LPIC-1 101-500 – Lesson 15

102.4 Use Debian package management

Introduction

- Linux systems use package manager for the installation of software, documentation, libraries, etc
- This makes the use of free/open source software very convenient for Linux users because they do not have to compile the program from source
- Package Managers use **repositories** for saving the packages and the program code

Package Management is the single biggest advancement Linux has brought to the industry

~ Ian Murdock ~

Functions of Package Managers

- Install software from repositories
- Verify digital signatures and checksums to ensure that the software has not been tampered with
- Upgrade software to newer editions
- Packaging of recently released software
- Dependency resolution
- Categorization of Packages

The Debian Package Manager

- **Debian** systems and derivatives use the **dpkg** package manager
- Debian package files have a **.deb** extension
- Packages can be initialized during the installation using a TUI
- The **apt** utility is used for downloading packages from repositories and for dependency resolution
- **dkpg**: Used for the installation of packages though **.deb** files, for uninstalling software and many other functions
- **dpkg-reconfigure**: is used to reconfigure an already installed package

The naming scheme of a .deb file

- **File name: apache2_2.2.16-6+squeeze4_i386.deb**
- **Package name**
- **Version**
- **Revision**
- **Architecture**

Advance Packaging Tool - APT

- **APT** is in charge of package downloading, installing/uninstalling packages, dependency resolution, showing package information, etc.
- Used **dpkg** in the backend for installation/removal of packages.
- **apt-get**: used for installation/removal/upgrade of packages and system update/upgrade.
- **apt-cache**: this command is used for package queries and showing package information.
- The **apt** configuration files are under the **/etc/apt** directory. One of the most useful configuration file is **/etc/apt/sources.list** (main repository configuration) and the **/etc/apt/sources.list.d/*.list (**custom repository configuration) where we define the repositories used by **apt**.

Sample */etc/apt/sources.list* file

```
# Main Repository
deb http://deb.debian.org/debian/ buster main non-free contrib
deb-src http://deb.debian.org/debian/ buster main non-free contrib

# Security updates
deb http://security.debian.org/debian-security buster/updates main contrib non-free
deb-src http://security.debian.org/debian-security buster/updates main contrib non-free

# buster-updates, previously known as 'volatile' (frequently updated software)
deb http://deb.debian.org/debian/ buster-updates main contrib non-free
deb-src http://deb.debian.org/debian/ buster-updates main contrib non-free

# buster-backports, previously on backports.debian.org (new/experimental software)
deb http://deb.debian.org/debian/ buster-backports main contrib non-free
deb-src http://deb.debian.org/debian/ buster-backports main contrib non-free
```

The `dpkg` command

- **# dpkg -i apache2_2.2.16-6+squeeze4_i386.deb** # install **apache2** package from a **.deb** file.
- **# dpkg -r apache2** # uninstall **apache2** package but keep the configuration files.
- **# dpkg --purge apache2** # uninstall **apache2** package and delete the configuration files.

The `dpkg` command

Options:

- **-i**, **--install** # install package from **.deb** file.
- **-r**, **--remove** # remove package and keep the configuration files.
- **-P**, **--purge** # remove package along with the configuration files.
- **-s**, **--status** # show package status and information.
- **-S**, **--search** # search for keywords in all the installed packages.
- **-L**, **--listfiles** # show all files in a package file.
- **-l**, **--list** # show information about packages that match the query.
- **--unpack** # install package without initial configuration.
- **-x --extract** # install package files in the specified directory.

The `dpkg` command

Options:

- **-p**, **--print-avail** # print information from installed package.
- **-I**, **--info** # print information from **.deb** file.
- **--configure** # configure an incompletely installed package.
- **-C**, **--audit** # search for incompletely installed packages and advise about possible resolution steps.

- The **dpkg** data directory is under **/var/lib/dpkg**. Here we can find information about installed packages.

The `dpkg-reconfigure` command

- The **dkpg-reconfigure** command is used to reconfigure already installed packages. If the package supports a TUI this will be invoked.
- `# dpkg-reconfigure postfix # reconfigure the postfix package.`
- `# dpkg-reconfigure locales # reconfigure the locales package.`
- The **dpkg --configure** is for configuring incompletely installed packages and it is not the same as **dkpg-reconfigure**.

The `apt-get` command

- The **apt-get** command is used the the installation of packages from the repositories, resolution of dependencies and conflicts, package removal and system upgrade.
- The **apt-get** command is invoked as follows:
  - **`apt-get <options> [commands]`**
  - Options can be single dashed (-) or double dashed (--) and they are optional.
  - Commands do not have a dash and they are obligatory.

Install packages with `apt-get`

- # **apt-get install apache2** # install the **apache2** package and dependencies. You should respond with "y" or simply "Enter" for the installation to proceed. If the package exists it will be upgraded to the most recent version/revision.
- # **apt-get -y install vim** # install package **vim** with "Yes" as a selected option. If the package exists it will be upgraded to the most recent version/revision.

Remove and purge packages with `apt-get`

- # **apt-get remove apache2** # remove package **apache2** while keeping its configuration.
- # **apt-get --purge remove apache2** # **= apt-get purge apache2** remove package **apache2** deleting its configuration.
- # **apt-get clean** # clean the temporary apt cache **/var/cache/apt** from downloaded **.deb** files.

Update/Upgrade system with `apt-get`

- # **apt-get update** # retrieve updated information about the new version/revisions of installed packages.
- # **apt-get upgrade** # upgrade all packages for which new versions/revisions are available.
- # **apt-get dist-upgrade** # upgrades all packages for which new versions/revisions are available but using a smarter conflict resolution algorithm than **apt-get upgrade**.

Some more options of `apt-get`

Options:

- **-d** # download .deb files from repositories but without installing them.
- **-s** # simulate all the steps without actually installing or removing.
- **-y** # answer "Yes" to all questions.
- **--purge** # purge (remove configuration) of a package.

The `apt-cache` command

- **$ apt-cache search** # search for regular expressions in the package names or descriptions.
- **$ apt-cache show apache2** # information about the **apache2** package.
- **$ apt-cache showpkg apache2** # provides alternative information like possible other versions, dependencies, reverse dependencies etc.
- **$ apt-cache depends apache2** # show **apache2** package dependencies.
- **$ apt-cache rdepends apache2** # show **apache2** package reverse dependencies, i.e. packages that depend from it.
- **$ apt-cache stats** # statistics about installed packages.

The `apt` command

- The **apt** command combines the commands of **apt-get**, **apt-cache** and other APT commands. The goal is for **apt** to replace the other commands in the future.
- **# apt install apache2** # install **apache2** package.
- **# apt remove apache2** # remove package **apache2** keeping its configuration.
- **# apt purge apache2** # remove package **apache2** deleting its configuration.
- **# apt clean** # = **apt-get clean**

The `apt` command

- **# apt search keyword** # similar to **apt-cache search** but searched only filenames by default.
- **# apt update** # = **apt-get update**
- **# apt safe-upgrade** # = **apt-get upgrade**
- **# apt full-upgrade** # = **apt-get dist-upgrade**
- **# apt show apache2** # show package information (similar to **apt-cache show**).

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