Software Installation and Management

Package Management

Once a system is initially installed, you use a *package manager* to update and add new functionality

- Packages are a way of combining all the files necessary to run a piece of software
- Includes information about dependencies between packages
- Two standard formats: rpm and .deb

Package Management

package	distro	package install tool	base package manager	GUI advanced version
rpm	**Red Hat, Fedora, SUSE**	rpm -i, -U -e, -q	yum (RH) zypper (SUSE) apt	*n/a* (RH) yast (SUSE)
deb	**Debian: Mint, Ubuntu**	dpkg -i, -r, -l	apt apt-get	aptitude synaptic

Package Management

Package managers allow you to:

- List apps and their dependents
- Install apps and their dependents
- Delete apps

Each package manager has its quirks. Reading the documentation is essential for the system you are administering.

Package managers run against a **repository**, a location that holds packages to access

Repositories

General flow:

- Synchronize your local repository with the latest details of a remote repository.
- Using the knowledge in your local repository:
  - Update current packages to the latest version
  - Find and install new packages

Local Repository Locations

- APT:
  - Repositories defined in file /etc/apt/sources.list
  - or directory /etc/apt/sources.list.d
- Fedora:
  - /etc/yum.repos.d
- SUSE:
  - /etc/zypp/repos.d

More on Repositories

- Using the repository config file, the package managers know how to contact their repositories.
- To install a package, you have to know its name.
- For Ubuntu, you can browse the available packages at https://packages.ubuntu.com.
- You can search on this page by release.
- See https://wiki.ubuntu.com/Releases for release code names.

APT - The Advanced Package Tool

On Ubuntu, typically use apt or apt-get

- apt is a wrapper around apt-get
- apt-get is still in a lot of stack-overflow answers
- See manpage: http://manpages.ubuntu.com/manpages/xenial/man8/apt.8.html
- Examples:

```
$ sudo apt update
    updates the local repository
$ sudo apt upgrade
    updates the actual packages
$ sudo apt install <pkg>
```

YUM - Yellowdog Updater, Modified (Red Hat)

- yum is similar to apt
  - # yum install <pkg>
  - # yum groupinstall
  - # yum info
  - # yum search
  - # yum list
  - # yum provides
  - # yum reinstall
  - # yum erase

YUM/APT Mismatch

However, there is one primary, treacherous difference between yum and apt:

- yum **update** → updates packages
  - This is the same as: apt **upgrade**
- yum **upgrade** → re-sync's repo list
  - This is the same as apt **update**

- Moral of the story: know the commands for your package manager. If in doubt, double-check!

Zypper (SUSE)

SUSE using Zypper is built on top of rpm

- Similar to apt and yum
  - $ sudo zypper install <pkg>
  - $ sudo zypper refresh
  - $ sudo zypper update
- A little more advanced. It has its own shell:
  $ zypper sh

Low Level Package Managers

All the managers mentioned work on top of underlying tools

- rpm works on rpm packages
- dpkg works on deb packages

Some tasks aren't included in the high-level tools, so sometimes you need to use rpm or dpkg directly

dpkg - useful commands

- To find what package you have installed:

  # dpkg -l | grep <package>

```
dpkg -l | grep ssh
ii  libssh-4:amd64 0.9.3-2ubuntu2.1  amd64  tiny C SSH library
(OpenSSL flavor)
```

- To install a package you have downloaded (instead of from a repository)

```
$ sudo dpkg -i virtualbox*.deb
$ sudo dpkg -l virtualbox
```

dpkg -l to confirm that you have the new version

Show and Tell…

Let's actually see some of these things in action…