.

Note Using the **/nolog** keyword makes the squeeze process uninterruptible.

Using the **/quiet** keyword disables the output of status messages to the console during the squeeze process.

If the optional keywords are not used, the progress of the squeeze process will be displayed to the console, a log for the process will be maintained, and the squeeze process is interruptible.

On Cisco 2600 or Cisco 3600 series routers, the entire file system has to be erased once before the **squeeze** command can be used. After being erased once, the **squeeze** command should operate properly on the flash file system for the rest of the flash file system's history.

To erase an entire flash file system on a Cisco 2600 or 3600 series router, perform the following steps:

Step 1 If the flash file system has multiple partitions, enter the **no partition** command to remove the partitions. The reason for removing partitions is to ensure that the entire flash file system is erased. The **squeeze** command can be used in a flash file system with partitions after the flash file system is erased once.

Step 2 Enter the **erase** command to erase the flash file system.

Examples

Supported Platforms Other tha the Cisco 7600 Series Router

In the following example, the file named config1 is deleted, and then the **squeeze** command is used to reclaim the space used by that file. The **/nolog** option is used to speed up the squeeze process.

```
Router# delete config1

Delete filename [config1]?
Delete slot0:conf? [confirm]

Router# dir slot0:

! Note that the deleted file name appears in square brackets
Directory of slot0:/

    1  -rw-     4300244   Apr 02 2001 03:18:07  c7200-boot-mz.122-0.14
    2  -rw-        2199   Apr 02 2001 04:45:15  [config1]
    3  -rw-     4300244   Apr 02 2001 04:45:23  image
20578304 bytes total (11975232 bytes free)
!20,578,304 - 4,300,244 - 4,300,244 - 2,199 - 385 = 11975232
```

```
Router# squeeze /nolog slot0:

%Warning: Using /nolog option would render squeeze operation uninterruptible.
All deleted files will be removed. Continue? [confirm]
Squeeze operation may take a while. Continue? [confirm]

Squeeze of slot0 completed in 291.832 secs .

Router# dir slot0:

Directory of slot0:/

    1  -rw-     4300244   Apr 02 2001 03:18:07  c7200-boot-mz.122-0.14
    2  -rw-     4300244   Apr 02 2001 04:45:23  image

20578304 bytes total (11977560 bytes free)
!20,578,304 - 4,300,244 - 4,300,244 - 256 = 11977560
```

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This example shows how to permanently erase the files that are marked “deleted” from the flash memory:

```
Router# squeeze flash:
```

Related Commands

Command	Description
delete	Deletes a file on a flash memory device.
dir	Displays a list of files on a file system.
erase	Erases a file system.
undelete	Recovers a file marked “deleted” on a Class A or Class B flash file system.

stack-mib portname

To specify a name string for a port, use the **stack-mib portname** command in interface configuration mode.

stack-mib portname *portname*

Syntax Description

portname	Name for a port.

Defaults

This command has no default settings.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Using the **stack-mib** command to set a name string to a port corresponds to the portName MIB object in the portTable of CISCO-STACK-MIB. portName is the MIB object in the portTable of CISCO-STACK-MIB. You can set this object to be descriptive text describing the function of the interface.

Examples

This example shows how to set a name to a port:

```
Router(config-if)# stack-mib portname portall

Router(config-if)#
```

state-machine

To specify the transition criteria for the state of a particular state machine, use the **state-machine** command in global configuration mode. To remove a particular state machine from the configuration, use the **no** form of this command.

state-machine *name state first-character last-character* [*next-state* | **transmit**]

no state-machine *name*

Syntax Description

name	Name for the state machine (used in the **dispatch-machine** line configuration command). The user can specify any number of state machines, but each line can have only one state machine associated with it.
state	State being modified. There are a maximum of eight states per state machine. Lines are initialized to state 0 and return to state 0 after a packet is transmitted.
first-character last-character	Specifies a range of characters. Use ASCII numerical values. If the state machine is in the indicated state, and the next character input is within this range, the process goes to the specified next state. Full 8-bit character comparisons are done, so the maximum value is 255. Ensure that the line is configured to strip parity bits (or not generate them), or duplicate the low characters in the upper half of the space.
next-state	(Optional) State to enter if the character is in the specified range.
transmit	(Optional) Causes the packet to be transmitted and the state machine to be reset to state 0. Recurring characters that have not been explicitly defined to have a particular action return the state machine to state 0.

Defaults

No transition criteria are specified.

Command Modes

Global configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is paired with the **dispatch-machine** line configuration command, which defines the line on which the state machine is effective.

Examples

In the following example a dispatch machine named "*function*" is configured to ensure that the function key characters on an ANSI terminal are kept in one packet. Because the default in the example is to remain in state 0 without sending anything, normal key signals are sent immediately.

```
Router(config)# line 1 20
Router(config-line)# dispatch-machine function
Router(config-line)# exit
Router(config)# state-machine function 0 0 255 transmit
```

Related Commands

Command	Description
dispatch-character	Defines a character that causes a packet to be sent.
dispatch-machine	Specifies an identifier for a TCP packet dispatch state machine on a particular line.
dispatch-timeout	Sets the character dispatch timer.

stopbits

To set the number of the stop bits transmitted per byte, use the **stopbits** command in line configuration mode. To restore the default value, use the **no** form of this command.

stopbits {**1** | **1.5** | **2**}

no stopbits

Syntax Description

1	One stop bit.
1.5	One and one-half stop bits.
2	Two stop bits.This is the default.

Defaults

2 stop bits per byte

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Communication protocols provided by devices such as terminals and modems often require a specific stop-bit setting.

Examples

In the following example, the stop bits transmitted per byte are changed from the default of two stop bits to one stop bit as a performance enhancement for line 4:

```
Router(config)# line 4
Router(config-line)# stopbits 1
```

Related Commands

Command	Description
terminal stopbits	Changes the number of stop bits sent per byte by the current terminal line during an active session.

storm-control level

To set the suppression level, use the **storm-control level** command in interface configuration mode. To turn off the suppression mode, use the **no** form of this command.

storm-control {**broadcast** | **multicast** | **unicast**} **level** *level*[**.***level*]

no storm-control {**broadcast** | **multicast** | **unicast**} **level**

Syntax Description

broadcast	Specifies the broadcast traffic.
multicast	Specifies the multicast traffic.
unicast	Specifies the unicast traffic.
level	Integer-suppression level; valid values are from 0 to 100 percent.
.*level*	(Optional) Fractional-suppression level; valid values are from 0 to 99.

Defaults

All packets are passed.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can enter this command on switch ports and router ports.

Enter the **storm-control level** command to enable traffic storm control on the interface, configure the traffic storm-control level, and apply the traffic storm-control level to all traffic storm-control modes that are enabled on the interface.

Only one suppression level is shared by all three suppression modes. For example, if you set the broadcast level to 30 and set the multicast level to 40, both levels are enabled and set to 40.

The Cisco 7600 series router supports storm control for multicast and unicast traffic only on Gigabit Ethernet LAN ports. The switch supports storm control for broadcast traffic on all LAN ports.

The **multicast** and **unicast** keywords are supported on Gigabit Ethernet LAN ports only. These keywords are not supported on 10 Mbps, 10/100 Mbps, 100 Mbps, or 10-Gigabit Ethernet modules.

The period is required when you enter the fractional-suppression level.

The suppression level is entered as a percentage of the total bandwidth. A threshold value of 100 percent means that no limit is placed on traffic. A threshold value of 0 or 0.0 (fractional) percent means that all specified traffic is blocked on a port, with the following guidelines:

- A fractional level value of 0.33 or lower is the same as 0.0 on the following modules:
  - WS-X6704-10GE
  - WS-X6748-SFP
  - WS-X6724-SFP
  - WS-X6748-GE-TX
- Enter 0 on all other modules to block all specified traffic on a port.

Enter the **show interfaces counters broadcast** command to display the discard count.

Enter the **show running-config** command to display the enabled suppression mode and level setting.

To turn off suppression for the specified traffic type, you can do one of the following:

- Set the *level* to 100 percent for the specified traffic type.
- Use the **no** form of this command.

Examples

This example shows how to enable and set the suppression level:

```
Router(config-if)# storm-control broadcast level 30
```

This example shows how to disable the suppression mode:

```
Router(config-if)# no storm-control multicast level
```

Related Commands

Command	Description
show interfaces counters	Displays the traffic that the physical interface sees.
show running-config	Displays the status and configuration of the module or Layer 2 VLAN.

sync-restart-delay

To set the synchronization-restart delay timer to ensure accurate status reporting, use the **sync-restart-delay** command in interface configuration mode. To disable the synchronization-restart delay timer, use the **no** form of this command.

sync-restart-delay *timer*

no sync-restart-delay *timer*

Syntax Description

timer	Interval between status-register resets; valid values are from 200 to 60000 milliseconds.

Defaults

timer is **210** milliseconds.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is supported on Gigabit Ethernet fiber ports only.

The status register records the current status of the link partner.

Examples

This example shows how to set the Gigabit Ethernet synchronization-restart delay timer:

```
Router(config-if)# sync-restart-delay 2000
```

Related Commands

Command	Description
show running-config	Displays the status and configuration of the module or Layer 2 VLAN.

system flowcontrol bus

To set the FIFO overflow error count, use the **system flowcontrol bus** command in global configuration mode. To return to the original FIFO threshold settings, use the **no** form of this command.

[**default**] **system flowcontrol bus** {**auto** | **on**}

no system flowcontrol bus

Syntax Description

default	(Optional) Specifies the default settings.
auto	Monitors the FIFO overflow error count and sends a warning message if the FIFO overflow error count exceeds a configured error threshold in 5-second intervals.
on	Specifies the original FIFO threshold settings.

Defaults

auto

Command Modes

Global configuration

Command History

Release	Modification
12.2(18)SXF	Support for this command was introduced on the Supervisor Engine 720 and the Supervisor Engine 32.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Note We recommend that you leave the system flow control in auto mode and use the other modes under the advice of Cisco TAC only.

Examples

This example shows how to monitor the FIFO overflow error count and send a warning message if the FIFO overflow error count exceeds a configured error threshold in 5-second intervals:

```
Router(config)# system flowcontrol bus auto
```

This example shows how to specify the original FIFO threshold settings:

```
Router(config)# system flowcontrol bus on
```

system jumbomtu

To set the maximum size of the Layer 2 and Layer 3 packets, use the **system jumbomtu** command in global configuration mode. To revert to the default MTU setting, use the **no** form of this command.

system jumbomtu *mtu-size*

no system jumbomtu

Syntax Description

mtu-size	Maximum size of the Layer 2 and Layer 3 packets; valid values are from 1500 to 9216 bytes.

Defaults

mtu-size is **9216** bytes.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The *mtu-size* parameter specifies the Ethernet packet size, not the total Ethernet frame size. The Layer 3 MTU is changed as a result of entering the **system jumbomtu** command.

The **system jumbomtu** command enables the global MTU for port ASICs. On a port ASIC after jumbo frames are enabled, the port ASIC accepts any size packet on the ingress side and checks the outgoing packets on the egress side. The packets on the egress side that exceed the global MTU are dropped by the port ASIC.

For example, if you have port A in VLAN 1 and Port B in VLAN 2, and if VLAN 1 and VLAN 2 are configured for **mtu 9216** and you enter the **system jumbomtu 4000** command, the packets that are larger than 4000 bytes are not transmitted out because Ports B and A drop anything larger than 4000 bytes.

Examples

This example shows how to set the global MTU size to 1550 bytes:

```
Router(config)# system jumbomtu 1550
```

This example shows how to revert to the default MTU setting:

```
Router(config)# no system jumbomtu
```

Related Commands

Command	Description
mtu	Adjusts the maximum packet size or MTU size.
show interfaces	Displays traffic that is seen by a specific interface.
show system jumbomtu	Displays the global MTU setting.

tdm clock priority

To configure the clock source and priority of the clock source used by the time-division multiplexing (TDM) bus on the Cisco AS5350, AS5400, and AS5850 access servers, use the **tdm clock priority** command in global configuration mode. To return the clock source and priority to the default values, use the **no** form of this command.

tdm clock priority *priority-number* {*slot/ds1-port* | *slot/ds3-port*:*ds1-port* | **external** | **freerun**}

no tdm clock priority *priority-number* {*slot/ds1-port* | *slot/ds3-port*:*ds1-port* | **external** | **freerun**}

Syntax Description

priority-number	Priority of the clock source. The priority range is from 1 to 99. A clock set to priority 100 will not drive the TDM bus.
slot/ds1-port	Trunk-card slot is a value from 1 to 7. DS1 port number controller is a value between 0 and 7. Specify with a slash separating the numbers; for example, 1/1.
slot/ds3-port:*ds1-port*	Trunk-card slot is a value from 1 to 7. DS3 port specifies the T3 port. DS1 port number controller is a value from 1 to 28. Specify with a slash separating the slot and port numbers, and a colon separating the DS1 port number. An example is 1/0:19.
external	Synchronizes the TDM bus with an external clock source that can be used as an additional network reference.
freerun	Selects the free-running clock from the local oscillator when there is no good clocking source from a trunk card or an external clock source.

Defaults

If no clocks are configured, the system uses a default, primary clock. An external clock is never selected by default; it must be explicitly configured.

Command Modes

Global configuration

Command History

Release	Modification
12.2(8)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The TDM bus can receive an input clock from one of three sources on the gateway:

- CT1, CE1, and CT3 trunk cards
- An external T1/E1 clock source feed directly through the Building Integrated Timing Supply (BITS) interface port on the motherboard
- Free-running clock providing clock from an oscillator

Note BITS is a single building master timing supply. BITS generally supplies DS1- and DS0-level timing throughout an office. BITS is the clocks that provide and distribute timing to a wireline network's lower levels.

Trunk-Card Ports

The TDM bus can be synchronized with any trunk cards. On the CT1/CE1 trunk card, each port receives the clock from the T1/E1 line. The CT3 trunk card uses an M13 multiplexer to receive the DS1 clock. Each port on each trunk-card slot has a default clock priority. Also, clock priority is configurable through the **tdm clock priority** command.

External Clock

The TDM bus can be synchronized with an external clock source that can be used as an additional network reference. If no clocks are configured, the system uses a primary clock through a software-controlled default algorithm. If you want the external T1/E1 clock (from the BITS interface) as the primary clock source, you must configure it using the **external** keyword with the **tdm clock priority** command; the external clock is never selected by default.

The BITS interface requires a T1 line composite clock reference set at 1.544 MHz and an E1 line composite clock reference set at 2.048 MHz.

Free-Running Clock

If there is no good clocking source from a trunk card or an external clock source, then select the free-running clock from the internal oscillator using the **freerun** keyword with the **tdm clock priority** command.

Examples

In the following example, BITS clock is set at priority 1:

```
AS5400(config)# tdm clock priority priority 1 external
```

In the following example, a trunk clock from a CT1 trunk card is set at priority 2 and uses slot 4 and DS1 port (controller) 6:

```
AS5400(config)# tdm clock priority priority 2 4/6
```

In the following example, a trunk clock from a CT3 trunk card is set at priority 2 and uses slot 1, DS3 port 0, and DS1 port 19:

```
AS5400(config)# tdm clock priority priority 2 1/0:19
```

In the following example, free-running clock is set at priority 3:

```
AS5400(config)# tdm clock priority priority 3 freerun
```

Related Commands

Command	Description
dial-tdm-clock	Configures the clock source and priority of the clock source used by the TDM bus on the dial shelf of the Cisco AS5800.
show tdm clocks	Displays default system clocks and clock history.

terminal databits

To change the number of data bits per character for the current terminal line for this session, use the **terminal databits** command in EXEC mode.

terminal databits {**5** | **6** | **7** | **8**}

Syntax Description

5	Five data bits per character.
6	Six data bits per character.
7	Seven data bits per character.
8	Eight data bits per character. This is the default.

Defaults

8 data bits per character

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Communication protocols provided by devices such as terminals and modems often require a specific data bit setting. The **terminal databits** command can be used to mask the high bit on input from devices that generate 7 data bits with parity. If parity is being generated, specify 7 data bits per character. If no parity generation is in effect, specify 8 data bits per character. The other keywords (**5** and **6**) are supplied for compatibility with older devices and are generally not used.

Examples

In the following example, the databits per character is changed to seven for the current session:

```
Router# terminal databits 7
```

Related Commands

Command	Description
databits	Sets the number of data bits per character that are interpreted and generated by the router hardware.
terminal parity	Defines the generation of the parity bit for the current terminal line and session.

terminal data-character-bits

To set the number of data bits per character that are interpreted and generated by the Cisco IOS software for the current line and session, use the **terminal data-character-bits** command in EXEC mode.

terminal data-character-bits {**7** | **8**}

Syntax Description

7	Seven data bits per character.
8	Eight data bits. This is the default.

Defaults

8 data bits per character

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is used primarily to strip parity from X.25 connections on routers with the protocol translation software option. The **terminal data-character-bits** command does not work on hard-wired lines.

Examples

The following example sets the data bits per character to seven on the current line:

```
Router# terminal data-character-bits 7
```

Related Commands

Command	Description
data-character-bits	Sets the number of data bits per character that are interpreted and generated by the Cisco IOS software.

terminal dispatch-character

To define a character that causes a packet to be sent for the current session, use the **terminal dispatch-character** command in EXEC mode.

terminal dispatch-character *ascii-number* [*ascii-number2 . . . ascii-number*]

Syntax Description

ascii-number	The ASCII decimal representation of the character, such as Return (ASCII character 13) for line-at-a-time transmissions.
ascii-number2 . . . ascii-number	(Optional) Additional decimal representations of characters. This syntax indicates that you can define any number of characters as dispatch characters.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

At times, you might want to queue up a string of characters until they fill a complete packet and then transmit the packet to a remote host. This can make more efficient use of a line, because the access server or router normally dispatches each character as it is entered.

Examples

The following example defines the characters Ctrl-D (ASCII decimal character 4) and Ctrl-Y (ASCII decimal character 25) as the dispatch characters:

```
Router# terminal dispatch-character 4 25
```

Related Commands

Command	Description
dispatch-character	Defines a character that causes a packet to be sent.

terminal dispatch-timeout

To set the character dispatch timer for the current terminal line for the current session, use the **terminal dispatch-timeout** command in EXEC mode.

terminal dispatch-timeout *milliseconds*

Syntax Description

milliseconds	Integer that specifies the number of milliseconds that the router waits after it puts the first character into a packet buffer before sending the packet. During this interval, more characters can be added to the packet, which increases the processing efficiency of the remote host.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Use this command to increase the processing efficiency of the remote host.

The **dispatch-timeout** line configuration command causes the software to buffer characters into packets for transmission to the remote host. The Cisco IOS software sends a packet a specified amount of time after the first character is put into the buffer. You can use the **terminal dispatch-timeout** and **terminal dispatch-character** line configuration commands together. In this case, the software dispatches a packet each time the dispatch character is entered, or after the specified dispatch timeout interval, depending on which condition is met first.

Note The router response time might appear intermittent if the timeout interval is greater than 100 milliseconds and remote echoing is used.

