

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 through **.deb** files, for uninstalling software and many other functions
 - **dpkg-reconfigure**: is used to reconfigure an already installed package
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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
```



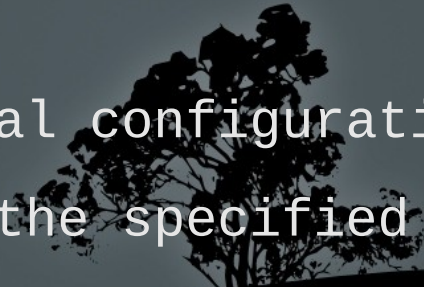
The `dpkg` command

- `# 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.
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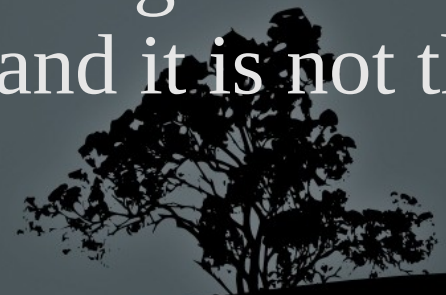
The `dpkg` command

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 **dpkg-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 **dpkg-reconfigure**.



The `apt-get` command

- The **apt-get** command is used for 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`.

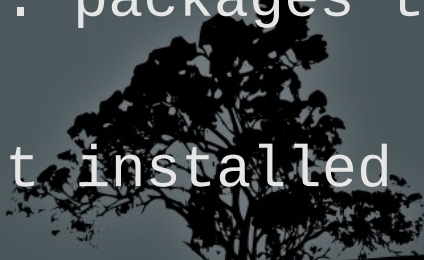
Some more options of `apt-get`

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.`
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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`

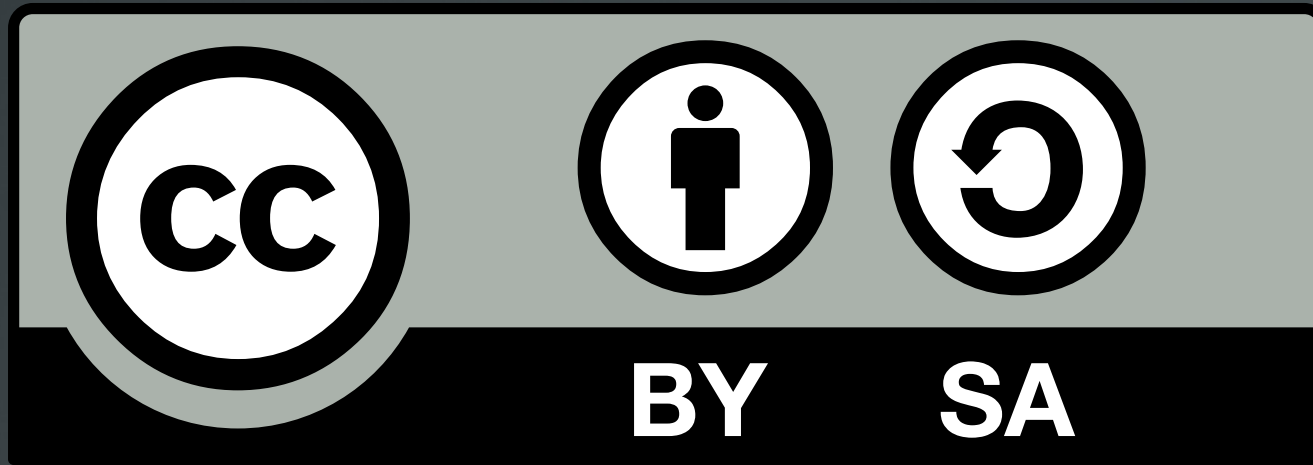


The `apt` command

- `# 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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