Package Management

Michael Tsai

2015/5/4

Software Installation

- System administrators often perform the following:
  - **Automating** mass installations of OS's (not covered today. Additional:
  - Maintaining custom OS configurations for the **local** environment
  - Keeping systems and applications patched and up to date
  - Managing add-on software packages

Packages - WHY?

- The old ways - .tar.gz (“zipped tar ball”)
- Advantages of the use of packages:
  - Ability to **roll back** to the original state
  - Quick (**binary** packages v.s. compile from **source**)
  - Handles **dependency**
  - Ability to run scripts during installation

Automation is important

- Install software for once is easy
- Install the same software for 10 times is boring and painful
- Human errors
  (typo, you forgot to install one of them)
- Human intervention takes the most time.
- Use a tool to **automate** the process!

The Old Ways

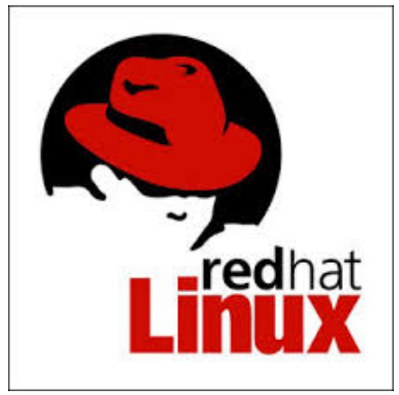
- tar - “store and extract files from a **tape** or **disk** archive”

- Example:
  tar zcvf nasa117.tar.gz nasa117/
  (create a tar archive with all files in nasa117/)
  tar zxvf nasa117.tar.gz
  (extract nasa117.tar)

- Commonly used options:
  c: create; x: extract; f: specify the file name
  v: verbose; z: gzipped; j: bzipped; t: list the content

Common Linux Package Management System

- RPM: Red Hat Package Manager
  - rpm: package handler
  - yum: Yellowdog Updater, Modified (package finder, handle dependency)
- .deb: Debian distribution package
  - dpkg: package handler
  - APT: advanced package tool (package finder, handle dependency)



dpkg

- Commonly used commands:

- List all installed packages: dpkg -l
  Example: dpkg -l | grep 217

- Install a package: dpkg -i 217-base-20150508.deb

High-level Package Management System

- Simplify the task of locating & downloading packages
- Automate the process of updating/upgrading systems
- Facilitate the management of interpackage dependencies

Package Repository

- Place to store all the packages
- Default: points to HTTP or FTP servers where the distributor has control
- Concept:
  Release: a snapshot of the package universe
  Component: a subset of the software within a release.
  Architecture: a specific class of hardware
  Individual Packages: self-explained
- Binary packages —>
  not always optimized for the specific machine you have.

Before we start …

- Set up /etc/apt/sources.list
  - Make a copy of the original sources.list
    sudo cp /etc/apt/sources.list /etc/apt/sources.list.bak
  - Change all server names in /etc/apt/sources.list from us.archive.ubuntu.com to free.nchc.org.tw (or other servers in Taiwan)
    Cheat sheet:
    sudo sed -i 's/us.archive.ubuntu.com/free.nchc.org.tw/g'

Before we start …

- Refresh apt-get's cache of package information
  sudo apt-get update

- Let's take a look at /etc/apt/sources.list

  deb | deb-src URL "distribution" list-of-components

  universe: other Linux open source software
  multiverse: include non-open-source content

Install a package

- Search for the package:
  apt-cache search <regex>
  Example: apt-cache search apache

- Then install the package:
  apt-get install apache2

Package Information

- Show information about a package
  apt-cache show <package name>

- Name, Version, Maintainer, Architecture,
  Description, Filename, …
  State: installed, not installed, removed

- Priority: required/important/standard/optional/extra

Package Information

- Dependencies: what is required by this package.
  Depends / Recommends / Suggests
  Conflicts / Replaces /Breaks

Removing a package

- Remove a package, but keep the configuration files
  Example: apt-get remove apache2

- Remove a package, and also remove all the configuration files
  Example: apt-get purge apache2

課堂小作業, part I

1. Update your /etc/apt/sources.list to use one of the Taiwan servers

2. Install the following packages:
   apache2, build-essential, dpkg-dev, debhelper, CDBS, dh-make, lintian

3. Use apt-get or dpkg to find one of the configuration files in apache2 package

4. Remove apache2 package (but not purge)

5. Locate the configuration files

6. Show to one of the TAs that your apache2 is already removed but the configuration file is still there

Upgrade and Hold

- Upgrade all currently installed packages
  (but do not install new dependencies)
  apt-get upgrade

- Upgrade all currently installed packages and satisfy all
  new dependencies
  apt-get dist-upgrade

- Hold the version of a package
  —>Newer version is not always good
  apt-mark hold/unhold <package>

Additional Resources

- Slides from 3 years ago:
  http://www.csie.ntu.edu.tw/~hsinmu/courses/_media/nasa_12fall/handout/package_managers.pdf

- Steps to Packaging:
  http://www.debian.org/doc/manuals/maint-guide/first.en.html

- Debian 新維護人員手冊:

  http://www.debian.org/doc/manuals/maint-guide/

- Get other package sources and see how other people do it.
  apt-get source XXX

課堂小作業, part II

- Create a meta package <TA>