Examples

In the following example, the dispatch timeout timer is set to 80 milliseconds:

```
Router# terminal dispatch-timeout 80
```

Related Commands

Command	Description
dispatch-timeout	Sets the character dispatch timer for a specified line or group of lines.

terminal download

To temporarily set the ability of a line to act as a transparent pipe for file transfers for the current session, use the **terminal download** command in EXEC mode.

terminal download

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can use this feature to run a program such as KERMIT, XMODEM, or CrossTalk that downloads a file across an access server or router line. This command configures the terminal line to send data and is equivalent to entering all the following commands:

- terminal telnet transparent
- **terminal no escape-character** (see **terminal escape-character**)
- **terminal no hold-character** (see **terminal hold-character**)
- **terminal no padding 0** (see **terminal padding**)
- **terminal no padding 128** (see **terminal padding**)
- terminal parity **none**
- terminal databits **8**

Examples

The following example configures a line to act as a transparent pipe:

```
Router# terminal download
```

terminal editing

To reenable the enhanced editing mode for only the current terminal session, use the **terminal editing** command in EXEC mode. To disable the enhanced editing mode on the current line, use the **no** form of this command.

terminal editing

terminal no editing

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is identical to the **editing** EXEC mode command, except that it controls (enables or disables) enhanced editing for only the terminal session you are using. For a description of the available editing keys, see the description of the **editing** command in this document.

Examples

In the following example, enhanced editing mode is reenabled for only the current terminal session:

```
Router> terminal editing
```

Related Commands

Command	Description
editing	Controls CLI enhanced editing features for a particular line.

terminal escape-character

To set the escape character for the current terminal line for the current session, use the **terminal escape-character** command in EXEC mode.

terminal escape-character *ascii-number*

Syntax Description

ascii-number	ASCII decimal representation of the escape character or control sequence (for example, Ctrl-P).

Defaults

Ctrl-^ (Ctrl-Shift-6)

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

See the "ASCII Character Set and Hexidecimal Values" appendix for a list of ASCII characters and their numerical representation.

This command is useful, for example, if you have the default escape character defined for a different purpose in your keyboard file. Entering the escape character followed by the X key returns you to EXEC mode when you are connected to another computer.

Note The Break key generally cannot be used as an escape character on the console terminal because the operating software interprets the Break command on a console line as an instruction to halt the system.

Examples

In the following example, the escape character to Ctrl-P (ASCII decimal character 16) for the current session:

```
Router# terminal escape-character 16
```

Related Commands

Command	Description
escape-character	Defines a system escape character.

terminal exec-character-bits

To locally change the ASCII character set used in EXEC and configuration command characters for the current session, use the **terminal exec-character-bits** command in EXEC mode.

terminal exec-character-bits {**7** | **8**}

Syntax Description

7	Selects the 7-bit ASCII character set. This is the default.
8	Selects the full 8-bit character set.

Defaults

7-bit ASCII character set (unless set otherwise in global configuration mode)

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This EXEC command overrides the **default-value exec-character-bits** global configuration command. Configuring the EXEC character width to 8 bits enables you to view special graphical and international characters in banners, prompts, and so on.

When the user exits the session, the character width is reset to the default value established by the **exec-character-bits** global configuration command. However, setting the EXEC character width to 8 bits can also cause failures. For example, if a user on a terminal that is sending parity enters the **help** command, an “unrecognized command” message appears because the system is reading all 8 bits, and the eighth bit is not needed for the **help** command.

Examples

The following example temporarily configures the system to use a full 8-bit user interface for system banners and prompts, allowing the use of additional graphical and international characters:

```
Router# terminal exec-character-bits 8
```

Related Commands

Command	Description
exec-character-bits	Configures the character widths of EXEC and configuration command characters.

terminal flowcontrol

To set flow control for the current terminal line for the current session, use the **terminal flowcontrol** command in EXEC mode.

terminal flowcontrol {**none** | **software** [**in** | **out**] | **hardware**}

Syntax Description

none	Prevents flow control.
software	Sets software flow control.
in | **out**	(Optional) Specifies the direction of flow control: **in** causes the router to listen to flow control from the attached device, and **out** causes the router to send flow control information to the attached device. If you do not specify a direction, both directions are assumed.
hardware	Sets hardware flow control. For information about setting up the EIA/TIA-232 line, see the manual that was shipped with your product.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Flow control enables you to regulate the rate at which data can be transmitted from one point so that it is equal to the rate at which it can be received at another point. Flow control protects against loss of data because the terminal is not capable of receiving data at the rate it is being sent. You can set up data flow control for the current terminal line in one of two ways: software flow control, which you do with control key sequences, and hardware flow control, which you do at the device level.

For software flow control, the default stop and start characters are Ctrl-S and Ctrl-Q (XOFF and XON). You can change them with the **terminal stop-character** and **terminal start-character** EXEC commands.

Examples

In the following example, incoming software flow control is set for the current session:

```
Router# terminal flowcontrol software in
```

Related Commands

Command	Description
flowcontrol	Sets the method of data flow control between the terminal or other serial device and the router.

terminal full-help

To get help for the full set of user-level commands, use the **terminal full-help** command in EXEC mode.

terminal full-help

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **terminal full-help** command enables a user to see all of the help messages available from the terminal. It is used with the **show ?** command.

Examples

In the following example, the difference between the output of the **show ?** command before and after using the **terminal full-help** command is shown:

```
Router> show ?

  bootflash  Boot Flash information
  calendar   Display the hardware calendar
  clock      Display the system clock
  context    Show context information
  dialer     Dialer parameters and statistics
  history    Display the session command history
  hosts      IP domain-name, lookup style, nameservers, and host table
  isdn       ISDN information
  kerberos   Show Kerberos Values
  modemcap   Show Modem Capabilities database
  ppp        PPP parameters and statistics
  rmon       rmon statistics
  sessions   Information about Telnet connections
  snmp       snmp statistics
  terminal   Display terminal configuration parameters
  users      Display information about terminal lines
  version    System hardware and software status


Router> terminal full-help
Router> show ?

  access-expression  List access expression
  access-lists       List access lists
```

```
aliases            Display alias commands
apollo             Apollo network information
appletalk          AppleTalk information
arp                ARP table
async              Information on terminal lines used as router interfaces
bootflash          Boot Flash information
bridge             Bridge Forwarding/Filtering Database [verbose]
bsc                BSC interface information
bstun              BSTUN interface information
buffers            Buffer pool statistics
calendar           Display the hardware calendar
cdp                CDP information
clns               CLNS network information
clock              Display the system clock
cls                DLC user information
cmns               Connection-Mode networking services (CMNS) information
compress           Show compression statistics.
.
.
.
x25                X.25 information
xns                XNS information
xremote            XRemote statistics
```

Related Commands

Command	Description
full-help	Gets help for the full set of user-level commands.
help	Displays a brief description of the help system.

terminal history

To enable the command history function with 10 lines for the current terminal session, use the **terminal history** command in user EXEC or privileged EXEC mode. To disable the command history function, use the **no** form of this command.

terminal history

terminal no history

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled, history buffer of 10 lines

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The history function provides a record of commands you have entered. This function is particularly useful for recalling long or complex commands or entries for the purposes of modifying them slightly and reexecuting them.

The **terminal history** command enables the command history function with the default buffer size or the last buffer size specified using the **terminal history size** command.

Table 1 lists the keys and functions you can use to recall commands from the history buffer.

Table 166 History Keys

Key(s)	Function
Ctrl-P or Up Arrow[1]	Recalls commands in the history buffer in a backward sequence, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Ctrl-N or Down Arrow[1]	Returns to more recent commands in the history buffer after recalling commands with Ctrl-P or the Up Arrow. Repeat the key sequence to recall successively more recent commands.

1. The arrow keys function only with ANSI-compatible terminals.

Examples

In the following example, the command history feature is disabled for the current terminal session:

```
Router> terminal no history
```

Related Commands

Command	Description
history	Enables the command history function, or changes the command history buffer size for a particular line.
show history	Lists the commands you have entered in the current EXEC session.
terminal history size	Sets the size of the history buffer for the command history feature for the current terminal session.

terminal history size

To change the size of the command history buffer for the current terminal session, use the **terminal history size** command in EXEC mode. To reset the command history buffer to its default size of 10 lines, use the **no** form of this command.

terminal history size *number-of-lines*

terminal no history size

Syntax Description

number-of-lines	Number of command lines that the system will record in its history buffer. The range is from 0 to 256. The default is 10.

Defaults

10 lines of command history

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The history feature provides a record of commands you have entered. This feature is particularly useful for recalling long or complex commands or entries for the purposes of modifying them slightly and reissuing them.

The **terminal history size** command enables the command history feature and sets the command history buffer size. The **terminal no history size** command resets the buffer size to the default of 10 command lines.

Table 2 lists the keys and functions you can use to recall commands from the history buffer. When you use these keys, the commands recalled will be from EXEC mode if you are in EXEC mode, or from all configuration modes if you are in any configuration mode.

Table 167 History Keys

Key	Function
Ctrl-P or Up Arrow[1]	Recalls commands in the history buffer in a backward sequence, beginning with the most recent command. Repeat the key sequence to recall successively older commands.
Ctrl-N or Down Arrow[1]	Returns to more recent commands in the history buffer after recalling commands with Ctrl-P or the Up Arrow. Repeat the key sequence to recall successively more recent commands.

1. The arrow keys function only with ANSI-compatible terminals.

In EXEC mode, you can also use the **show history** command to show the contents of the command history buffer.

To check the current settings for the command history feature on your line, use the **show line** command.

Examples

In the following example, the number of command lines recorded is set to 15 for the current terminal session. The user then checks to see what line he/she is connected to using the **show users** command. The user uses this line information to issue the show line command. (In this example, the user uses the **show begin** option in the **show line** command to start the output at the "Editing is enabled/disabled" line.)

```
Router# terminal history size 15
Router# show users

    Line       User       Host(s)              Idle       Location
* 50 vty 0     admin      idle                 00:00:00
! the * symbol indicates the active terminal session for the user (line 50)

Router# show line 50 | begin Editing

Editing is enabled.
! the following line shows the history settings for the line
History is enabled, history size is 15.
DNS resolution in show commands is enabled
Full user help is disabled
Allowed transports are telnet.  Preferred is none.
No output characters are padded
No special data dispatching characters
```

Related Commands

Command	Description
history	Enables the command history function, or changes the command history buffer size for a particular line.
show <command> begin	Searches the output of any show command and displays the output from the first instance of a specified string.
show history	Lists the commands you have entered in the current EXEC session.
terminal history	Enables the command history feature for the current terminal session.

terminal hold-character

To define the hold character for the current session, use the **terminal hold-character** command in EXEC mode. To return the hold character definition to the default, use the **no** form of this command.

terminal hold-character *ascii-number*

terminal no hold-character

Syntax Description

ascii-number	ASCII decimal representation of a character or control sequence (for example, Ctrl-P).

Defaults

The default hold character is defined by the **hold-character** global configuration command.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can define a local hold character that temporarily suspends the flow of output on the terminal. When information is scrolling too quickly, you can enter the hold character to pause the screen output, then enter any other character to resume the flow of output.

You cannot suspend output on the console terminal. To send the hold character to the host, precede it with the escape character.

Examples

In the following example, the hold character for the current (local) session is set to Ctrl-P. The **show terminal** output is included to show the verification of the setting (the value for the hold character is shown in the “Special Characters” listing).

```
Router# terminal hold-character 16
"^P" is the local hold character
Router# show terminal
Line 50, Location: "", Type: "VT220"
Length: 24 lines, Width: 80 columns
Baud rate (TX/RX) is 9600/9600
Status: PSI Enabled, Ready, Active, No Exit Banner, Automore On
Capabilities: none
Modem state: Ready
Group codes:    0
```

```
Special Chars: Escape  Hold  Stop  Start  Disconnect  Activation
                ^^x     ^P    -     -       none
Timeouts:      Idle EXEC    Idle Session   Modem Answer  Session   Dispatch
               00:10:00        never                       none     not set
                            Idle Session Disconnect Warning
                              never
                            Login-sequence User Response
                             00:00:30
                            Autoselect Initial Wait
                              not set
Modem type is unknown.
Session limit is not set.
Time since activation: 00:04:13
Editing is enabled.
History is enabled, history size is 10.
.
.
.
```

Related Commands

Command	Description
hold-character	Defines the local hold character used to pause output to the terminal screen.
show terminal	Displays settings for terminal operating characteristics.

terminal international

If you are using Telnet to access a Cisco IOS platform and you want to display 8-bit and multibyte international characters (for example, Kanji) and print the Escape character as a single character instead of as the caret and bracket symbols (^[) for a current Telnet session, use the **terminal international** command in user EXEC or priviledged mode. To display characters in 7-bit format for a current Telnet session, use the **no** form of this command.

terminal international

no terminal international

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

User EXEC

Privileged EXEC

Command History

Release	Modification
11.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If you are configuring a Cisco IOS platform using the Cisco web browser UI, this feature is enabled automatically when you enable the Cisco web browser UI using the **ip http server** global configuration command.

Examples

The following example enables a Cisco IOS platform to display 8-bit and multibyte characters and print the Escape character as a single character instead of as the caret and bracket symbols (^[) when you are using Telnet to access the platform for the current Telnet session:

```
Router# terminal international
```

Related Commands

Command	Description
international	Prints the Escape character as a single character instead of as the caret and bracket symbols (^[) in instances when you are using Telnet to access a Cisco IOS platform and you want to display 8-bit and multibyte international characters (for example, Kanji).

terminal keymap-type

To specify the current keyboard type for the current session, use the **terminal keymap-type** command in EXEC mode.

terminal keymap-type *keymap-name*

Syntax Description

keymap-name	Name defining the current keyboard type.

Defaults

VT100

Command Modes

EXEC

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You must use this command when you are using a keyboard other than the default of VT100.

Examples

The following example specifies a VT220 keyboard as the current keyboard type:

```
Router# terminal keymap-type vt220
```

Related Commands

Command	Description
show keymap	Displays the current keymap settings.

terminal length

To set the number of lines on the current terminal screen for the current session, use the **terminal length** command in EXEC, privileged EXEC, and diagnostic mode.

terminal length *screen-length*

Syntax Description

screen-length	Number of lines on the screen. A value of zero disables pausing between screens of output.

Defaults

24 lines

Command Modes

EXEC (>)
Privileged EXEC (#)
Diagnostic (diag)

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers, and became available in diagnostic mode.

Usage Guidelines

The system uses the length value to determine when to pause during multiple-screen output. A value of zero prevents the router from pausing between screens of output.

Some types of terminal sessions do not require you to specify the screen length because the screen length specified can be learned by some remote hosts. For example, the rlogin protocol uses the screen length to set up terminal parameters on a remote UNIX host.

Examples

In the following example, the system is configured to prevent output from pausing if it exceeds the length of the screen:

```
Router# terminal length 0
```

Related Commands

Command	Description
length	Sets the terminal screen length.

terminal monitor

To display **debug** command output and system error messages for the current terminal and session, use the **terminal monitor** command in EXEC mode.

terminal monitor

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Remember that all terminal parameter-setting commands are set locally and do not remain in effect after a session is ended.

Examples

In the following example, the system is configured to display **debug** command output and error messages during the current terminal session:

```
Router# terminal monitor
```

terminal notify

To enable terminal notification about pending output from other Telnet connections for the current session, use the **terminal notify** command in EXEC mode. To disable notifications for the current session, use the **no** form of this command.

terminal notify

terminal no notify

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Enabling notifications may be useful if, for example, you want to know when another connection receives mail, or when a process has been completed.

This command enables or disables notifications for only the current session. To globally set these notifications, use the **notify** line configuration command.

Examples

In the following example, notifications will be displayed to inform the user when output is pending on another connection:

```
Router# terminal notify
```

Related Commands

Command	Description
notify	Enables terminal notification about pending output from other Telnet connections.

terminal padding

To change the character padding on a specific output character for the current session, use the **terminal padding** command in EXEC mode.

terminal padding *ascii-number count*

Syntax Description

ascii-number	ASCII decimal representation of the character.
count	Number of NULL bytes sent after the specified character, up to 255 padding characters in length.

Defaults

No padding

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Character padding adds a number of null bytes to the end of the string and can be used to make a string an expected length for conformity.

Use this command when the attached device is an old terminal that requires padding after certain characters (such as ones that scrolled or moved the carriage). See the"ASCII Character Set and Hexidecimal Values" appendix for a list of ASCII characters.

Examples

The following example pads Ctrl-D (ASCII decimal character 4) with 164 NULL bytes:

```
Router# terminal padding 4 164
```

Related Commands

Command	Description
padding	Sets the padding on a specific output character.

terminal parity

To define the generation of the parity bit for the current terminal line and session, use the **terminal parity** command in EXEC mode.

terminal parity {**none** | **even** | **odd** | **space** | **mark**}

Syntax Description

none	No parity. This is the default.
even	Even parity.
odd	Odd parity.
space	Space parity.
mark	Mark parity.

Defaults

No parity.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Communication protocols provided by devices such as terminals and modems will sometimes require a specific parity bit setting. Refer to the documentation for your device to determine required parity settings.

Examples

In the following example, odd parity checking is enabled for the current session:

```
Router# terminal parity odd
```

Related Commands

Command	Description
parity	Defines generation of a parity bit for connections on a specified line or lines.

terminal rxspeed

To set the terminal receive speed (how fast information is sent to the terminal) for the current line and session, use the **terminal rxspeed** command in EXEC mode.

terminal rxspeed *bps*

Syntax Description

bps	Baud rate in bits per second (bps). The default is 9600.

Defaults

9600 bps

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Set the speed to match the baud rate of whatever device you have connected to the port. Some baud rates available on devices connected to the port might not be supported on the system. The system will indicate if the speed you select is not supported.

Examples

The following example sets the current auxiliary line receive speed to 115200 bps:

```
Router# terminal rxspeed 115200
```

Related Commands

Command	Description
rxspeed	Sets the terminal receive speed for a specified line or lines.
terminal rxspeed	Sets the terminal receive speed for the current session.
terminal txspeed	Sets the terminal transmit speed for a specified line or lines.
terminal speed	Sets the transmit and receive speeds for the current session.

terminal special-character-bits

To change the ASCII character widths to accept special characters for the current terminal line and session, use the **terminal special-character-bits** command in EXEC mode.

terminal special-character-bits {**7** | **8**}

Syntax Description

7	Selects the 7-bit ASCII character set. This is the default.
8	Selects the full 8-bit ASCII character set.

Defaults

7-bit ASCII character set

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Configuring the width to 8 bits enables you to use twice as many special characters as with the 7-bit setting. This selection enables you to add special graphical and international characters in banners, prompts, and so on.

This command is useful, for example, if you want the router to provide temporary support for international character sets. It overrides the **default-value special-character-bits** global configuration command and is used to compare character sets typed by the user with the special character available during a data connection, which includes software flow control and escape characters.

When you exit the session, character width is reset to the width established by the **default-value exec-character-bits** global configuration command.

Note that setting the EXEC character width to eight bits can cause failures. For example, if a user on a terminal that is sending parity enters the **help** command, an “unrecognized command” message appears because the Cisco IOS software is reading all eight bits, and the eighth bit is not needed for the **help** command.

Examples

The following example temporarily configures a router to use a full 8-bit user interface for system banners and prompts.

```
Router# terminal special-character-bits 8
```

Related Commands

Command	Description
default-value exec-character-bits	Globally defines the character width as 7-bit or 8-bit.
special-character-bits	Configures the number of data bits per character for special characters such as software flow control characters and escape characters.

terminal speed

To set the transmit and receive speeds of the current terminal line for the current session, use the **terminal speed** command in EXEC mode.

terminal speed *bps*

Syntax Description

bps	Baud rate in bits per second (bps). The default is 9600.

