APT
Outline

- `.deb` packages
- `dpkg` toolset
- `apt-get`
- `apt-cache`
- helpful tools
.deb packages

- used in Debian and its derivatives (Ubuntu)
- primary method of installing software
- name convention:
  - vlc_2.2.4-14_amd64.deb
Source packages

- original sources used to create the package
- package.dsc
  - signed, metadata
- package.orig.tar.xz
  - original source and build scripts
- package.debian.tar.xz
  - simple patch (and metadata, tests ...)
Binary packages

- `debian-binary`
- `data.tar.xz`
  - directory tree
- `control.tar.xz`
  - control, checksum, scripts
usr
 |   |-- bin
 |   |     |-- make
 |   |     \-- make-first-existing-target
 |   |-- include
 |   |     \-- gnumake.h
 | \-- share
 |   |-- doc
 |   |     |-- make
 |   |     |     |-- AUTHORS
 |   |     |     |-- changelog.Debian.gz
 |   |     |     |-- copyright
 |   |     |     |-- Explanations.gz
 |   |     |     |-- NEWS.gz
 |   |     |     \-- README.gz
 |   |-- locale
 |   |     |-- cs
 |   |     |     |     \-- LCMESSAGES
 |   |     |     |     \-- make.mo
 |   |     \-- uk
 |   |         |     \-- LCMESSAGES
 |   |         |         \-- make.mo
 | \-- man
 |     \-- man1
 |         |     |-- make.1.gz
 |         \-- make-first-existing-target.1.gz
Control file

Package: hello
Version: 2.9-2+deb8u1
Architecture: amd64
Maintainer: Santiago Vila <sanvila@debian.org>
Installed-Size: 145
Depends: libc6 (>= 2.14)
Conflicts: hello-traditional
Breaks: hello-debhelper (<< 2.9)
Replaces: hello-debhelper (<< 2.9), hello-traditional
Section: devel
Priority: optional
Homepage: http://www.gnu.org/software/hello/
Description: example description
Virtual and meta packages

- packages provide virtual package
  - `c++`, `awk`, `editor`, `www-browser`, `pager`
  - `update-alternatives`

- metapackages “install” multiple packages
  - desktop environments (gnome, kde, xfce), build-essential, linux-generic, language-support-*
Dependencies

- package metadata
  - Depends
  - Recommends
  - Suggests
  - Conflicts
  - Replaces
  - Breaks
  - Provides
Depends: vlc-bin (= 2.2.4-14), vlc-plugin-base (= 2.2.4-14), vlc-plugin-qt (= 2.2.4-14), vlc-plugin-video-output (= 2.2.4-14), vlc-110n (= 2.2.4-14)

Recommends: vlc-plugin-notify (= 2.2.4-14), vlc-plugin-samba (= 2.2.4-14), vlc-plugin-skins2 (= 2.2.4-14), vlc-plugin-video-splitter (= 2.2.4-14), vlc-plugin-visualization (= 2.2.4-14)

Provides: mp3-decoder
dpkg

- debian package manager
- basic tool to manage packages
- frontend to dpkg-deb and dpkg-query
- dpkg-source for building source packages
  - `script` `debian/rules <clean|build|binary|...>`
  - creates a .deb package
- install, configure, remove, purge, verify
Package states

- not-installed
- config-files
- half-installed
- unpacked
- half-configured
- triggers-awaiting
- triggers-pending
- installed
Package selection states

- install
- hold
- deinstall
- purge
Build package from source

- `dpkg-source -x foo_version-revision.dsc`
- `cd foo_version`
- `dpkg-buildpackage -rfakeroot -b`
- `dpkg -i ../foo_version-revision_arch.deb`
Creating packages from source

- requirements: dependencies installed and package-orig.tar.xz
- steps:
  - edit sources and patch as needed
  - create **debian** directory
    - create rules script (**dh_make**)
    - add control, copyright, changelog
  - `dpkg-buildpackage -B`
    - clean the source tree (**debian/rules clean**)
    - build the program (**debian/rules build**)
    - build architecture dependent binary packages (**fakeroot debian/rules binary-arch**)
    - sign the source `.dsc` file, using `gpg`
    - create and sign the upload `.changes` file, using `dpkg-genchanges` and `gpg`
apt-get

- command-line tool for handling packages
- simplifies package installation, dependency handling and package upgrading
/etc/apt/sources.list

- deb http://ftp.cz.debian.org/debian/stretch main non-free contrib
- deb http://security.debian.org/debian-security stretch/updates main contrib non-free
- deb-src http://security.debian.org/debian-security stretch/updates main contrib non-free
apt-get actions

- update
- upgrade
- dist-upgrade
- dselect-upgrade
- install
- remove
- purge
- source
- build-dep
apt-cache

- allows users to query APT cache
- does not manipulate system state
- works with package metadata
- may work with outdated metadata if the last update was too long ago
apt-cache actions

- showpkg
- stats
- showsrc
- dump
- search <regex>
- depends
- dotty
tasksel

• high-level abstraction to install a group of packages
• helps configuring the system to perform a certain task
• run during system installation
• tasks:
  – desktop, web-server, print-server, dns-server, file-server, mail-server, database-server, ssh-server, laptop
apt

- front-end to apt-get and apt-cache
- simple way to work with packages
- colorized output
- dist-upgrade renamed to full-upgrade
- for scripts, apt-get is recommended
aptitude

- front-end to apt
- terminal GUI
- uses ncurses
- also possible to run from command-line
  - aptitude install package
aptitude vs apt

- easy access to all versions of a package.
- easy to keep track of obsolete software by listing it under "Obsolete and Locally Created Packages"
- includes a fairly powerful system for searching particular packages and limiting the package display (mutt was the inspiration for the expression syntax)
- can be used to install the predefined tasks available (tasksel)
- full screen mode has su functionality embedded and can be run by a normal user
Synaptic

- front-end to apt
- GTK+ GUI
- installed in Ubuntu
- allows editing /etc/apt/sources.list
Upgrading to new release

• Simply edit `/etc/apt/sources.list`

• Run `dist-upgrade (full-upgrade)`
Alien

• a tool to convert rpm, deb, slp and Slackware (tgz) packages

• alien --to-deb /path/to/package.rpm
The end