Defaults

9600 bps

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Set the speed to match the transmission rate of whatever device you have connected to the port. Some baud rates available on devices connected to the port might not be supported on the router. The router indicates whether the speed you selected is not supported.

Examples

The following example restores the transmit and receive speed on the current line to 9600 bps:

```
Router# terminal speed 9600
```

Related Commands

Command	Description
speed	Sets the terminal baud rate.

terminal start-character

To change the flow control start character for the current session, use the **terminal start-character** command in EXEC mode.

terminal start-character *ascii-number*

Syntax Description

ascii-number	ASCII decimal representation of the start character.

Defaults

Ctrl-Q (ASCII decimal character 17)

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The flow control start character signals the start of data transmission when software flow control is in effect.

Examples

The following example changes the start character to Ctrl-O (ASCII decimal character 15):

```
Router# terminal start-character 15
```

Related Commands

Command	Description
start-character	Sets the flow control start character.

terminal stopbits

To change the number of stop bits sent per byte by the current terminal line during an active session, use the **terminal stopbits** command in EXEC mode.

terminal stopbits {**1** | **1.5** | **2**}

Syntax Description

1	One stop bit.
1.5	One and one-half stop bits.
2	Two stop bits. This is the default.

Defaults

2 stop bits

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Communication protocols provided by devices such as terminals and modems often require a specific stop-bit setting.

Examples

In the following example, the setting for stop bits is changed to one for the current session:

```
Router# terminal stopbits 1
```

Related Commands

Command	Description
stopbits	Sets the number of the stop bits sent per byte.

terminal stop-character

To change the flow control stop character for the current session, use the **terminal stop-character** command in EXEC mode.

terminal stop-character *ascii-number*

Syntax Description

ascii-number	ASCII decimal representation of the stop character.

Defaults

Ctrl-S (ASCII character decimal 19)

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The flow control stop character signals the end of data transmission when software flow control is in effect.

See the "ASCII Character Set and Hexidecimal Values" appendix for a list of ASCII characters.

Examples

In the following example, the stop character is configured as Ctrl-E (ASCII character decimal 5) for the current session:

```
Router# terminal stop-character 5
```

Related Commands

Command	Description
stop-character	Sets the flow control stop character.

terminal telnet break-on-ip

To cause an access server to generate a hardware Break signal when an interrupt-process (ip) command is received, use the **terminal telnet break-on-ip** command in EXEC mode.

terminal telnet break-on-ip

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The hardware Break signal occurs when a Telnet interrupt-process (ip) command is received on that connection. The **terminal telnet break-on-ip** command can be used to control the translation of Telnet interrupt-process commands into X.25 Break indications.

Note In this command, the acronym “ip” indicates “interrupt-process,” not Internet Protocol (IP).

This command is also a useful workaround in the following situations:

- Several user Telnet programs send an ip command, but cannot send a Telnet Break signal.
- Some Telnet programs implement a Break signal that sends an ip command.

Some EIA/TIA-232 hardware devices use a hardware Break signal for various purposes. A hardware Break signal is generated when a Telnet Break command is received.

You can verify if this command is enabled with the **show terminal** EXEC command. If enabled the following line will appear in the output: `Capabilities: Send BREAK on IP`.

Examples

In the following example, a Break signal is generated for the current connection when an interrupt-process command is issued:

```
Router# terminal telnet break-on-ip
```

Related Commands

Command	Description
terminal telnet ip-on-break	Configures the system to send an interrupt-process (ip) signal when the Break command is issued.

terminal telnet refuse-negotiations

To configure the current session to refuse to negotiate full-duplex, remote echo options on incoming connections, use the **terminal telnet refuse-negotiations** command in EXEC mode.

terminal telnet refuse-negotiations

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can set the line to allow access server to refuse full-duplex, remote echo connection requests from the other end. This command suppresses negotiation of the Telnet Remote Echo and Suppress Go Ahead options.

Examples

In the following example, the current session is configured to refuse full-duplex, remote echo requests:

```
Router# terminal telnet refuse-negotiations
```

terminal telnet speed

To allow an access server to negotiate transmission speed for the current terminal line and session, use the **terminal telnet speed** command in EXEC mode.

terminal telnet speed *default-speed maximum-speed*

Syntax Description

default-speed	Line speed, in bits per second (bps), that the access server will use if the device on the other end of the connection has not specified a speed.
maximum-speed	Maximum line speed in bits per second (bps), that the device on the other end of the connection can use.

Defaults

9600 bps (unless otherwise set using the **speed**, **txspeed** or **rxspeed** line configuration commands)

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can match line speeds on remote systems in reverse Telnet, on host machines connected to an access server to access the network, or on a group of console lines connected to the access server when disparate line speeds are in use at the local and remote ends of the connections listed above. Line speed negotiation adheres to the Remote Flow Control option, defined in RFC 1080.

Note This command applies only to access servers. It is not supported on standalone routers.

Examples

The following example enables the access server to negotiate a bit rate on the line using the Telnet option. If no speed is negotiated, the line will run at 2400 bps. If the remote host requests a speed greater than 9600 bps, then 9600 bps will be used.

```
Router# terminal telnet speed 2400 9600
```

terminal telnet sync-on-break

To cause the access server to send a Telnet Synchronize signal when it receives a Telnet Break signal on the current line and session, use the **terminal telnet sync-on-break** command in EXEC mode.

terminal telnet sync-on-break

Syntax Description

This command has no arguments or keywords.

Defaults

Disabled

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can configure the session to cause a reverse Telnet line to send a Telnet Synchronize signal when it receives a Telnet Break signal. The TCP Synchronize signal clears the data path, but still interprets incoming commands.

Note This command applies only to access servers. It is not supported on standalone routers.

Examples

The following example sets an asynchronous line to cause the access server to send a Telnet Synchronize signal:

```
Router# terminal telnet sync-on-break
```

terminal telnet transparent

To cause the current terminal line to send a Return character (CR) as a CR followed by a NULL instead of a CR followed by a Line Feed (LF) for the current session, use the **terminal telnet transparent** command in EXEC mode.

terminal telnet transparent

Syntax Description

This command has no arguments or keywords.

Defaults

CR followed by an LF

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The end of each line typed at the terminal is ended with a Return (CR). This command permits interoperability with different interpretations of end-of-line demarcation in the Telnet protocol specification.

Note This command applies only to access servers. It is not supported on stand-alone routers.

Examples

In the following example, the session is configured to send a CR signal as a CR followed by a NULL:

```
Router# terminal telnet transparent
```

terminal terminal-type

To specify the type of terminal connected to the current line for the current session, use the **terminal terminal-type** command in EXEC, privileged EXEC, and diagnostic mode.

terminal terminal-type *terminal-type*

Syntax Description

terminal-type	Defines the terminal name and type, and permits terminal negotiation by hosts that provide that type of service. The default is VT100.

Defaults

VT100

Command Modes

EXEC (>)
Privileged EXEC (#)
Diagnostic (diag)

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers, and became available in diagnostic mode.

Usage Guidelines

Indicate the terminal type if it is different from the default of VT100.

The terminal type name is used by TN3270s for display management and by Telnet and rlogin to inform the remote host of the terminal type.

Examples

In the following example, the terminal type is defined as VT220 for the current session:

```
Router# terminal terminal-type VT220
```

Related Commands

Command	Description
terminal keymap-type	Specifies the current keyboard type for the current session.
terminal-type	Specifies the type of terminal connected to a line.

terminal txspeed

To set the terminal transmit speed (how fast the terminal can send information) for the current line and session, use the **terminal txspeed** command in EXEC mode.

terminal txspeed *bps*

Syntax Description

bps	Baud rate in bits per second (bps). The default is 9600 bps.

Defaults

9600 bps

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

In the following example, the line transmit speed is set to 2400 bps for the current session:

```
Router# terminal txspeed 2400
```

Related Commands

Command	Description
rxspeed	Sets the terminal receive speed for a specified line or lines.
terminal rxspeed	Sets the terminal receive speed for the current line and session.
terminal terminal-type	Specifies the type of terminal connected to the current line for the current session.
txspeed	Sets the terminal transmit speed for a specified line or lines.

terminal width

To set the number of character columns on the terminal screen for the current line for a session, use the **terminal width** command in EXEC, privileged EXEC, or diagnostic mode.

terminal width *characters*

Syntax Description

characters	Number of character columns displayed on the terminal. The default is 80 characters.

Defaults

80 characters

Command Modes

EXEC (>)
Privileged EXEC (#)
Diagnostic (diag)

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on the Cisco ASR 1000 Series Routers, and became available in diagnostic mode.

Usage Guidelines

By default, the route provides a screen display width of 80 characters. You can reset this value for the current session if it does not meet the needs of your terminal.

The rlogin protocol uses the value of the *characters* argument to set up terminal parameters on a remote host.

Examples

The following example sets the terminal character columns to 132:

```
Router# terminal width 132
```

Related Commands

Command	Description
width	Sets the terminal screen width (the number of character columns displayed on the attached terminal).

terminal-queue entry-retry-interval

To change the retry interval for a terminal port queue, use the **terminal-queue entry-rety-interval** command in global configuration mode. To restore the default terminal port queue interval, use the **no** form of this command.

terminal-queue entry-retry-interval *seconds*

no terminal-queue entry-retry-interval

Syntax Description

seconds	Number of seconds between terminal port retries. The default is 60 seconds.

Defaults

60 seconds

Command Modes

Global configuration

Command History

Release	Modification
11.1	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

If a remote device (such as a printer) is busy, the connection attempt is placed in a terminal port queue. If you want to decrease the waiting period between subsequent connection attempts, decrease the default of 60 to an interval of 10 seconds. Decrease the time between subsequent connection attempts when, for example, a printer queue stalls for long periods.

Examples

The following example changes the terminal port queue retry interval from the default of 60 seconds to 10 seconds:

```
Router# terminal-queue entry-retry-interval 10
```

terminal-type

To specify the type of terminal connected to a line, use the **terminal-type** command in line configuration mode. To remove any information about the type of terminal and reset the line to the default terminal emulation, use the **no** form of this command.

terminal-type {*terminal-name* | *terminal-type*}

no terminal-type

Syntax Description

terminal-name	Terminal name.
terminal-type	Terminal type.

Defaults

VT100

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command records the type of terminal connected to the line. The *terminal-name* argument provides a record of the terminal type and allows terminal negotiation of display management by hosts that provide that type of service.

For TN3270 applications, this command must follow the corresponding ttycap entry in the configuration file.

Examples

The following example defines the terminal on line 7 as a VT220:

```
Router(config)# line 7
Router(config-line)# terminal-type VT220
```

test cable-diagnostics

To test the condition of 10-Gigabit Ethernet links or copper cables on 48-port 10/100/1000 BASE-T modules, use the **test cable-diagnostics** command in privileged EXEC mode.

test cable-diagnostics tdr interface *type number*

Syntax Description

tdr	Activates the TDR test for copper cables on 48-port 10/100/1000 BASE-T modules.
interface *type*	Specifies the interface type; see the "Usage Guidelines" section for valid values.
number	Module and port number.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(17a)SX	Support for this command was introduced on the Cisco 7600 series routers.
12.2(17b)SXA	This command was changed to provide support for the 4-port 10GBASE-E serial 10-Gigabit Ethernet module (WS-X6704-10GE).
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

Cable diagnostics can help you detect whether your cable has connectivity problems.

The TDR test guidelines are as follows:

- TDR can test cables up to a maximum length of 115 meters.
- The TDR test is supported on Cisco 7600 series routers running Release 12.2(17a)SX and later releases on specific mdoules. See the Release Notes for Cisco IOS Release 12.2SX on the Catalyst 6500 and Cisco 7600 Supervisor Engine 720, Supervisor Engine 32, and Supervisor Engine 2 for the list of the modules that support TDR.
- The valid values for **interface** *type* are **fastethernet** and **gigabitethernet**.
- Do not start the test at the same time on both ends of the cable. Starting the test at both ends of the cable at the same time can lead to false test results.
- Do not change the port configuration during any cable diagnostics test. This action may result in incorrect test results.
- The interface must be up before running the TDR test. If the port is down, the **test cable-diagnostics tdr** command is rejected and the following message is displayed:

```
Router# test cable-diagnostics tdr interface gigabitethernet2/12
```

```
% Interface Gi2/12 is administratively down
% Use 'no shutdown' to enable interface before TDR test start.
```

- If the port speed is 1000 and the link is up, do not disable the auto-MDIX feature.
- For fixed 10/100 ports, before running the TDR test, disable auto-MDIX on both sides of the cable. Failure to do so can lead to misleading results.
- For all other conditions, you must disable the auto-MDIX feature on both ends of the cable (use the **no mdix auto** command). Failure to disable auto-MDIX will interfere with the TDR test and generate false results.
- If a link partner has auto-MDIX enabled, this action will interfere with the TDR-cable diagnostics test and test results will be misleading. The workaround is to disable auto-MDIX on the link partner.
- If you change the port speed from 1000 to 10/100, enter the **no mdix auto** command before running the TDR test. Note that entering the **speed 1000** command enables auto-MDIX regardless of whether the **no mdix auto** command has been run.

Examples

This example shows how to run the TDR-cable diagnostics:

```
Router # test cable-diagnostics tdr interface gigabitethernet2/1
TDR test started on interface Gi2/1
A TDR test can take a few seconds to run on an interface
Use 'show cable-diagnostics tdr' to read the TDR results.
```

Related Commands

Command	Description
clear cable-diagnostics tdr	Clears a specific interface or clears all interfaces that support TDR.
show cable-diagnostics tdr	Displays the test results for the TDR cable diagnostics.

test flash

To test Flash memory on MCI and envm Flash EPROM interfaces, use the **test flash** command in EXEC mode.

test flash

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default values.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Examples

In the following example, the Flash memory is tested:

```
test flash
```

Related Commands

Command	Description
test interfaces	Tests the system interfaces on the modular router.
test memory	Performs a test of Multibus memory (including nonvolatile memory) on the modular router.

test interfaces

To test the system interfaces on the modular router, use the **test interfaces** command in EXEC mode.

test interfaces

Syntax Description

This command has no arguments or keywords.

Defaults

This command has no default values.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **test interfaces** EXEC command is intended for the factory checkout of network interfaces. It is not intended for diagnosing problems with an operational router. The **test interfaces** output does not report correct results if the router is attached to a "live" network. For each network interface that has an IP address that can be tested in loopback (MCI and ciscoBus Ethernet and all serial interfaces), the **test interfaces** command sends a series of ICMP echoes. Error counters are examined to determine the operational status of the interface.

Examples

In the following example, the system interfaces are tested:

```
test interfaces
```

Related Commands

Command	Description
test flash	Tests Flash memory on MCI and envm Flash EPROM interfaces.
test memory	Performs a test of Multibus memory (including nonvolatile memory) on the modular router.

test memory

To perform a test of Multibus memory (including nonvolatile memory) on the modular router, use the **test memory** command in privileged EXEC mode. The memory test overwrites memory.

test memory

Syntax Description

This command has no arguments or keywords.

Command Default

This command overwrites memory.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The memory test overwrites memory. If you use the **test memory** command, you will need to rewrite nonvolatile memory. For example, if you test Multibus memory, which is the memory used by the CSC-R 4-Mbps Token Ring interfaces, you will need to reload the system before the network interfaces will operate properly. The **test memory** command is intended primarily for use by Cisco personnel.

Examples

In the following example, the memory is tested:

```
test memory
```

Related Commands

Command	Description
test flash	Tests Flash memory on MCI and envm Flash EPROM interfaces.
test interfaces	Tests the system interfaces on the modular router.

test memory destroy

To destroy a memory chunk or dangling reference, use the **test memory destroy** command in privileged EXEC mode.

test memory destroy [**chunk** | **mgd-chunk** | **force-chunk** | **dangling-reference**] *chunk-id*

Syntax Description

chunk	(Optional) Ordinary chunk of memory.
mgd-chunk	(Optional) Managed chunk of memory.
force-chunk	(Optional) Chunk of memory that is destroyed forcefully.
dangling-reference	(Optional) Dangling reference of memory.
chunk-id	Address of the chunk to be destroyed.

Command Default

This command destroys memory chunks or dangling references on a router.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(33)SRC	This command was introduced.

Usage Guidelines

The **force-chunk** keyword destroys a chunk of ordinary (not managed) memory, even if the memory has elements or siblings that are not free.

Caution Use the **force-chunk** keyword carefully. A crash or corruption will occur if someone refers to the destroyed chunk or its elements.

Examples

In the following example, a chunk of ordinary memory is destroyed:

```
test memory destroy force-chunk
```

Related Commands

Command	Description
test memory chunk	Allocates or frees chunk elements from a chunk.
test memory create chunk	Creates a memory chunk.

test platform police get

To get the IPv6 internal police rate, use the **test platform police get** command in privileged EXEC mode.

test platform police get

Syntax Description

This command has no arguments or keywords.

Defaults

0 (No rate has been applied.)

Command Modes

Privileged EXEC (Router#)

Command History

Release	Modification
12.2(33)SRD1	The command was introduced on the Cisco 7600 series routers for the ES+ line cards, the SIP-400, and the 7600-ES+ITU-2TG and 7600-ES+ITU-4TG.

Usage Guidelines

Use this command under the **exec** command of the line card console. It is not visible from the route processor (RP) console.

Examples

The following example shows show to get the IPv6 internal police rate:

```
Router-dfc3# enable
Router-dfc3# test platform police ipv6 get
IPv6 with HBH header is policed at 100000 kbps
```

Related Commands

Command	Description
test platform police set	Sets the IPv6 internal police rate.

test platform police set

To set the IPv6 internal police rate, use the **test platform police set** command in privileged EXEC mode.

test platform police set *rate*

Note There is not a **no** version of this command. If you have set a rate limit and wish to cancel it, you will need to use this command to set the rate to 0.

Syntax Description

rate	The range is 0 to 100000 kbps. • For the SIP-400, you can configure a rate up to, and including 25600 packets per second (PPS). • For the ES+ line cards, and the 7600-ES+ITU-2TG and 7600-ES+ITU-4TG line cards, you can configure a rates of: – 16 Kbps—2 Mbps; granularity of 16 kbps – 2 Mbps—100 Mbps; granularity of 64 kbps

Defaults

For ES40 line cards, the default police rate is 12.8Mbps.

For the SIP-400, the default police rate is 21.36kpps.

Command Modes

Privileged EXEC (Router#)

Command History

Release	Modification
12.2(33)SRD1	The command was introduced on the Cisco 7600 series routers for the ES+ line cards, the SIP-400, and the 7600-ES+ITU-2TG and 7600-ES+ITU-4TG.

Usage Guidelines

Use this command under EXEC command of the line card console. It is not visible from the route processor (RP) console.

For both the ES+ line cards and the SIP-400, setting the police rate to 0 turns off the policing.

For both the ES+ line cards and the SIP-400, when the policer is set from the the line card console, the setting remains effective even if the line card is moved to another chassis running the Cisco IOS Release 12.2(33)SRD1 (or later) image.

For the SIP-400, IPv6 HBH packets will continue to go through the QoS policing configured on the line card. For ES+ line cards, IPv6 HBH packets will bypass any QoS configured on the line card.

Examples

The following examples shows how to set the IPv6 with HBH header to be policed at 100000 kbps:

```
Router-dfc3# enable
Router-dfc3# test platform police ipv6 set 100000
```

Related Commands

Command	Description
test platform police get	Gets the IPv6 internal police rate.

tftp-server

To configure a router or a Flash memory device on the router as a TFTP server, use one of the following **tftp-server** commands in global configuration mode. This command replaces the **tftp-server system** command. To remove a previously defined filename, use the **no** form of this command with the appropriate filename.

tftp-server flash [*partition-number***:**]*filename1* [**alias** *filename2*] [*access-list-number*]

tftp-server rom alias *filename1* [*access-list-number*]

no tftp-server {**flash** [*partition-number***:**]*filename1* | **rom alias** *filename2*}

Cisco 1600 Series and Cisco 3600 Series Routers

tftp-server flash [*device***:**][*partition-number***:**]*filename*

no tftp-server flash [*device***:**][*partition-number***:**]*filename*

Cisco 7000 Family Routers

tftp-server flash *device***:***filename*

no tftp-server flash *device***:***filename*

Syntax Description

flash	Specifies TFTP service of a file in Flash memory.
rom	Specifies TFTP service of a file in ROM.
filename1	Name of a file in Flash or in ROM that the TFTP server uses in answering TFTP Read Requests.
alias	Specifies an alternate name for the file that the TFTP server uses in answering TFTP Read Requests.
filename2	Alternate name of the file that the TFTP server uses in answering TFTP Read Requests. A client of the TFTP server can use this alternate name in its Read Requests.
access-list-number	(Optional) Basic IP access list number. Valid values are from 0 to 99.
*partition-number***:**	(Optional) Specifies TFTP service of a file in the specified partition of Flash memory. If the partition number is not specified, the file in the first partition is used. For the Cisco 1600 series and Cisco 3600 series routers, you must enter a colon after the partition number if a filename follows it.

device:	(Optional) Specifies TFTP service of a file on a Flash memory device in the Cisco 1600 series, Cisco 3600 series, and Cisco 7000 family routers. The colon is required. Valid devices are as follows: • **flash**—Internal Flash memory on the Cisco 1600 series and Cisco 3600 series routers. This is the only valid device for the Cisco 1600 series routers. • **bootflash**—Internal Flash memory in the Cisco 7000 family routers. • **slot0**—First PCMCIA slot on the Cisco 3600 series and Cisco 7000 family routers. • **slot1**—Second PCMCIA slot on the Cisco 3600 series and Cisco 7000 family. • **slavebootflash**—Internal Flash memory on the slave RSP card of a Cisco 7507 or Cisco 7513 router configured for HSA. • **slaveslot0**—First PCMCIA slot of the slave RSP card on a Cisco 7507 or Cisco 7513 router configured for HSA. • **slaveslot1**—Second PCMCIA slot of the slave RSP card on a Cisco 7507 or Cisco 7513 router configured for HSA.
filename	Name of the file on a Flash memory device that the TFTP server uses in answering a TFTP Read Request. Use this argument only with the Cisco 1600 series, Cisco 3600 series, Cisco 7000 series, or Cisco 7500 series routers.

Defaults

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

You can specify multiple filenames by repeating the **tftp-server** command. The system sends a copy of the system image contained in ROM or one of the system images contained in Flash memory to any client that issues a TFTP Read Request with this filename.

If the specified *filename1* or *filename2* argument exists in Flash memory, a copy of the Flash image is sent. On systems that contain a complete image in ROM, the system sends the ROM image if the specified *filename1* or *filename2* argument is not found in Flash memory.

Images that run from ROM cannot be loaded over the network. Therefore, it does not make sense to use TFTP to offer the ROMs on these images.

On the Cisco 7000 family routers, the system sends a copy of the file contained on one of the Flash memory devices to any client that issues a TFTP Read Request with its filename.

Examples

In the following example, the system uses TFTP to send a copy of the *version-10.3* file located in Flash memory in response to a TFTP Read Request for that file. The requesting host is checked against access list 22.

```
tftp-server flash version-10.3 22
```

In the following example, the system uses TFTP to send a copy of the ROM image *gs3-k.101* in response to a TFTP Read Request for the gs3-k.101 file:

```
tftp-server rom alias gs3-k.101
```

In the following example, the system uses TFTP to send a copy of the *version-11.0* file in response to a TFTP Read Request for that file. The file is located on the Flash memory card inserted in slot 0.

```
tftp-server flash slot0:version-11.0
```

The following example enables a Cisco 3600 series router to operate as a TFTP server. The source file c3640-i-mz is in the second partition of internal Flash memory.

```
Router# configure terminal

Enter configuration commands, one per line.  End with CNTL/Z.
router(config)# tftp-server flash flash:2:dirt/gate/c3640-i-mz
```

In the following example, the source file is in the second partition of the Flash memory PC card in slot 0 on a Cisco 3600 series:

```
Router# configure terminal

Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# tftp-server flash slot0:2:dirt/gate/c3640-j-mz
```

The following example enables a Cisco 1600 series router to operate as a TFTP server. The source file c1600-i-mz is in the second partition of Flash memory:

```
router# configure terminal

Enter configuration commands, one per line.  End with CNTL/Z.
router(config)# tftp-server flash flash:2:dirt/gate/c1600-i-mz
```

Related Commands

Command	Description
access-list	Creates an extended access list.

tftp-server system

The **tftp-server system** command has been replaced by the **tftp-server** command. See the description of the **tftp-server** command in this chapter for more information.

time-period

To set the time increment for automatically saving an archive file of the current running configuration in the Cisco IOS configuration archive, use the **time-period** command in archive configuration mode. To disable this function, use the **no** form of this command.

time-period *minutes*

no time-period *minutes*

Syntax Description

minutes	Specifies how often, in minutes, to automatically save an archive file of the current running configuration in the Cisco IOS configuration archive.

Command Default

By default, no time increment is set.

Command Modes

Archive configuration

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was implemented on the Cisco 10000 series router.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB and implemented on the Cisco 10000 series.

Usage Guidelines

Note Before using this command, you must configure the **path** command to specify the location and filename prefix for the files in the Cisco IOS configuration archive.

If this command is configured, an archive file of the current running configuration is automatically saved after the given time specified by the *minutes* argument. Archive files continue to be automatically saved at this given time increment until this function is disabled. Use the **maximum** command to set the maximum number of archive files of the running configuration to be saved.

Note This command saves the current running configuration to the configuration archive whether or not the running configuration has been modified since the last archive file was saved.

Examples

In the following example, a value of 20 minutes is set as the time increment for which to automatically save an archive file of the current running configuration in the Cisco IOS configuration archive:

```
Router# configure terminal
!
Router(config)# archive
Router(config-archive)# path disk0:myconfig
Router(config-archive)# time-period 20
Router(config-archive)# end
```

Related Commands

Command	Description
archive config	Saves a copy of the current running configuration to the Cisco IOS configuration archive.
configure confirm	Confirms replacement of the current running configuration with a saved Cisco IOS configuration file.
configure replace	Replaces the current running configuration with a saved Cisco IOS configuration file.
maximum	Sets the maximum number of archive files of the running configuration to be saved in the Cisco IOS configuration archive.
path	Specifies the location and filename prefix for the files in the Cisco IOS configuration archive.
show archive	Displays information about the files saved in the Cisco IOS configuration archive.

trace (privileged)

To discover the routes that packets will actually take when traveling to their destination, use the **trace** command in privileged EXEC mode.

trace [*protocol*] [*destination*]

Syntax Description

protocol	(Optional) Protocols that can be used are **appletalk**, **clns**, **ip** and **vines**.
destination	(Optional) Destination address or host name on the command line. The default parameters for the appropriate protocol are assumed and the tracing action begins.

Defaults

The *protocol* argument is based on the Cisco IOS software examination of the format of the *destination* argument. For example, if the software finds a *destination* argument in IP format, the *protocol* value defaults to **ip**.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(13)T	This command is no longer supported in Cisco IOS Mainline releases or in Technology-based (T-train) releases. It might continue to appear in 12.2S-family releases.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **trace** command works by taking advantage of the error messages generated by routers when a datagram exceeds its time-to-live (TTL) value.

The **trace** command starts by sending probe datagrams with a TTL value of one. This causes the first router to discard the probe datagram and send back an error message. The **trace** command sends several probes at each TTL level and displays the round-trip time for each.

The **trace** command sends out one probe at a time. Each outgoing packet may result in one or two error messages. A “time exceeded” error message indicates that an intermediate router has seen and discarded the probe. A “destination unreachable” error message indicates that the destination node has received the probe and discarded it because it could not deliver the packet. If the timer goes off before a response comes in, the **trace** command prints an asterisk (*).

The **trace** command terminates when the destination responds, when the maximum TTL is exceeded, or when the user interrupts the trace with the escape sequence. By default, to invoke the escape sequence, type **Ctrl-^ X** by simultaneously pressing and releasing the **Ctrl**, **Shift**, and **6** keys, and then pressing the **X** key.

To use nondefault parameters and invoke an extended **trace** test, enter the command without a *destination* argument. You will be stepped through a dialog to select the desired parameters.

Common Trace Problems

Due to bugs in the IP implementation of various hosts and routers, the IP **trace** command may behave in unexpected ways.

Not all destinations will respond correctly to a probe message by sending back an "ICMP port unreachable" message. A long sequence of TTL levels with only asterisks, terminating only when the maximum TTL has been reached, may indicate this problem.

There is a known problem with the way some hosts handle an "ICMP TTL exceeded" message. Some hosts generate an "ICMP" message but they reuse the TTL of the incoming packet. Because this is zero, the ICMP packets do not make it back. When you trace the path to such a host, you may see a set of TTL values with asterisks (*). Eventually the TTL gets high enough that the *ICMP* message can get back. For example, if the host is six hops away, the **trace** command will time out on responses 6 through 11.

Trace IP Routes

The following display shows sample IP **trace** output when a destination host name has been specified:

```
Router# trace ABA.NYC.mil

Type escape sequence to abort.
Tracing the route to ABA.NYC.mil (26.0.0.73)
    1 DEBRIS.CISCO.COM (192.180.1.6) 1000 msec 8 msec 4 msec
    2 BARRNET-GW.CISCO.COM (192.180.16.2) 8 msec 8 msec 8 msec
    3 EXTERNAL-A-GATEWAY.STANFORD.EDU (192.42.110.225) 8 msec 4 msec 4 msec
    4 BB2.SU.BARRNET.NET (192.200.254.6) 8 msec 8 msec 8 msec
    5 SU.ARC.BARRNET.NET (192.200.3.8) 12 msec 12 msec 8 msec
    6 MOFFETT-FLD-MB.in.MIL (192.52.195.1) 216 msec 120 msec 132 msec
    7 ABA.NYC.mil (26.0.0.73) 412 msec 628 msec 664 msec
```

Table 168 describes the significant fields shown in the display.

Table 168 trace Field Descriptions

Field	Description
1	Indicates the sequence number of the router in the path to the host.
DEBRIS.CISCO.COM	Host name of this router.
192.180.1.6	Internet address of this router.
1000 msec 8 msec 4 msec	Round-trip time for each of the three probes that are sent.

Extended IP Trace Dialog

The following display shows a sample **trace** session involving the extended dialog of the **trace** command:

```
Router# trace

Protocol [ip]:
Target IP address: mit.edu
Source address:
Numeric display [n]:
Timeout in seconds [3]:
Probe count [3]:
Minimum Time to Live [1]:
Maximum Time to Live [30]:
Port Number [33434]:
Loose, Strict, Record, Timestamp, Verbose[none]:
Type escape sequence to abort.
Tracing the route to MIT.EDU (18.72.2.1)
```

```
 1 ICM-DC-2-V1.ICP.NET (192.108.209.17) 72 msec 72 msec 88 msec
 2 ICM-FIX-E-H0-T3.ICP.NET (192.157.65.122) 80 msec 128 msec 80 msec
 3 192.203.229.246 540 msec 88 msec 84 msec
 4 T3-2.WASHINGTON-DC-CNSS58.T3.ANS.NET (140.222.58.3) 84 msec 116 msec 88 msec
 5 T3-3.WASHINGTON-DC-CNSS56.T3.ANS.NET (140.222.56.4) 80 msec 132 msec 88 msec
 6 T3-0.NEW-YORK-CNSS32.T3.ANS.NET (140.222.32.1) 92 msec 132 msec 88 msec
 7 T3-0.HARTFORD-CNSS48.T3.ANS.NET (140.222.48.1) 88 msec 88 msec 88 msec
 8 T3-0.HARTFORD-CNSS49.T3.ANS.NET (140.222.49.1) 96 msec 104 msec 96 msec
 9 T3-0.ENSS134.T3.ANS.NET (140.222.134.1) 92 msec 128 msec 92 msec
10 W91-CISCO-EXTERNAL-FDDI.MIT.EDU (192.233.33.1) 92 msec 92 msec 112 msec
11 E40-RTR-FDDI.MIT.EDU (18.168.0.2) 92 msec 120 msec 96 msec
12 MIT.EDU (18.72.2.1) 96 msec 92 msec 96 msec
```

Table 169 describes the fields that are unique to the extended trace sequence, as shown in the display.

Table 169 trace Field Descriptions

Field	Description
Target IP address	You must enter a host name or an IP address. There is no default.
Source address	One of the interface addresses of the router to use as a source address for the probes. The router will normally pick what it feels is the best source address to use.
Numeric display	The default is to have both a symbolic and numeric display; however, you can suppress the symbolic display.
Timeout in seconds	The number of seconds to wait for a response to a probe packet. The default is 3 seconds.
Probe count	The number of probes to be sent at each TTL level. The default count is 3.
Minimum Time to Live [1]	The TTL value for the first probes. The default is 1, but it can be set to a higher value to suppress the display of known hops.
Maximum Time to Live [30]	The largest TTL value that can be used. The default is 30. The **trace** command terminates when the destination is reached or when this value is reached.
Port Number	The destination port used by the User Datagram Protocol (UDP) probe messages. The default is 33434.
Loose, Strict, Record, Timestamp, Verbose	IP header options. You can specify any combination. The **trace** command issues prompts for the required fields. Note that the **trace** command will place the requested options in each probe; however, there is no guarantee that all routers (or end nodes) will process the options.
Loose	Allows you to specify a list of nodes that must be traversed when going to the destination.
Strict	Allows you to specify a list of nodes that must be the only nodes traversed when going to the destination.
Record	Allows you to specify the number of hops to leave room for.
Timestamp	Allows you to specify the number of time stamps to leave room for.
Verbose	If you select any option, the verbose mode is automatically selected and the **trace** command prints the contents of the option field in any incoming packets. You can prevent verbose mode by selecting it again, toggling its current setting.

Table 170 describes the characters that can appear in **trace** command output.

Table 170 ip trace Text Characters

Char	Description
nn msec	For each node, the round-trip time (in milliseconds) for the specified number of probes.
*	The probe timed out.
?	Unknown packet type.
A	Administratively unreachable. Usually, this output indicates that an access list is blocking traffic.
H	Host unreachable.
N	Network unreachable.
P	Protocol unreachable.
Q	Source quench.
U	Port unreachable.

Related Commands

Command	Description
trace (user)	Discovers the CLNS routes that packets will actually take when traveling to their destination.

trace (user)

To discover the IP routes that packets will actually take when traveling to their destination, use the **trace** command in EXEC mode.

trace [*protocol*] [*destination*]

Syntax Description

protocol	(Optional) Protocols that can be used are **appletalk**, **clns**, **ip** and **vines**.
destination	(Optional) Destination address or host name on the command line. The default parameters for the appropriate protocol are assumed and the tracing action begins.

Defaults

The *protocol* argument is based on the Cisco IOS software examination of the format of the *destination* argument. For example, if the software finds a *destination* argument in IP format, the *protocol* defaults to **ip**.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(13)T	This command is no longer supported in Cisco IOS Mainline releases or in Technology-based (T-train) releases. It might continue to appear in 12.2S-family releases.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **trace** command works by taking advantage of the error messages generated by routers when a datagram exceeds its time-to-live (TTL) value.

The **trace** command starts by sending probe datagrams with a TTL value of one. This causes the first router to discard the probe datagram and send back an error message. The **trace** command sends several probes at each TTL level and displays the round-trip time for each.

The **trace** command sends out one probe at a time. Each outgoing packet may result in one or two error messages. A “time exceeded” error message indicates that an intermediate router has seen and discarded the probe. A “destination unreachable” error message indicates that the destination node has received the probe and discarded it because it could not deliver the packet. If the timer goes off before a response comes in, **trace** prints an asterisk (*).

The **trace** command terminates when the destination responds, when the maximum TTL is exceeded, or when the user interrupts the trace with the escape sequence. By default, to invoke the escape sequence, type **Ctrl-^ X** by simultaneously pressing and releasing the **Ctrl**, **Shift**, and **6** keys, and then pressing the **X** key.

Common Trace Problems

Due to bugs in the IP implementation of various hosts and routers, the IP **trace** command may behave in unexpected ways.

Not all destinations will respond correctly to a probe message by sending back an "ICMP port unreachable" message. A long sequence of TTL levels with only asterisks, terminating only when the maximum TTL has been reached, may indicate this problem.

There is a known problem with the way some hosts handle an "ICMP TTL exceeded" message. Some hosts generate an *ICMP* message but they reuse the TTL of the incoming packet. Since this is zero, the ICMP packets do not make it back. When you trace the path to such a host, you may see a set of TTL values with asterisks (*). Eventually the TTL gets high enough that the "ICMP" message can get back. For example, if the host is six hops away, **trace** will time out on responses 6 through 11.

Trace IP Routes

The following display shows sample IP **trace** output when a destination host name has been specified:

```
Router# trace ip ABA.NYC.mil

Type escape sequence to abort.
Tracing the route to ABA.NYC.mil (26.0.0.73)
  1 DEBRIS.CISCO.COM (192.180.1.6) 1000 msec 8 msec 4 msec
  2 BARRNET-GW.CISCO.COM (192.180.16.2) 8 msec 8 msec 8 msec
  3 EXTERNAL-A-GATEWAY.STANFORD.EDU (192.42.110.225) 8 msec 4 msec 4 msec
  4 BB2.SU.BARRNET.NET (192.200.254.6) 8 msec 8 msec 8 msec
  5 SU.ARC.BARRNET.NET (192.200.3.8) 12 msec 12 msec 8 msec
  6 MOFFETT-FLD-MB.in.MIL (192.52.195.1) 216 msec 120 msec 132 msec
  7 ABA.NYC.mil (26.0.0.73) 412 msec 628 msec 664 msec
```

Table 171 describes the significant fields shown in the display.

Table 171 trace Field Descriptions

Field	Description
1	Indicates the sequence number of the router in the path to the host.
DEBRIS.CISCO.COM	Host name of this router.
192.180.1.61	Internet address of this router.
1000 msec 8 msec 4 msec	Round-trip time for each of the three probes that are sent.

Table 172 describes the characters that can appear in **trace** output.

Table 172 ip trace Text Characters

Char	Description
nn msec	For each node, the round-trip time (in milliseconds) for the specified number of probes.
*	The probe timed out.
?	Unknown packet type.
A	Administratively unreachable. Usually, this output indicates that an access list is blocking traffic.
H	Host unreachable.
N	Network unreachable.

Table 172 ip trace Text Characters (continued)

Char	Description
P	Protocol unreachable.
Q	Source quench.
U	Port unreachable.

Related Commands

Command	Description
trace (privileged)	Probes the routes that packets follow when traveling to their destination from the router.

traceroute

To discover the routes that packets will actually take when traveling to their destination address, use the **traceroute** command in user EXEC or privileged EXEC mode.

traceroute [**vrf** *vrf-name* | **topology** *topology-name*] [*protocol*] *destination*

Syntax Description

vrf *vrf-name*	(Optional) Specifies the name of a Virtual Private Network (VPN) routing and forwarding (VRF) instance table in which to find the destination address. The only keyword that you can select for the *protocol* argument when you use the **vrf** *vrf-name* keyword-argument pair is the **ip** keyword.
topology *topology-name*	(Optional) Specifies the name of the topology instance. The *topology-name* argument is case-sensitive; "VOICE" and "voice" specify different topologies.
protocol	(Optional) Protocol keyword, either **appletalk**, **clns**, **ip**, **ipv6**, **ipx**, **oldvines**, or **vines**. When not specified, the *protocol* argument is based on an examination by the software of the format of the *destination* argument. The default protocol is IP.
destination	(Optional in privileged EXEC mode; required in user EXEC mode) The destination address or hostname for which you want to trace the route. The software determines the default parameters for the appropriate protocol and the tracing action begins.

Command Default

When not specified, the *protocol* argument is determined by the software examining the format of the *destination* argument. For example, if the software finds a *destination* argument in IP format, the protocol value defaults to IP.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
12.0(5)T	The **vrf** *vrf-name* keyword and argument were added.
12.2(2)T	Support for IPv6 was added.
12.0(21)ST	Support for IPv6 was added.
12.0(22)S	Support for IPv6 was added.
12.2(11)T	The **traceroute** command test characters for IPv6 were updated. A new error message was added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Release	Modification
12.3(5)	A line was added to the interactive **traceroute vrf** command, so that you can resolve the autonomous system number through the use of the global table or a VRF table, or you can choose not to resolve the autonomous system.
12.0(26)S1	Changes to the command were integrated into Cisco IOS Release 12.0(26)S1.
12.2(20)S	Changes to the command were integrated into Cisco IOS Release 12.2(20)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	The **topology** *topology-name* keyword and argument were added to support Multi-Topology Routing (MTR).
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SRE	This command was integrated into Cisco IOS Release 12.2(33)SRE.

Usage Guidelines

The **traceroute** command works by taking advantage of the error messages generated by routers when a datagram exceeds its hop limit value.

The **traceroute** command starts by sending probe datagrams with a hop limit of 1. Including a hop limit of 1 with a probe datagram causes the neighboring routers to discard the probe datagram and send back an error message. The **traceroute** command sends several probes with increasing hop limits and displays the round-trip time for each.

The **traceroute** command sends out one probe at a time. Each outgoing packet might result in one or more error messages. A time-exceeded error message indicates that an intermediate router has seen and discarded the probe. A destination unreachable error message indicates that the destination node has received and discarded the probe because the hop limit of the packet reached a value of 0. If the timer goes off before a response comes in, the **traceroute** command prints an asterisk (*).

The **traceroute** command terminates when the destination responds, when the hop limit is exceeded, or when the user interrupts the trace with the escape sequence. By default, to invoke the escape sequence, type **Ctrl-^ X**—by simultaneously pressing and releasing the **Ctrl**, **Shift**, and **6** keys, and then pressing the **X** key.

To use nondefault parameters and invoke an extended **traceroute** test, enter the command without a *protocol* or *destination* argument in privileged EXEC mode. You are stepped through a dialog to select the desired parameters. Extended **traceroute** tests are not supported in user EXEC mode. The user-level traceroute feature provides a basic trace facility for users who do not have system privileges. The *destination* argument is required in user EXEC mode.

If the system cannot map an address for a hostname, it returns a “%No valid source address for destination” message.

If the **vrf** *vrf-name* keyword and argument are used, the **topology** option is not displayed because only the default VRF is supported. The **topology** *topology-name* keyword and argument and the DiffServ Code Point (DSCP) option in the extended traceroute system dialog are displayed only if a topology is configured on the router.

Examples

After you enter the **traceroute** command in privileged EXEC mode, the system prompts you for a protocol. The default protocol is IP.

If you enter a hostname or address on the same line as the **traceroute** command, the default action is taken as appropriate for the protocol type of that name or address.

The following example is sample dialog from the **traceroute** command using default values. The specific dialog varies somewhat from protocol to protocol.

```
Router# traceroute

Protocol [ip]:
Target IP address:
Source address:
DSCP Value [0]: ! Only displayed if a topology is configured on the router.
Numeric display [n]:
Timeout in seconds [3]:
Probe count [3]:
Minimum Time to Live [1]:
Maximum Time to Live [30]:
Port Number [33434]:
Loose, Strict, Record, Timestamp, Verbose [none]:
```

Related Commands

Command	Description
ping (MTR)	Pings a destination within a specific topology.

traceroute mac

To display the Layer 2 path taken by the packets from the specified source to the specified destination, use the **traceroute mac** command in privileged EXEC mode.

traceroute mac *source-mac-address* {*destination-mac-address* | **interface** *type interface-number destination-mac-address*} [**vlan** *vlan-id*] [**detail**]

traceroute mac interface *type interface-number source-mac-address* {*destination-mac-address* | **interface** *type interface-number destination-mac-address*} [**vlan** *vlan-id*] [**detail**]

traceroute mac ip {*source-ip-address* | *source-hostname*} {*destination-ip-address* | *destination-hostname*} [**detail**]

Syntax Description

source-mac-address	Media Access Control (MAC) address of the source switch in hexadecimal format.
destination-mac-address	MAC address of the destination switch in hexadecimal format.
interface *type*	Specifies the interface where the MAC address resides; valid values are **FastEthernet**, **GigabitEthernet**, and **Port-channel**.
interface-number	Module and port number or the port-channel number; valid values for the port channel are from 1 to 282.
vlan *vlan-id*	(Optional) Specifies the virtual local area network (VLAN) on which to trace the Layer 2 path that the packets take from the source switch to the destination switch; valid values are from 1 to 4094.
detail	(Optional) Displays detailed information about the Layer 2 trace.
ip	Specifies the IP address where the MAC address resides.
source-ip-address	IP address of the source switch as a 32-bit quantity in dotted-decimal format.
source-hostname	IP hostname of the source switch.
destination-ip-address	IP address of the destination switch as a 32-bit quantity in dotted-decimal format.
destination-hostname	IP hostname of the destination switch.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(18)SXE	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command is not supported on the Cisco 7600 series router that is configured with a Supervisor Engine 2.

Do not use leading zeros when entering a VLAN ID.

For Layer 2 traceroute to functional properly, you must enable CDP on all of the switches in the network. Do not disable CDP.

When the switch detects a device in the Layer 2 path that does not support Layer 2 traceroute, the switch continues to send Layer 2 trace queries and lets them time out.

The maximum number of hops identified in the path is ten.

Layer 2 traceroute supports only unicast traffic. If you specify a multicast source or destination MAC address, the physical path is not identified, and a message appears.

The **traceroute mac** command output shows the Layer 2 path when the specified source and destination addresses belong to the same VLAN. If you specify source and destination addresses that belong to different VLANs, the Layer 2 path is not identified, and a message appears.

If the source or destination MAC address belongs to multiple VLANs, you must specify the VLAN to which both the source and destination MAC addresses belong. If the VLAN is not specified, the path is not identified, and a message appears.

When multiple devices are attached to one port through hubs (for example, multiple CDP neighbors are detected on a port), the Layer 2 traceroute utility terminates at that hop and displays an error message.

This feature is not supported in Token Ring VLANs.

Examples

This example shows how to display detailed information about the Layer 2 path:

```
Router# traceroute mac 0001.0000.0204 0001.0000.0304 detail

Source 1001.0000.0204 found on VAYU[WS-C6509] (10.1.1.10)
1 VAYU / WS-C6509 / 10.1.1.10 :
Gi6/1 [full, 1000M] => Po100 [auto, auto]
2 PANI / WS-C6509 / 10.1.1.12 :
Po100 [auto, auto] => Po110 [auto, auto]
3 BUMI / WS-C6509 / 10.1.1.13 :
Po110 [auto, auto] => Po120 [auto, auto]
4 AGNI / WS-C6509 / 10.1.1.11 :
Po120 [auto, auto] => Gi8/12 [full, 1000M]
Destination 1001.0000.0304 found on AGNI[WS-C6509] (10.1.1.11)
Layer 2 trace completed.
Router#
```

This example shows the output when the switch is not connected to the source switch:

```
Router# traceroute mac 0000.0201.0501 0000.0201.0201 detail

Source not directly connected, tracing source .....
Source 1000.0201.0501 found on con5[WS-C6509] (10.2.5.5)
con5 / WS-C6509 / 10.2.5.5 :
        Fa0/1 [auto, auto] =>Gi0/1 [auto, auto]
con1 / WS-C6509 / 10.2.1.1 :
        Gi0/1 [auto, auto] =>Gi0/2 [auto, auto]
con2 / WS-C6509 / 10.2.2.2 :
        Gi0/2 [auto, auto] =>Fa0/1 [auto, auto]
Destination 1000.0201.0201 found on con2[WS-C6509] (10.2.2.2)
Layer 2 trace completed.
Router#
```

This example shows the output when the switch cannot find the destination port for the source MAC address:

```
Router# traceroute mac 0000.0011.1111 0000.0201.0201

Error:Source Mac address not found.
Layer2 trace aborted.
Router#
```

This example shows the output when the source and destination devices are in different VLANs:

```
Router# traceroute mac 0000.0201.0601 0000.0301.0201

Error:Source and destination macs are on different vlans.
Layer2 trace aborted.
Router#
```

This example shows the output when the destination MAC address is a multicast address:

```
Router# traceroute mac 0000.0201.0601 0100.0201.0201

Invalid destination mac address
Router#
```

This example shows the output when the source and destination switches belong to multiple VLANs:

```
Router# traceroute mac 0000.0201.0601 0000.0201.0201

Error:Mac found on multiple vlans.
Layer2 trace aborted.
Router#
```

This example shows how to display the Layer 2 path by specifying the interfaces on the source and destination switches:

```
Router# traceroute mac interface fastethernet0/1 0000.0201.0601 interface fastethernet0/3
0000.0201.0201

Source 1000.0201.0601 found on con6[WS-C6509] (10.2.6.6)
con6 (10.2.6.6) :Fa0/1 =>Fa0/3
con5                 (10.2.5.5        )  :    Fa0/3 =>Gi0/1
con1                 (10.2.1.1        )  :    Gi0/1 =>Gi0/2
con2                 (10.2.2.2        )  :    Gi0/2 =>Fa0/1
Destination 1000.0201.0201 found on con2[WS-C6509] (10.2.2.2)
Layer 2 trace completed
Router#
```

This example shows how to display detailed traceroute information:

```
Router# traceroute mac ip 10.2.66.66 10.2.22.22 detail

Translating IP to mac.....
10.2.66.66 =>0000.0201.0601
10.2.22.22 =>0000.0201.0201

Source 0000.0201.0601 found on con6[WS-C6509] (10.2.6.6)
con6 / WS-C6509 / 10.2.6.6 :
        Fa0/1 [auto, auto] =>Fa0/3 [auto, auto]
con5 / WS-C6509 / 10.2.5.5 :
        Fa0/3 [auto, auto] =>Gi0/1 [auto, auto]
con1 / WS-C6509 / 10.2.1.1 :
        Gi0/1 [auto, auto] =>Gi0/2 [auto, auto]
con2 / WS-C6509 / 10.2.2.2 :
        Gi0/2 [auto, auto] =>Fa0/1 [auto, auto]
Destination 0000.0201.0201 found on con2[WS-C6509] (10.2.2.2)
```

```
Layer 2 trace completed.
Router#
```

This example shows how to display the Layer 2 path by specifying the source and destination hostnames:

```
Router# traceroute mac ip con6 con2

Translating IP to mac .....
10.2.66.66 =>0000.0201.0601
10.2.22.22 =>0000.0201.0201

Source 0000.0201.0601 found on con6
con6 (10.2.6.6) :Fa0/1 =>Fa0/3
con5                 (10.2.5.5        )  :    Fa0/3 =>Gi0/1
con1                 (10.2.1.1        )  :    Gi0/1 =>Gi0/2
con2                 (10.2.2.2        )  :    Gi0/2 =>Fa0/1
Destination 0000.0201.0201 found on con2
Layer 2 trace completed
Router#
```

This example shows the output when ARP cannot associate the source IP address with the corresponding MAC address:

```
Router# traceroute mac ip 10.2.66.66 10.2.77.77

Arp failed for destination 10.2.77.77.
Layer2 trace aborted.
Router#
```

undelete

To recover a file marked "deleted" on a Class A Flash file system, use the **undelete** command in user EXEC or privileged EXEC mode.

undelete *index* [*filesystem***:**]

Syntax Description

index	A number that indexes the file in the **dir** command output.
*filesystem***:**	(Optional) A file system containing the file to undelete, followed by a colon.

Defaults

The default file system is the one specified by the **cd** command.

Command Modes

user EXEC
privileged EXEC

Command History

Release	Modification
11.0	This command was introduced for Class A Flash File Systems (platforms include the Cisco 7500 series and Cisco 12000 series).
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command was introduced on the Supervisor Engine 2.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

For Class A Flash file systems, when you delete a file, the Cisco IOS software simply marks the file as deleted, but it does not erase the file. This command allows you to recover a "deleted" file on a specified Flash memory device. You must undelete a file by its index because you could have multiple deleted files with the same name. For example, the "deleted" list could contain multiple configuration files with the name router-config. You undelete by index to indicate which of the many router-config files from the list to undelete. Use the **dir** command to learn the index number of the file you want to undelete.

You cannot undelete a file if a valid (undeleted) file with the same name exists. Instead, you first delete the existing file and then undelete the file you want. For example, if you had an undeleted version of the router-config file and you wanted to use a previous, deleted version instead, you could not simply undelete the previous version by index. You would first delete the existing router-config file and then undelete the previous router-config file by index. You can delete and undelete a file up to 15 times.

On Class A Flash file systems, if you try to recover the configuration file pointed to by the CONFIG_FILE environment variable, the system prompts you to confirm recovery of the file. This prompt reminds you that the CONFIG_FILE environment variable points to an undeleted file. To permanently delete all files marked "deleted" on a Flash memory device, use the **squeeze** EXEC command.

For further information on Flash File System types (classes), see http://www.cisco.com/warp/public/63/pcmciamatrix.html.

Examples

In the following example, the deleted file at index 1 is recovered:

```
Router# show flash

System flash directory:
File  Length   Name/status
  1   8972116  c7000-js56i-mz.121-5.T [deleted]
  2   6765916  c7000-ds-mz.CSCds70452
[15738160 bytes used, 1039056 available, 16777216 total]
16384K bytes of processor board System flash (Read/Write)

Router# undelete 1 flash:
```

Related Commands

Command	Description
delete	Deletes a file on a Flash memory device.
dir	Displays a list of files on a file system.
squeeze	Permanently deletes Flash files by squeezing a Class A Flash file system.

upgrade automatic abortversion

To cancel the scheduled reloading of the router with a new Cisco IOS software image, use the **upgrade automatic abortversion** command in privileged EXEC mode.

upgrade automatic abortversion

no upgrade automatic abortversion

Syntax Description

This command has no arguments or keywords.

Command Default

The reload of the router with the Cisco IOS software image is not scheduled.
The disk-management utility is disabled.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(15)T	This command was introduced.

Usage Guidelines

Use the **upgrade automatic abortversion** command to cancel a reload that has already been scheduled with either the **upgrade automatic getversion** command or the **upgrade automatic runversion** command.

Examples

The following example shows how to cancel a reload that is scheduled within one hour and 15 minutes. The reload was scheduled by using the **upgrade automatic runversion** command.

```
Router# upgrade automatic runversion in 01:15

Upgrading to "flash:c1841-adventerprisek9-mz.calvin-build-20060714". Wait..

Reload scheduled for 09:51:38 UTC Thu Aug 3 2006 (in 1 hour and 15 minutes) with image -
flash:c1841-adventerprisek9-mz.calvin-build-20060714 by console
Reload reason: Auto upgrade
Device will WARM UPGRADE in 1:15:00
To cancel the upgrade, enter the command "upgrade automatic abortversion"
Aug  3 08:36:38.072: %SYS-5-SCHEDULED_RELOAD: Reload requested for 09:51:38 UTC Thu Aug 3
2006 at 08:36:38 UTC Thu Aug 3 2006 by console. Reload Reason: Auto upgrade.

Router# upgrade automatic abortversion

Auto upgrade of image which was scheduled earlier is aborted!


***
*** --- SHUTDOWN ABORTED ---
***
```

```
Aug  3 08:37:02.292: %SYS-5-SCHEDULED_RELOAD_CANCELLED:  Scheduled reload cancelled at
08:37:02 UTC Thu Aug 3 2006
```

Related Commands

Command	Description
upgrade automatic getversion	Downloads a Cisco IOS software image directly from www.cisco.com or from a non-Cisco server.
upgrade automatic runversion	Reloads the router with a new Cisco IOS software image.

upgrade automatic getversion

To download a Cisco IOS software image directly from www.cisco.com or from a non-Cisco server, use the **upgrade automatic getversion** command in privileged EXEC mode.

upgrade automatic getversion {**cisco username** *username* **password** *password* **image** *image* | *url*}[**at** *hh:mm* | *now* | **in** *hh:mm*] [**disk-management** {**auto** | **confirm** | **no**}]

Syntax Description

cisco	Downloads the image from www.cisco.com.
username *username*	Username for logging in to www.cisco.com.
password *password*	Password for logging in to www.cisco.com.
image	Specifies the Cisco IOS software image to which the router is to be upgraded.
image	Name of the Cisco IOS software image to which the router is to be upgraded.
url	URL from where the Cisco IOS Auto-Upgrade Manager can download the image that has already been downloaded to a non-Cisco server.
at	(Optional) Schedules a reload at a specified time. Use either of the following arguments with this keyword: • *hh:mm*—Hour and minute. The time entered must be in 24-hour format. • *now*—Immediately after the download of the Cisco IOS software image.
in *hh:mm*	(Optional) Schedules a reload in a specified length of time after downloading the Cisco IOS software image.
disk-management	(Optional) Cisco IOS Auto-Upgrade Manager disk cleanup utility. You must configure one of the following keywords: • **auto**—Deletes the files without asking for confirmation. • **confirm**—Asks for confirmation before deleting a file. • **no**—Never deletes any file.

Command Default

The reload of the router with the Cisco IOS software image is not scheduled.
The disk-management utility is disabled.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(15)T	This command was introduced.

Usage Guidelines

Use the **upgrade automatic getversion** command to download the Cisco IOS software image to a router. You can either download the image from the Cisco website (www.cisco.com) or from a non-Cisco server to which the Cisco IOS software image has already been downloaded from the Cisco website.

You can also use this command to schedule a reload. Additionally, this command can use the disk cleanup utility to delete files if there is not enough space to download the new Cisco IOS software image.

Examples

Downloading the Cisco IOS Image from the Cisco Website

The following example shows how to download a Cisco IOS software image from the Cisco website (www.cisco.com). Here, the reloading of the router with the downloaded Cisco IOS software image is not scheduled. Also, the disk-cleanup utility is not enabled.

```
Router# upgrade automatic getversion cisco username myusername password mypassword image
c3825-adventerprisek9-mz.124-2.XA.bin
```

Downloading the Cisco IOS Image from a Non-Cisco TFTP Server

The following example shows how to download the Cisco IOS software image from a non-Cisco TFTP server and reload the router immediately after the download. It also shows how to delete the files automatically if there is not enough disk space.

```
Router# upgrade automatic getversion tftp://abc/tom/c3825-adventerprisek9-mz.124-2.XA.bin
at now disk-management auto
```

Downloading the Cisco IOS Image from a Non-Cisco TFTP Server Using the Interactive Mode

The following example shows how to use this command in interactive mode to download a Cisco IOS software image from a non-Cisco server. Here, the reloading of the device with the downloaded Cisco IOS software image is not scheduled.

```
Router# upgrade automatic
################################################################################
Welcome to the Cisco IOS Auto Upgrade Manager. To upgrade your device, please answer the
following questions. To accept the default value for a question, simply hit <ENTER>
################################################################################
Would you like to download an image directly from Cisco Server over the Internet? A valid
Cisco login will be required.

Download from Cisco server? [yes]: no
Image location:tftp://10.1.0.1/emailid/c3825-adventerprisek9-mz_pi6_aum_review
Image Found: c3825-adventerprisek9-mz_pi6_aum_review (42245860 bytes)
Memory Available: 851Mb Main Memory (RAM) - 71335936 bytes of flash space
New image will be downloaded to flash:c3825-adventerprisek9-mz_pi6_aum_review

Reload and upgrade the device immediately after image download is complete? [yes]: no
When would you like to reload your device? Use hh:mm format or specify "Manual" to not
schedule a reload time. Use 'upgrade automatic runversion' to reload manually.
Time to reload the box [Manual]?

Proceed with device image upgrade from
[tftp://10.1.0.1/emailid/c3825-adventerprisek9-mz_pi6_aum_review] to
[c3825-adventerprisek9-mz_pi6_aum_review]? [yes]:

Downloading Image from user specified url:

Loading emailid/c3825-adventerprisek9-mz_pi6_aum_review from 172.16.0.0(via
GigabitEthernet0/0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 42245860 bytes]
 [download complete]

Verifiying the image: ........................
Done!
Image Verification: PASS
Use 'upgrade automatic runversion' command to reload manually.
```

Related Commands

Command	Description
upgrade automatic abortversion	Cancels upgrading the router with a new Cisco IOS software image.
upgrade automatic runversion	Reloads the router with a new Cisco IOS software image.

upgrade automatic runversion

To reload the router with a new Cisco IOS software image, use the **upgrade automatic runversion** command in privileged EXEC mode.

upgrade automatic runversion [**at** *hh:mm* | *now* | **in** *hh:mm*]

Syntax Description

at	Schedules a reload at a specified time. Use either of the following arguments with this keyword: • *hh:mm*—Hour and minute. The time entered must be in 24-hour format. • *now*—Immediately after the download of the Cisco IOS software image.
in *hh:mm*	Schedules a reload in a specified length of time after downloading the Cisco IOS software image.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(15)T	This command was introduced.

Usage Guidelines

Use the **upgrade automatic runversion** command to schedule a reload after downloading a Cisco IOS software image using the **upgrade automatic getversion** command.

Note You can also use the **upgrade automatic getversion** command to reload the router with the new Cisco IOS software image. However, if you have already downloaded the Cisco IOS software image using the **upgrade automatic getversion** command, you should use the **upgrade automatic runversion** command to reload the router.

Examples

The following example shows how to schedule a reload after downloading a Cisco IOS software image:

```
Router# show clock

09:01:36.124 UTC Thu Aug 3 2006

Router# upgrade automatic runversion at 10:20

Upgrading to "flash:c1841-adventerprisek9-mz.calvin-build-20060714". Wait..
Reload scheduled for 10:20:00 UTC Thu Aug 3 2006 (in 1 hour and 18 minutes) with image -
flash:c1841-adventerprisek9-mz.calvin-build-20060714 by console
Reload reason: Auto upgrade
Device will WARM UPGRADE at 10:20:00
To cancel the upgrade, enter the command "upgrade automatic abortversion"
Router#
Aug  3 09:01:58.116: %SYS-5-SCHEDULED_RELOAD: Reload requested for 10:20:00 UTC Thu Aug 3
2006 at 09:01:58 UTC Thu Aug 3 2006 by console. Reload Reason: Auto upgrade.
```

Related Commands

Command	Description
upgrade automatic abortversion	Cancels upgrading the router with a new Cisco IOS software image.
upgrade automatic getversion	Downloads a Cisco IOS software image directly from www.cisco.com or from a non-Cisco server.

upgrade filesystem monlib

To upgrade the ATA ROM monitor library (monlib) file without erasing file system data, use the **upgrade filesystem monlib** command in privileged EXEC mode.

upgrade filesystem monlib {**disk0** | **disk1**}

Syntax Description

disk0	Selects disk 0 as the file system to be formatted.
disk1	Selects disk 1 as the file system to be formatted.

Defaults

No default behavior or values

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.2(25)S	This command was integrated into the Cisco IOS Release 12.2(25)S.

Usage Guidelines

If you attempt to upgrade the ATA monlib file on a disk that has not been formatted on a router running Cisco IOS software, the upgrade operation will fail.

If the amount of space available on the disk for the monlib image is smaller than the monlib image you are trying to upgrade to, the upgrade operation will fail. The amount of space available for the monlib file can be determined by issuing the **show disk** command with the **all** keyword specified. The “Disk monlib size” field displays the number of bytes available for the ATA monlib file.

Examples

The following example shows how to upgrade the ATA monlib file on disk 0:

```
Router# upgrade filesystem monlib disk0

Writing Monlib sectors.
................................................................................
.....................................
Monlib write complete
```

Related Commands

Command	Description
format	Formats a Class A or Class C flash file system.
show disk	Displays flash or file system information for a disk.

upgrade rom-monitor

To set the execution preference on a read-only memory monitor (ROMMON), use the **upgrade rom-monitor** command in privileged EXEC or diagnostic mode.

upgrade rom-monitor slot *num* {**sp** | **rp**} **file** *filename*

upgrade rom-monitor slot *num* {**sp** | **rp**} {**invalidate** | **preference**} {**region1** | **region2**}

Cisco ASR 1000 Series Aggregation Services Routers

upgrade rom-monitor filename *URL slot*

Syntax Description

slot *num*	Specifies the slot number of the ROMMON to be upgraded.
sp	Upgrades the ROMMON of the Switch Processor.
rp	Upgrades the ROMMON of the Route Processor.
file *filename*	Specifies the name of the S-record (SREC) file; see the "Usage Guidelines" section for valid values.
invalidate	Invalidates the ROMMON of the selected region.
preference	Sets the execution preference on a ROMMON of the selected region.
region1	Selects the ROMMON in region 1.
region2	Selects the ROMMON in region 2.
filename	Specifies the ROMMON package filename.
URL	The URL to a ROMMON file. The URL always begins with a file system, such as **bootflash:**, **harddisk:**, **obfl:**, **stby-harddisk:**, or **usb**[**0**-**1**], then specifies the path to the file.
slot	The slot that contains the hardware that will receive the ROMMON upgrade. Options are: • *number*—the number of the Session Initiation Protocol (SIP) slot that requires the ROMMON upgrade • **all**—All hardware on the router • **F0**—Embedded-Service-Processor slot 0 • **F1**—Embedded-Service-Processor slot 1 • **FP**—All installed Embedded-Service-Processors • **R0**—Route-Processor slot 0 • **R1**—Route-Processor slot 1 • **RP**—Route-Processor

Defaults

This command has no default settings.

Command Modes

Privileged EXEC (#)
Diagnostic (diag)

Command History

Release	Modification
12.2(14)SX	This command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	This command was modified. Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(24)T	This command was integrated into Cisco IOS Release 12.4(24)T.
Cisco IOS XE Release 2.1	This command was integrated into Cisco ASR 1000 Series Routers, and introduced in diagnostic mode.

Usage Guidelines

Caution If you enter the **upgrade rom-monitor** command from a Telnet session instead of a console connection, service may be interrupted.

The **slot** *num* keyword and argument combination is required for this command to function properly.

The **sp** or **rp** keyword is required if you installed a supervisor engine in the specified slot.

Valid values for **file** *filename* are the following:

- **bootflash:**
- **disk0:**
- **disk1:**
- **flash:**
- **ftp:**
- **rcp:**
- **sup-bootflash:**
- **sup-slot0:**
- **tftp:**

On Cisco ASR 1000 Series Routers, this command can be used to upgrade ROMMON in privileged EXEC and diagnostic mode. The hardware receiving the ROMMON upgrade must be reloaded to complete the upgrade.

From Cisco IOS Release 12.4(24)T, you can use the **upgrade rom-monitor** command on Cisco 3200 series routers to upgrade ROMMON and the system bootstrap, if a newer version of ROMMON is available on the system.

Examples

This example shows how to upgrade the new ROMMON image to the flash device on a Supervisor Engine 2:

```
Router# upgrade rom-monitor slot 1 sp file tftp://dirt/tftpboot-users/A2_71059.srec

ROMMON image upgrade in progress
   Erasing flash
   Programming flash
   Verifying new image
   ROMMON image upgrade complete
   The card must be reset for this to take effect
```

```
Router#
```

In the following example, a ROMMON upgrade is performed to upgrade to Cisco IOS Release 12.2(33r)XN1 on a Cisco ASR 1000 Series Router using an ROMMON image stored on the bootflash: file system. All hardware is upgraded on the Cisco ASR 1000 Series Router in this example, and the router is then reloaded to complete the procedure.

```
Router# show rom-monitor 0

System Bootstrap, Version 12.2(33)XN1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2007 by cisco Systems, Inc.


Router# show rom-monitor F0

System Bootstrap, Version 12.2(33)XN1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2007 by cisco Systems, Inc.

Router# show rom-monitor R0

System Bootstrap, Version 12.2(33)XN1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2007 by cisco Systems, Inc.

Router# copy tftp bootflash:
Address or name of remote host []? 127.23.16.81
Source filename []? auto/tftp-boot/asr1000-rommon.122-33r.XN1.pkg
Destination filename [asr1000-rommon.122-33r.XN1.pkg]?
Accessing tftp://127.23.16.81/auto/tftp-boot/asr1000-rommon.122-33r.XN1.pkg...
Loading auto/tftp-boot/asr1000-rommon.122-33r.XN1.pkg from 127.23.16.81 (via
GigabitEthernet0): !!!
[OK - 553164 bytes]

553164 bytes copied in 1.048 secs (527828 bytes/sec)
Router# dir bootflash:
Directory of bootflash:/

   11  drwx       16384   Dec 2 2004 12:02:09 +00:00  lost+found
14401  drwx        4096   Dec 2 2004 12:05:05 +00:00  .ssh
86401  drwx        4096   Dec 2 2004 12:05:07 +00:00  .rollback_timer
   12  -rw-    33554432  Nov 20 2007 19:53:47 +00:00  nvram_00100
   13  -rw-     6401536  Dec 23 2004 19:45:11 +00:00  mcp-fpd-pkg.122-test.pkg
28801  drwx        4096   Nov 1 2007 17:00:36 +00:00  .installer
   15  -rw-      553164  Nov 28 2007 15:33:49 +00:00  asr1000-rommon.122-33r.XN1.pkg
   16  -rw-    51716300  Nov 14 2007 16:39:59 +00:00
asr1000rp1-espbase.v122_33_xn_asr_rls0_throttle.pkg
   17  -rw-    21850316  Nov 14 2007 16:41:23 +00:00
asr1000rp1-rpaccess-k9.v122_33_xn_asr_rls0_throttle.pkg
   18  -rw-    21221580  Nov 14 2007 16:42:21 +00:00
asr1000rp1-rpbase.v122_33_xn_asr_rls0_throttle.pkg
   19  -rw-    27576524  Nov 14 2007 16:43:50 +00:00
asr1000rp1-rpcontrol.v122_33_xn_asr_rls0_throttle.pkg
   20  -rw-    48478412  Nov 14 2007 16:45:50 +00:00
asr1000rp1-rpios-advipservicesk9.v122_33_xn_asr_rls0_throttle.pkg
   21  -rw-    36942028  Nov 14 2007 16:47:17 +00:00
asr1000rp1-sipbase.v122_33_xn_asr_rls0_throttle.pkg
   22  -rw-    14749900  Nov 14 2007 16:48:17 +00:00
asr1000rp1-sipspa.v122_33_xn_asr_rls0_throttle.pkg
   23  -rw-        6049  Nov 14 2007 16:49:29 +00:00  packages.conf
   14  -rw-   213225676  Nov 20 2007 19:53:13 +00:00
asr1000rp1-advipservicesk9.v122_33_xn_asr_rls0_throttle.bin
```

```
928833536 bytes total (451940352 bytes free)

Router# upgrade rom-monitor filename bootflash:/asr1000-rommon.122-33r.XN1.pkg all

Upgrade rom-monitor on Route-Processor 0

Target copying rom-monitor image file
Checking upgrade image...
1966080+0 records in
3840+0 records out
Upgrade image MD5 signature is 253f15daf89eea22b1db92d440d03608
Burning upgrade partition...
1966080+0 records in
3840+0 records out
Checking upgrade partition...
Upgrade flash partition MD5 signature is 253f15daf89eea22b1db92d440d03608
ROMMON upgrade complete.
To make the new ROMMON permanent, you must restart the RP.

Upgrade rom-monitor on Embedded-Service-Processor 0

Target copying rom-monitor image file
Checking upgrade image...
1966080+0 records in
3840+0 records out
Upgrade image MD5 signature is 253f15daf89eea22b1db92d440d03608
Burning upgrade partition...
1966080+0 records in
3840+0 records out
Checking upgrade partition...
Upgrade flash partition MD5 signature is 253f15daf89eea22b1db92d440d03608
ROMMON upgrade complete.
To make the new ROMMON permanent, you must restart the linecard.

Upgrade rom-monitor on SPA-Inter-Processor 0

Target copying rom-monitor image file
Checking upgrade image...
1966080+0 records in
3840+0 records out
Upgrade image MD5 signature is 253f15daf89eea22b1db92d440d03608
Burning upgrade partition...
1966080+0 records in
3840+0 records out
Checking upgrade partition...
Upgrade flash partition MD5 signature is 253f15daf89eea22b1db92d440d03608
ROMMON upgrade complete.
To make the new ROMMON permanent, you must restart the linecard.

Upgrade rom-monitor on SPA-Inter-Processor 1

Target copying rom-monitor image file
Checking upgrade image...
1966080+0 records in
3840+0 records out
Upgrade image MD5 signature is 253f15daf89eea22b1db92d440d03608
Burning upgrade partition...
1966080+0 records in
3840+0 records out
Checking upgrade partition...
Upgrade flash partition MD5 signature is 253f15daf89eea22b1db92d440d03608
ROMMON upgrade complete.
To make the new ROMMON permanent, you must restart the linecard.
```

```
Router# reload

<reload bootup output removed for brevity>


Router# show rom-monitor 0

System Bootstrap, Version 12.2(33r)XN1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2007 by cisco Systems, Inc.

Router# show rom-monitor F0

System Bootstrap, Version 12.2(33r)XN1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2007 by cisco Systems, Inc.

Router# show rom-monitor R0

System Bootstrap, Version 12.2(33r)XN1, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 2007 by cisco Systems, Inc.
```

Related Commands

Command	Description
show rom-monitor	Displays the ROMMON status.

upgrade rom-monitor file

To upgrade the ROM monitor (ROMmon) image, use the **upgrade rom-monitor file** command in privileged EXEC mode.

Cisco 1941, 2900, and 3900 Routers

upgrade rom-monitor file {**archive:** | **cns:** | **flash0:** | **flash1:** | **flash:** | **ftp:** | **http:** | **https:** | **null:** | **nvram:** | **rcp:** | **scp:** | **system:** | **tar:** | **tftp:** | **tmpsys:** | **usbflash0:** | **xmodem:** | **ymodem:**} [*file-path*]

Cisco 7200 VXR Router with NPE-G1

upgrade rom-monitor file {**bootflash:**[*file-path*] | **disk0:**[*file-path*] | **disk1:**[*file-path*] | **disk2:**[*file-path*] | **flash:**[*file-path*] | **ftp:**[*file-path*] | **slot0:**[*file-path*] | **slot1:**[*file-path*] | **tftp:**[*file-path*]}

Cisco 7301 Router

upgrade rom-monitor file {**flash:**[*file-path*] | **ftp:**[*file-path*] | **disk0:**[*file-path*] | **tftp:**[*file-path*]}

Cisco 7304 Router

upgrade rom-monitor {**rom0** | **rom1** | **rom2**} **file** {**bootdisk:**[*file-path*] | **disk0:**[*file-path*] | **flash:**[*file-path*] | **ftp:**[*file-path*] | **rcp:**[*file-path*] | **tftp:**[*file-path*]}

Cisco 10008 Router (PRE3 Only)

upgrade {**rom-monitor** | **fpga**}

Syntax Description

archive:	Filename location of the Upgrade ROMmon image in archive memory.
file-path	Directory pathname or filename where the Upgrade ROMmon image is located.
bootdisk:	Filename location of the Upgrade ROMmon image in the boot disk.
bootflash:	Filename location of the Upgrade ROMmon image in boot flash memory.
cns:	Filename location of the Upgrade ROMmon image in a Cisco Networking Services (CNS) configuration.
disk0:	The filename location of the Upgrade ROMmon image in disk 0 of the router chassis. Disk 0 is present only on a Cisco 7200 VXR that has an I/O controller.
disk1:	The filename location of the Upgrade ROMmon image in disk 1 of the router chassis. Disk 1 is present only on a Cisco 7200 VXR that has an I/O controller.
disk2:	The filename location of the Upgrade ROMmon image in disk 2 of the router chassis. Disk 2 is always present on a Cisco 7200 VXR.
flash:	Filename location of the Upgrade ROMmon image in Flash memory.
flash0:	Filename location of the Upgrade ROMmon image in Flash 0 memory.
flash1:	Filename location of the Upgrade ROMmon image in Flash 1 memory.

fpga	(Cisco 10008 router only) Upgradable field-programmable gate array (FPGA).
ftp:	Filename location of the Upgrade ROMmon image using FTP.
http:	Filename location of the Upgrade ROMmon image on an HTTP server (also called a web server)
https:	Filename location of the Upgrade ROMmon image on a Secure HTTP (HTTPS) server.
null:	Filename location of the Upgrade ROMmon image in the null file system.
nvram:	Filename location of the Upgrade ROMmon image in NVRAM memory.
rcp:	Filename location of the Upgrade ROMmon image using Remote Copy Protocol (RCP).
rom-monitor	(Cisco 10008 router only) Upgradable ROM monitor.
rom0	One-time programmable, always there “golden” ROMmon.
rom1	Upgradable ROM monitor 1.
rom2	Upgradable ROM monitor 2.
scp:	Filename location of the Upgrade ROMmon image for a network server that supports Secure Shell (SSH) and accepts copies of files using the secure copy protocol (scp).
slot0:, slot1:	The filename location of the Upgrade ROMmon image in slot 0 and slot 1 of the router chassis. Slot 0 and slot 1 are present only on a Cisco 7200 VXR that has an I/O controller.
system:	Filename location of the Upgrade ROMmon image in system memory.
tar:	Filename location of the Upgrade ROMmon image in the archive file system.
tftp:	Filename location of the Upgrade ROMmon image on the TFTP server.
tmpsys:	Filename location of the Upgrade ROMmon image in the temporary file system.
usbflash0:	Filename location of the Upgrade ROMmon image in usbflash 0 memory.
xmodem:	Filename location of the Upgrade ROMmon image using Xmodem protocol.
ymodem:	Filename location of the Upgrade ROMmon image using Ymodem protocol.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(28)S	This command was introduced on the Cisco 7200 VXR router.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T and supported on the Cisco 7200 VXR router and Cisco 7301 router.
12.3(9)	This command was integrated into Cisco IOS Release 12.3(9) and supported on the Cisco 7200 VXR router and Cisco 7301 router.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S and supported on the Cisco 7304 router.
12.0S	This command was implemented on the PRE2 for the Cisco 10000 series router.

Release	Modification
12.2(31)SB2	This command was implemented on the PRE3 for the Cisco 10000 series router.
15.0(1)M2	This command was implemented on the Cisco 1941, 2900, and 3900 routers.
15.1(1)T	This command was integrated into Cisco IOS Release 15.1(1)T.

Usage Guidelines

You can use the **upgrade rom-monitor file** command to download a new ROMmon image instead of having to replace the processor to obtain a new image.

Note Images are marked as invalid if the first bootup is not completed. Do not reset the router when it is doing an initial bootup.

Cisco 7200 VXR Router

A Cisco 7200 VXR that has an I/O controller card installed has the following additional devices on its chassis: disk 0, disk 1, slot 0, and slot 1.

Cisco 7304 Router

There are three ROMmon images. ROM 0 is a one-time programmable, always-there ROMmon image, referred to as the "golden" ROMmon. ROM 1 and ROM 2 are upgradable ROMmon images. At bootup, the system uses the golden ROMmon by default. If either ROM 1 or ROM 2 are configured, the system still begins bootup with the golden ROMmon, then switches to the configured ROMmon. If a new configured ROMmon image fails to boot up Cisco IOS software, the router marks this ROMmon image as invalid and reverts to the golden image for the next Cisco IOS bootup.

After downloading a new ROMmon image to the writable ROMmon, you must reload Cisco IOS software for the new ROMmon to take effect. The first time a new ROMmon image is loaded, you must allow the system to boot up Cisco IOS software before doing any resets or power cycling. If the ROMmon loading process is interrupted, the system interprets this as a bootup failure of the new ROMmon image and reverts the ROMmon back to the golden ROMmon image in ROM 0.

Cisco 10008 Router

The PRE2 does not allow you to upgrade the ROM monitor image. However, the PRE3 does allow this using the **upgrade rom-monitor** command.

Examples

The following example of a Cisco 7200 VXR using an I/O controller loads the Upgrade ROMmon image from a disk 1 filename:

```
Router# upgrade rom-monitor file disk1:C7200_NPEG1_RMFUR.srec.123-4r.T1

This command will reload the router. Continue? [yes/no]:yes
ROMMON image upgrade in progress.

Erasing boot flash eeeeeeeeeeeeeeeee
Programming boot flash pppppp
Now Reloading via hard watchdog timeout
```

The following example on a Cisco 7301 router loads the Upgrade ROMmon image from a specified TFTP file location:

```
Router# upgrade rom-monitor file tftp://00.0.00.0/biff/C7301_RMFUR.srec
```

```
Loading biff/C7301_RMFUR.srec from 00.0.00.0 (via GigabitEthernet0/1):
 !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 392348 bytes]

This command will reload the router. Continue? [yes/no]:yes
ROMMON image upgrade in progress.
Erasing boot flash eeeeeeeeeeeeeeeee
Programming boot flash ppppp
Now Reloading via hard watchdog timeout

Unexpected exception, CP
System Bootstrap, Version 12.2(20031011:151758) [biff]
Copyright (c) 2004 by cisco Systems, Inc.

 Running new upgrade for first time

System Bootstrap, Version 12.2(20031011:151758) [biff]
Copyright (c) 2004 by cisco Systems, Inc.

ROM:Rebooted by watchdog hard reset
C7301 platform with 1048576 Kbytes of main memory


Upgrade ROMMON initialized
rommon 1 >
```

The following example configures the system to install a file called “rommonfile” as ROM 1 from the bootdisk:

```
Router# upgrade rom-monitor rom1 file bootdisk:rommonfile

ROM 1 upgrade in progress
Erasing (this may take a while)...
Programming...
CC
Do you want to verify this image (may take a few minutes)? [yes/no]: y
Verifying ROM 1
  Reading from ROM 1....Done
  Comparing with the source file...Passed

Set this ROMMON image as the default (will take effect on next reload/reset)? y
```

Related Commands

Command	Description
show diag	Displays hardware information for any slot or the chassis.

upgrade rom-monitor preference

To select a ReadOnly or Upgrade ROMmon image to be booted on the next reload of a Cisco 7200 VXR or Cisco 7301router, use the **upgrade rom-monitor preference** command in privileged EXEC mode.

upgrade rom-monitor preference [readonly | upgrade]

Syntax Description

readonly	Selects the ReadOnly ROMmon image to be booted on the next reload.
upgrade	Selects the Upgrade second ROMmon image to be booted on the next reload.

Defaults

No default behavior or values

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(28)S	This command was introduced on the Cisco 7200 VXR router.
12.3(8)T	This command was integrated into Cisco IOS Release 12.3(8)T and supported on the Cisco 7200 VXR router and Cisco 7301 router.
12.3(9)	This command was integrated into Cisco IOS Release 12.3(9) and supported on the Cisco 7200 VXR router and Cisco 7301 router.

Usage Guidelines

After running the **upgrade rom-monitor preference** command, you must reload the router for the selected ROMmon image to take effect.

Use the **rommon-pref** command when you are in ROMmon mode.

Examples

The following example applicable to both the Cisco 7200 VXR and Cisco 7301 routers selects the ReadOnly ROMmon image to be booted on the next reload of the router:

```
Router# upgrade rom-monitor preference readonly
You are about to mark ReadOnly region of ROMMON for the highest boot preference.
Proceed? [confirm]
Done! Router must be reloaded for this to take effect.
```

Related Commands

Command	Description
rommon-pref	Selects a ReadOnly or Upgrade ROMmon image to be booted on the next reload when you are in ROMmon mode.

vacant-message

To display an idle terminal message, use the **vacant-message** command in line configuration mode. To remove the default vacant message or any other vacant message that may have been set, use the **no** form of this command.

vacant-message [*d message d*]

no vacant-message

Syntax Description

d	(Optional) Delimiting character that marks the beginning and end of the vacant-message. Text delimiters are characters that do not ordinarily appear within the text of a title, such as slash (/), double quote ("), or tilde (~). ^C is reserved for special use and should not be used in the message.
message	(Optional) Vacant terminal message.

Defaults

The format of the default vacant message is as follows:

```
<blank lines>
hostname tty# is now available
<blank lines>
Press RETURN to get started.
```

This message is generated by the system.

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command enables the banner to be displayed on the screen of an idle terminal. The **vacant-message** command without any arguments restores the default message.

Follow this command with one or more blank spaces and a delimiting character of your choice. Then enter one or more lines of text, terminating the message with the second occurrence of the delimiting character.

Note For a rotary group, you need to define only the message for the first line in the group.

Examples

The following example turns on the system banner and displays this message:

```
Router(config)# line 0
Router(config-line)# vacant-message %
                Welcome to Cisco Systems, Inc.
                 Press Return to get started.
%
```

verify

To verify the checksum of a file on a flash memory file system or compute a Message Digest 5 (MD5) signature for a file, use the **verify** command in privileged EXEC mode.

verify [**/md5** [*md5-value*]] *filesystem***:**[*file-url*]

Cisco 7600 Series Router

verify {**/md5** *flash-filesystem* [*expected-md5-signature*] | **/ios** *flash-filesystem* | *flash-filesystem*}

Syntax Description

/md5	(Optional) Calculates and displays the MD5 value for the specified software image. Compare this value with the value available on Cisco.com for this image.
md5-value	(Optional) The known MD5 value for the specified image. When an MD5 value is specified in the command, the system calculates the MD5 value for the specified image and display a message verifying that the MD5 values match or that there is a mismatch.
*filesystem***:**	File system or directory containing the files to list, followed by a colon. Standard file system keywords for this command are **flash:** and **bootflash:**.
file-url	(Optional) The name of the files to display on a specified device. The files can be of any type. You can use wildcards in the filename. A wildcard character (*) matches all patterns. Strings after a wildcard are ignored.
Cisco 7600 Series Router	
/md5 *flash-filesystem*	Computes an MD5 signature for a file; valid values are **bootflash:**, **disk0:**, **disk1:**, **flash:**, or **sup-bootflash:**.
expected-md5-signature	(Optional) MD5 signature.
/ios *flash-filesystem*	Verifies the compressed Cisco IOS image checksum; valid values are **bootflash:**, **disk0:**, **disk1:**, **flash:**, or **sup-bootflash:**.
flash-filesystem	Device where the Flash memory resides; valid values are **bootflash:**, **disk0:**, **disk1:**, **flash:**, or **sup-bootflash:**.

Defaults

The current working device is the default device (file system).

Command Modes

Privileged EXEC

Command History

Release	Modification
11.0	This command was introduced.
12.2(4)T	The **/md5** keyword was added.

Release	Modification
12.2(18)S	The **verify** command was enhanced to verify the hash that is contained in the image, and the output was enhanced to show the hash value in addition to the entire hash image (CCO hash).
12.0(26)S	The **verify** command enhancements were integrated into Cisco IOS Release 12.0(26)S.
12.2(14)SX	Support for this command was added for the Supervisor Engine 720.
12.3(4)T	The **verify** command enhancements were integrated into Cisco IOS Release 12.3(4)T.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

This command replaces the **copy verify** and **copy verify flash** commands.

Use the **verify** command to verify the checksum of a file before using it.

Each software image that is distributed on disk uses a single checksum for the entire image. This checksum is displayed only when the image is copied into flash memory; it is not displayed when the image file is copied from one disk to another.

Supported Platforms Other than the Cisco 7600 Series Router

Before loading or duplicating a new image, record the checksum and MD5 information for the image so that you can verify the checksum when you copy the image into flash memory or onto a server. A variety of image information is available on Cisco.com. For example, you can get the Release, Feature Set, Size, BSD Checksum, Router Checksum, MD5, and Publication Date information by clicking on the image file name prior to downloading it from the Software Center on Cisco.com.

To display the contents of flash memory, use the **show flash** command. The flash contents listing does not include the checksum of individual files. To recompute and verify the image checksum after the image has been copied into flash memory, use the **verify** command. Note, however, that the **verify** command only performs a check on the integrity of the file after it has been saved in the file system. It is possible for a corrupt image to be transferred to the router and saved in the file system without detection. If a corrupt image is transferred successfully to the router, the software will be unable to tell that the image is corrupted and the file will verify successfully.

To use the message-digest5 (MD5) hash algorithm to ensure file validation, use the **verify** command with the **/md5** option. MD5 is an algorithm (defined in RFC 1321) that is used to verify data integrity through the creation of a unique 128-bit message digest. The **/md5** option of the **verify** command allows you to check the integrity of a Cisco IOS software image by comparing its MD5 checksum value against a known MD5 checksum value for the image. MD5 values are now made available on Cisco.com for all Cisco IOS software images for comparison against local system image values.

To perform the MD5 integrity check, issue the **verify** command using the **/md5** keyword. For example, issuing the **verify flash:c7200-is-mz.122-2.T.bin /md5** command will calculate and display the MD5 value for the software image. Compare this value with the value available on Cisco.com for this image.

Alternatively, you can get the MD5 value from Cisco.com first, then specify this value in the command syntax. For example, issuing the **verify flash:c7200-is-mz.122-2.T.bin /md5 8b5f3062c4caeccae72571440e962233** command will display a message verifying that the MD5 values match or that there is a mismatch. A mismatch in MD5 values means that either the image is corrupt or the wrong MD5 value was entered.

Cisco 7600 Series Router

The Readme file, which is included with the image on the disk, lists the name, file size, and checksum of the image. Review the contents of the Readme file before loading or duplicating the new image so that you can verify the checksum when you copy it into the flash memory or onto a server.

Use the **verify /md5** command to verify the MD5 signature of a file before using it. This command validates the integrity of a copied file by comparing a precomputed MD5 signature with the signature that is computed by this command. If the two MD5 signatures match, the copied file is identical to the original file.

You can find the MD5 signature that is posted on the Cisco.com page with the image.

You can use the **verify /md5** command in one of the following ways:

- Verify the MD5 signatures manually by entering the **verify /md5** *filename* command.

  Check the displayed signature against the MD5 signature that is posted on the Cisco.com page.

- Allow the system to compare the MD5 signatures by entering the **verify /md5** *flash-filesystem:filenam expected-md5-signature* command.

  After completing the comparison, the system returns with a verified message. If an error is detected, the output is similar to the following:

```
Router# verify /md5 disk0:c6msfc2-jsv-mz 0f

.
.
.
Done
!
 %Error verifying disk0:c6msfc2-jsv-mz
 Computed signature  = 0f369ed9e98756f179d4f29d6e7755d3
 Submitted signature = 0f
```

To display the contents of the flash memory, enter the **show flash** command. The listing of the flash contents does not include the checksum of the individual files. To recompute and verify the image checksum after the image has been copied into the flash memory, enter the **verify** command.

A colon (:) is required after the specified device.

Examples

Supported Platforms Other than Cisco 7600 Series Router

The following example shows how to use the **verify** command to check the integrity of the file c7200-js-mz on the flash memory card inserted in slot 0:

```
Router# dir slot0:

Directory of slot0:/

  1  -rw-     4720148   Aug 29 1997 17:49:36  hampton/nitro/c7200-j-mz
  2  -rw-     4767328   Oct 01 1997 18:42:53  c7200-js-mz
  5  -rw-         639   Oct 02 1997 12:09:32  rally
  7  -rw-         639   Oct 02 1997 12:37:13  the_time

20578304 bytes total (3104544 bytes free)

Router# verify slot0:c7200-js-mz

Verified slot0:c7200-js-mz
```

In the following example, the **/md5** keyword is used to display the MD5 value for the image:

```
Router# verify /md5 disk1:

Verify filename []? c7200-js-mz

.
.
.
Done
!
verify /md5 (disk1:c7200-js-mz) = 0f369ed9e98756f179d4f29d6e7755d3
```

In the following example, the known MD5 value for the image (obtained from Cisco.com) is specified in the **verify** command, and the system checks the value against the stored value:

```
Router# verify /md5 disk1:c7200-js-mz ?

  WORD  Expected md5 signature
  <cr>

router# verify /md5 disk1:c7200-js-mz 0f369ed9e98756f179d4f29d6e7755d3
.
.
.
Done
!
Verified (disk1:c7200-js-mz) = 0f369ed9e98756f179d4f29d6e7755d3
```

The following example shows how the output of the **verify** command was enhanced to show the hash value in addition to the entire hash image (CCO hash):

```
Router# verify disk0:c7200-js-mz

%Filesystem does not support verify operations
Verifying file integrity of disk0:c7200-js-mz
.
.
.
Done
!
Embedded Hash   MD5 :CFA258948C4ECE52085DCF428A426DCD
Computed Hash   MD5 :CFA258948C4ECE52085DCF428A426DCD
CCO Hash        MD5 :44A7B9BDDD9638128C35528466318183

Signature Verified
```

Cisco 7600 Series Router

This example shows how to use the **verify** command:

```
Router# verify cat6k_r47_1.cbi

.
.
.
File cat6k_r47_1.cbi verified OK.
```

This example shows how to check the MD5 signature manually:

```
Router# verify /md5 c6msfc2-jsv-mz
```

```
.
.
.
Done
!
 verify /md5 (disk0:c6msfc2-jsv-mz) = 0f369ed9e98756f179d4f29d6e7755d3
```

This example shows how to allow the system to compare the MD5 signatures:

```
Router# verify /md5 disk0:c6msfc2-jsv-mz 0f369ed9e98756f179d4f29d6e7755d3

.
.
.
Done
!
 verified /md5 (disk0:c6sup12-jsv-mz) = 0f369ed9e98756f179d4f29d6e7755d3
Router#
```

This example shows how to verify the compressed checksum of the Cisco IOS image:

```
Router# verify /ios disk0:c6k222-jsv-mz

Verified compressed IOS image checksum for disk0:c6k222-jsv-mz
```

Related Commands

Command	Description
cd	Changes the default directory or file system.
copy	Copies any file from a source to a destination.
copy /noverify	Disables the automatic image verification for the current copy operation.
dir	Displays a list of files on a file system.
file verify auto	Verifies the compressed Cisco IOS image checksum.
pwd	Displays the current setting of the **cd** command.
show file systems	Lists available file systems.
show flash	Displays the layout and contents of flash memory.

vtp

To configure the global VLAN Trunking Protocol (VTP) state, use the **vtp** command in global configuration mode. To return to the default value, use the **no** form of this command.

vtp {{**domain** *domain-name*} | **file** *filename* | **interface** *interface-name* [**only**] | **mode** {**client** | **off** | **server** | **transparent**} | **password** *password-value* | **pruning** | **version** {**1** | **2**}}

no vtp

Syntax Description

domain *domain-name*	Sets the VTP-administrative domain name.
file *filename*	Sets the ASCII name of the IFS-file system file where the VTP configuration is stored.
interface *interface-name*	Sets the name of the preferred source for the VTP-updater ID for this device.
only	(Optional) Specifies to use only this interface's IP address as the VTP-IP updater address.
mode client	Sets the type of VTP-device mode to client mode.
mode off	Sets the type of VTP-device mode to off mode.
mode server	Sets the type of VTP-device mode to server mode.
mode transparent	Sets the type of VTP-device mode to transparent mode.
password *password-value*	Specifies the administrative-domain password.
pruning	Enables the administrative domain to permit pruning.
version {**1** | **2**}	Specifies the administrative-domain VTP-version number.

Defaults

The defaults are as follows:

- **vtp domain** and **vtp interface** commands have no default settings.
- *filename* is **const-nvram:vlan.dat**.
- VTP mode is **mode server**.
- No password is configured.
- Pruning is disabled.
- Administrative-domain VTP-version number 1.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.2(14)SX	This command was introduced on the Supervisor Engine 720.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was extended to Cisco IOS Release 12.2(17d)SXB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	The **mode off** keyword combination was added.

Usage Guidelines

Note The **vtp pruning**, **vtp password**, and **vtp version** commands are also available in privileged EXEC mode. We recommend that you use these commands in global configuration mode only; do not use these commands in privileged EXEC mode.

Extended-range VLANs are not supported by VTP.

When you define the *domain-name* value, the domain name is case sensitive and can be from 1 to 32 characters.

The *filename* and *interface-name* values are ASCII strings from 1 to 255 characters.

You must configure a password on each network device in the management domain when the switch is in secure mode.

Caution If you configure VTP in secure mode, the management domain does not function properly if you do not assign a management domain password to each network device in the domain.

A VTP version 2-capable network device can operate in the same VTP domain as a network device running VTP version 1 if VTP version 2 is disabled on the VTP version 2-capable network device (VTP version 2 is disabled by default).

Do not enable VTP version 2 on a network device unless all of the network devices in the same VTP domain are version 2-capable. When you enable VTP version 2 on a network device, all of the version 2-capable network devices in the domain enable VTP version 2.

In a Token Ring environment, you must enable VTP version 2 for VLAN switching to function properly.

Enabling or disabling VTP pruning on a VTP server enables or disables VTP pruning for the entire management domain.

Configuring VLANs as pruning eligible or pruning ineligible on a Cisco 7600 series router affects pruning eligibility for those VLANs on that switch only; it does not affect pruning eligibility on all network devices in the VTP domain.

The **vtp password**, **vtp pruning**, and **vtp version** commands are not placed in startup memory but are included in the VTP transparent-mode startup configuration file.

Extended-range VLANs are not supported by VTP.

You can configure the **pruning** keyword in VTP-server mode; the **version** keyword is configurable in VTP-server mode or VTP transparent mode.

The *password-value* argument is an ASCII string from 8 to 64 characters identifying the administrative domain for the device.

VTP pruning causes information about each pruning-eligible VLAN to be removed from VTP updates if there are no stations belonging to that VLAN.

All Cisco 7600 series routers in a VTP domain must run the same version of VTP. VTP version 1 and VTP version 2 do not operate on Cisco 7600 series routers in the same VTP domain.

If all Cisco 7600 series routers in a domain are VTP version 2-capable, you need only to enable VTP version 2 on one Cisco 7600 series router; the version number is then propagated to the other version 2-capable Cisco 7600 series routers in the VTP domain.

If you toggle the version 2 mode, certain default VLAN parameters are modified.

If you enter the **vtp mode off** command, it sets the device to off. If you enter the **no vtp mode off** command, it resets the device to the VTP server mode.

Examples

This example shows how to set the device's management domain:

```
Router(config)# vtp domain DomainName1
```

This example shows how to specify the file in the IFS-file system where the VTP configuration is stored:

```
Router(config)# vtp file vtpconfig

Setting device to store VLAN database at filename vtpconfig.
```

This example shows how to set the VTP mode to client:

```
Router(config)# vtp mode client

Setting device to VTP CLIENT mode.
```

This example shows how to disable VTP mode globally:

```
Router(config)# vtp mode off

Setting device to VTP OFF mode.
```

This example shows how to reset the device to the VTP server mode:

```
Router(config)# no vtp mode off

Setting device to VTP OFF mode.
```

Related Commands

Command	Description
show vtp	Displays the VTP statistics and domain information.
vtp (interface configuration)	Enables VTP on a per-port basis.

warm-reboot

To enable a router to do a warm-reboot, use the **warm-reboot** command in global configuration mode. To disable warm rebooting, use the **no** form of this command.

warm-reboot [**count** *number*] [**uptime** *minutes*]

no warm-reboot count *number* **uptime** *minutes*

Syntax Description

count *number*	(Optional) Maximum number of warm reboots allowed between any intervening cold reboot. Valid values range from 1 to 50. The default value is 5 times.
uptime *minutes*	(Optional) Minimum number of minutes that must elapse between initial system configuration and an exception before a warm reboot is attempted. If the system crashes before the specified time elapses, a warm reboot is not attempted. Valid values range from 0 to 120. The default value is 5 minutes.

Defaults

Warm rebooting is disabled.

If warm rebooting is enabled, the default value for the **count** *number* option is 5 times, and the default value for the **uptime** *minutes* option is 5 minutes.

Command Modes

Global configuration

Command History

Release	Modification
12.3(2)T	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(28)SB	This command was integrated into Cisco IOS Relase 12.2(28)SB.

Usage Guidelines

Use the **warm-reboot** command to enable the router to reload a Cisco IOS image without ROM monitor mode (ROMMON) intervention, in which the image restores read-write data from a previously saved copy in the RAM and starts execution from that point. Unlike a cold reboot, this process does not involve a flash to RAM copy or self-decompression of the image.

Note After a warm reboot is enabled, it will not become active until after the next cold reboot because a warm reboot requires a copy of the initialized memory.

Note If the system crashes before the image completes the warm reboot process, a cold reboot is initiated.

Examples

The following example shows how to enable a warm reboot on the router:

```
Router#(config) warm-reboot count 10 uptime 10
```

Related Commands

Command	Description
show warm-reboot	Displays the statistics for attempted warm reboots.

where

To list the open sessions, use the **where** command in EXEC mode.

where

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced in a release prior to Cisco IOS Release 10.0.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The **where** command displays all open sessions associated with the current terminal line.

The break (Ctrl-Shift-6, x), **where**, and **resume** commands are available with all supported connection protocols.

Examples

The following is sample output from the **where** command:

```
Router# where
Conn Host                 Address          Byte    Idle  Conn Name
   1 MATHOM               192.31.7.21         0       0  MATHOM
*  2 CHAFF                131.108.12.19       0       0  CHAFF
```

The asterisk (*) indicates the current terminal session.

Table 173 describes the fields shown in the display.

Table 173 where Field Descriptions

Field	Description
Conn	Name or address of the remote host to which the connection is made.
Host	Remote host to which the router is connected through a Telnet session.
Address	IP address of the remote host.
Byte	Number of unread bytes for the user to see on the connection.
Idle	Interval (in minutes) since data was last sent on the line.
Conn Name	Assigned name of the connection.

Related Commands

Command	Description
show line	Displays information about all lines on the system or the specified line.
show sessions	Displays information about open LAT, Telnet, or rlogin connections.

width

To set the terminal screen width, use the **width** command in line configuration mode. To return to the default screen width, use the **no** form of this command.

width *characters*

no width

Syntax Description

characters	Number of character columns displayed on the terminal. The default is 80 characters.

Defaults

80 character columns

Command Modes

Line configuration

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

By default, the route provides a screen display width of 80 characters. You can reset this value for the current session if it does not meet the needs of your terminal.

The rlogin protocol uses the value of the *characters* argument to set up terminal parameters on a remote host.

Examples

In the following example the location for line 7 is defined as “console terminal” and the display is set to 132 columns wide:

```
Router(config)# line 7
Router(config-line)# location console terminal
Router(config-line)# width 132
```

Related Commands

Command	Description
terminal width	Sets the number of character columns on the terminal screen for the current session.

write core

To test the configuration of a core dump setup, use the **write core** command in privileged EXEC mode.

write core [*hostname* [**LINE**] | *destination-address* [**LINE**]]

Syntax Description

hostname	(Optional) Host name of the remote server where the core dump file is to be written.
destination-address	(Optional) IP address of the remote server where the core dump file is to be written.
LINE	(Optional) Assigns the name "LINE" to the core dump file.

Defaults

If the *hostname* or *destination* arguments are not specified, the core dump file is written to the IP address or hostname specified by the **exception dump** command.

If the **LINE** keyword is not specified, the name of the core dump file is assigned as the host name of the remote server followed by the word "-core."

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(11)T	This command was introduced.

Usage Guidelines

When a router reloads, it is sometimes useful to obtain a full copy of the memory image (called a core dump) to identify the cause of the reload. Core dumps are generally useful to your technical support representative. Not all types of router reloads will produce a core dump.

The **write core** command causes the router to generate a core dump without reloading, which may be useful if the router is malfunctioning but has not reloaded. The core dump files will be the size of the respective memory regions. It is important to remember that the entire memory region is dumped, not just the memory that is in use.

Caution Use the **write core** command only under the direction of a technical support representative. Creating a core dump while the router is functioning in a network can disrupt network operation. When using this command, the router will not reload until the content of its memory is dumped. This event might take some time, depending on the amount of DRAM present on the router. Also, the resulting binary file, which is very large, must be transferred to a Trivial File Transfer Protocol (TFTP), File Transfer Protocol (FTP), or remote copy protocol (rcp) server and subsequently interpreted by technical personnel who have access to source code and detailed memory maps.

Depending on your TFTP server, you might need to create an empty target file to which the router can write the core dump.

Examples

The following example shows how to test the configuration of a core dump setup. In this example, the core dump file is written to the remote server with the host name test.

```
write core test
```

write erase

The **write erase** command is replaced by the **erase nvram:** command. See the description of the **erase** command for more information.

write memory

To save the running configuration to the nonvolatile random-access memory (NVRAM), use the **write memory** command in privileged EXEC mode.

write memory

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(11)T	This command was introduced in a release earlier than Cisco IOS Release 12.2(11)T.
12.2(14)SX	This command was integrated into a release earlier than Cisco IOS Release 12.2(14)SX.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Usage Guidelines

If you try to configure the **write memory** command when a router is low on memory and the backup buffer cannot be allocated, then the command will fail with the error message, “Not enough space.” When the **write memory** command fails to apply the new configuration, the backup configuration is used to restore the original configuration.

Examples

The following example shows how to save the running configuration to NVRAM:

```
Router> enable
Router# write memory
```

write terminal

This command is deprecated. Deprecated commands are considered obsolete, and their use is discouraged. Support for this command may be removed.

The **write terminal** command is now enabled only as a command alias for the **show running-config** command.

The **show running-config** command offers additional options not available for the **write terminal** command; see the documentation of the **show running-config** command for details.

Command Modes

Privileged EXEC

Command History

Release	Modification
8.0	This command was introduced in a release prior to 8.0.
11.0	The **show running-config** command was introduced as a replacement for the **write terminal** command.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

xmodem

To copy a Cisco IOS image to a router using the ROM monitor and the Xmodem or Ymodem protocol, use the **xmodem** command in ROM monitor mode.

xmodem [**-c**] [**-y**] [**-e**] [**-f**] [**-r**] [**-x**] [**-s** *data-rate*] [*filename*]

Syntax Description

-c	(Optional) CRC-16 checksumming, which is more sophisticated and thorough than standard checksumming.
-y	(Optional) Uses the Ymodem protocol for higher throughput.
-e	(Optional) Erases the first partition in Flash memory before starting the download. This option is only valid for the Cisco 1600 series.
-f	(Optional) Erases all of Flash memory before starting the download. This option is only valid for the Cisco 1600 series.
-r	(Optional) Downloads the file to DRAM. The default is Flash memory.
-x	(Optional) Do not execute Cisco IOS image on completion of the download.
-s *data-rate*	(Optional) Sets the console port's data rate during file transfer. Values are **1200**, **2400**, **4800**, **9600**, **19200**, **38400**, and **115200 bps**. The default rate is specified in the configuration register. This option is only valid for the Cisco 1600 series.
filename	(Optional) Filename to copy. This argument is ignored when the **-r** keyword is specified, because only one file can be copied to DRAM. On the Cisco 1600 series routers, files are loaded to the ROM for execution.

Defaults

Xmodem protocol with 8-bit CRC, file downloaded into Flash memory and executed on completion.

Command Modes

ROM monitor

Command History

Release	Modification
11.2 P	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Usage Guidelines

The Cisco 3600 series routers does not support XBOOT functionality. If your Cisco IOS image is erased or damaged, you cannot load a new image over the network.

Use the **xmodem** ROM monitor command to download a new system image to your router from a local personal computer (such as a PC, Mac, or UNIX workstation), or a remote computer over a modem connection, to the router's console port. The computer must have a terminal emulation application that supports these protocols.

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Your router must have enough DRAM to hold the file being transferred, even if you are copying to Flash memory. The image is copied to the first file in internal Flash memory. Any existing files in Flash memory are erased. There is no support for partitions or copying as a second file.

Cisco 1600 Series Routers

If you include the **-r** option, your router must have enough DRAM to hold the file being transferred. To run from Flash, an image must be positioned as the first file in Flash memory. If you are copying a new image to boot from Flash, erase all existing files first.

Caution A modem connection from the telephone network to your console port introduces security issues that you should consider before enabling the connection. For example, remote users can dial in to your modem and access the router's configuration settings.

Note If the file to be downloaded is not a valid router image, the copy operation is automatically terminated.

Examples

The following example uses the **xmodem -c** *filename* ROM monitor command to copy the file named new-ios-image from a remote or local computer:

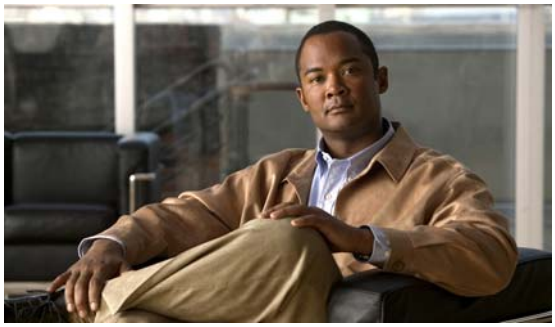
```
rommon > xmodem -c new-ios-image

Do not start the sending program yet...
         File size           Checksum   File name
   1738244 bytes (0x1a8604)   0xdd25 george-admin/c3600-i-mz

WARNING: All existing data in bootflash will be lost!
Invoke this application only for disaster recovery.
Do you wish to continue? y/n  [n]:  yes
Ready to receive file new-ios-image ...
```

Related Commands

Command	Description
copy xmodem:	Copies a Cisco IOS image from a local or remote computer (such as a PC, Macintosh, or UNIX workstation) to Flash memory on a Cisco 3600 series router using the Xmodem protocol.
copy ymodem:	Copies a Cisco IOS image from a local or remote computer (such as a PC, Macintosh, or UNIX workstation) to Flash memory on a Cisco 3600 series router using the Ymodem protocol.



ASCII Character Set and Hexadecimal Values

Some commands described in the Cisco IOS documentation set, such as the **escape-character** line configuration command, require that you enter the decimal representation of an ASCII character. Other commands occasionally make use of hexadecimal (hex) representations.

Table 174 provides character code translations from the decimal numbers to their hexadecimal and ASCII equivalents. It also provides the keyword entry for each ASCII character. For example, the ASCII carriage return (CR) is decimal 13. Entering Ctrl-M at your terminal generates decimal 13, which is interpreted as a CR.

Note This document is a reference for only the standard ASCII character set. Extended ASCII character sets are not generally recommended for use in Cisco IOS commands. Extended ASCII character set references are widely available on the internet.

Table 174 ASCII Translation Table

Numeric Values		ASCII		
Decimal	**Hex**	**Character**	**Meaning**	**Keyboard Entry**
0	00	NUL	Null	Ctrl-@
1	01	SOH	Start of heading	Ctrl-A
2	02	STX	Start of text	Ctrl-B
3	03	ETX	Break/end of text	Ctrl-C
4	04	EOT	End of transmission	Ctrl-D
5	05	ENQ	Enquiry	Ctrl-E
6	06	ACK	Positive acknowledgment	Ctrl-F
7	07	BEL	Bell	Ctrl-G
8	08	BS	Backspace	Ctrl-H
9	09	HT	Horizontal tab	Ctrl-I
10	0A	LF	Line feed	Ctrl-J
11	0B	VT	Vertical tab	Ctrl-K
12	0C	FF	Form feed	Ctrl-L

Table 174 ASCII Translation Table (continued)

Numeric Values		ASCII Character	Meaning	Keyboard Entry
Decimal	Hex			
13	0D	CR	Carriage return (in the CLI, equivalent to the Enter or Return key)	Ctrl-M
14	0E	SO	Shift out	Ctrl-N
15	0F	SI	Shift in/XON (resume output)	Ctrl-O
16	10	DLE	Data link escape	Ctrl-P
17	11	DC1	Device control character 1	Ctrl-Q
18	12	DC2	Device control character 2	Ctrl-R
19	13	DC3	Device control character 3	Ctrl-S
20	14	DC4	Device control character 4	Ctrl-T
21	15	NAK	Negative acknowledgment	Ctrl-U
22	16	SYN	Synchronous idle	Ctrl-V
23	17	ETB	End of transmission block	Ctrl-W
24	18	CAN	Cancel	Ctrl-X
25	19	EM	End of medium	Ctrl-Y
26	1A	SUB	Substitute/end of file	Ctrl-Z
27	1B	ESC	Escape	Ctrl-[
28	1C	FS	File separator	Ctrl-\
29	1D	GS	Group separator	Ctrl-]
30	1E	RS	Record separator	Ctrl-^
31	1F	US	Unit separator	Ctrl-_
32	20	SP	Space	Space
33	21	!	!	!
34	22	"	"	"
35	23	#	#	#
36	24	$	$	$
37	25	%	%	%
38	26	&	&	&
39	27	’	’	’
40	28	(	(	(
41	29	)	)	)
42	2A	*	*	*
43	2B	+	+	+
44	2C	,	,	,
45	2D	-	-	-

Table 174 ASCII Translation Table (continued)

Numeric Values		ASCII		
Decimal	Hex	Character	Meaning	Keyboard Entry
46	2E	.	.	.
47	2F	/	/	/
48	30	0	Zero	0
49	31	1	One	1
50	32	2	Two	2
51	33	3	Three	3
52	34	4	Four	4
53	35	5	Five	5
54	36	6	Six	6
55	37	7	Seven	7
56	38	8	Eight	8
57	39	9	Nine	9
58	3A	:	:	:
59	3B	;	;	;
60	3C	<	<	<
61	3D	=	=	=
62	3E	>	>	>
63	3F	?	?	?
64	40	@	@	@
65	41	A	A	A
66	42	B	B	B
67	43	C	C	C
68	44	D	D	D
69	45	E	E	E
70	46	F	F	F
71	47	G	G	G
72	48	H	H	H
73	49	I	I	I
74	4A	J	J	J
75	4B	K	K	K
76	4C	L	L	L
77	4D	M	M	M
78	4E	N	N	N
79	4F	O	O	O
80	50	P	P	P

Table 174 ASCII Translation Table (continued)

Numeric Values		ASCII		
Decimal	Hex	Character	Meaning	Keyboard Entry
81	51	Q	Q	Q
82	52	R	R	R
83	53	S	S	S
84	54	T	T	T
85	55	U	U	U
86	56	V	V	V
87	57	W	W	W
88	58	X	X	X
89	59	Y	Y	Y
90	5A	Z	Z	Z
91	5B	[	[	[
92	5C	\	\	\
93	5D	]	]	]
94	5E	^	^	^
95	5F	_	_	_
96	60	`	`	`
97	61	a	a	a
98	62	b	b	b
99	63	c	c	c
100	64	d	d	d
101	65	e	e	e
102	66	f	f	f
103	67	g	g	g
104	68	h	h	h
105	69	i	i	i
106	6A	j	j	j
107	6B	k	k	k
108	6C	l	l	l
109	6D	m	m	m
110	6E	n	n	n
111	6F	o	o	o
112	70	p	p	p
113	71	q	q	q
114	72	r	r	r
115	73	s	s	s

Table 174 ASCII Translation Table (continued)

Numeric Values		ASCII Character	Meaning	Keyboard Entry
Decimal	Hex			
116	74	t	t	t
117	75	u	u	u
118	76	v	v	v
119	77	w	w	w
120	78	x	x	x
121	79	y	y	y
122	7A	z	z	z
123	7B	{	{	{
124	7C	|	|	|
125	7D	}	}	}
126	7E	~	Tilde	~
127	7F	DEL	Delete	Del