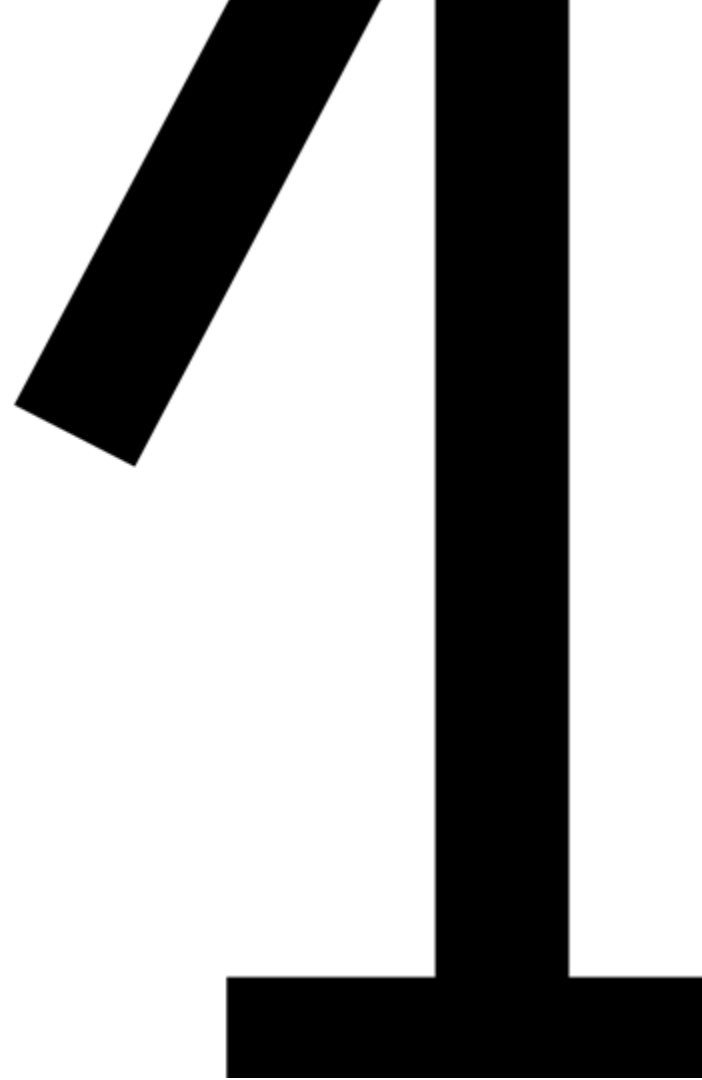# Operating System fundamentals

Software management

Contents

1. Packages and repositories
2. Installing software with package manager
3. Manage repositories
4. Installing individual packages
5. Comparison RedHat/Debian

Course text

- Chapter 13 Install and Update Software Packages
  - (RedHat chapter 12)
  - Packages for distributions and Repositories
  - Using a packagemanager and the repositories to install software
  - Managing repositories
  - Installing and removing packages
  - Comparison RedHat / Debian distribution family

Packages and repositories

Distributions, packages, repositories

- Every Linux distribution (RedHat, Debian, Kali, Ubuntu, …) has pre-installed software

- Software is bundled into packages

- The packages are made available through a repository

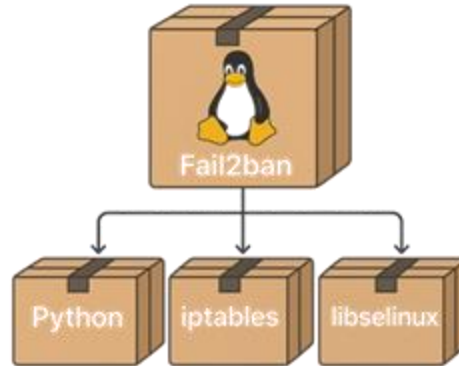 - comparable to Play Store and App Store

Packages

- A **package** contains
  - binaries (executables)
  - configuration files
  - man pages
  - install scripts
  - uninstall scripts
  - security information
  - metadata/manifest
- The structure of a package depends on the distribution and the version. Mostly **.rpm** or **.deb** files
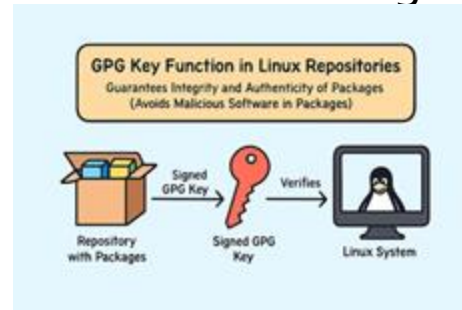
Repositories

- The packages are bundled into a **repository**
- It contains different versions of each package
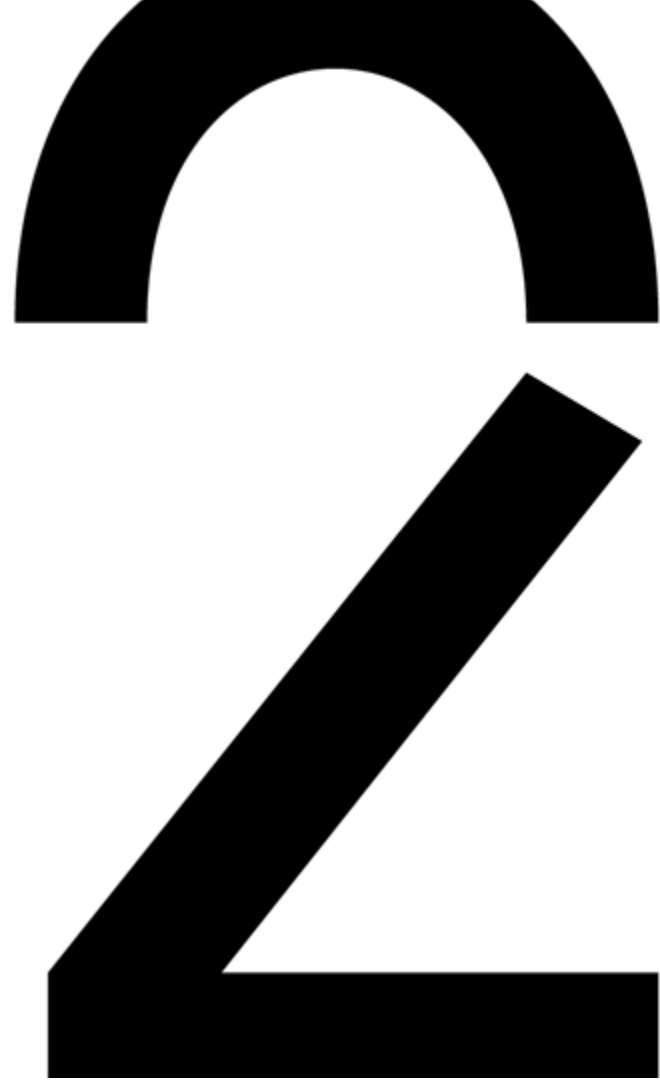- Packages can depend on other packages

Package manager

- We use a **package manager** to install or remove packages from a repository (**dnf** in RedHat)
- The package manager looks for repositories in a file or directory on the computer
  - RedHat: **/etc/yum.repos.d/**
  - Debian: **/etc/apt/sources.list**
- The package manager uses the public key of the repository to make sure the package comes from the right source and it has not been altered

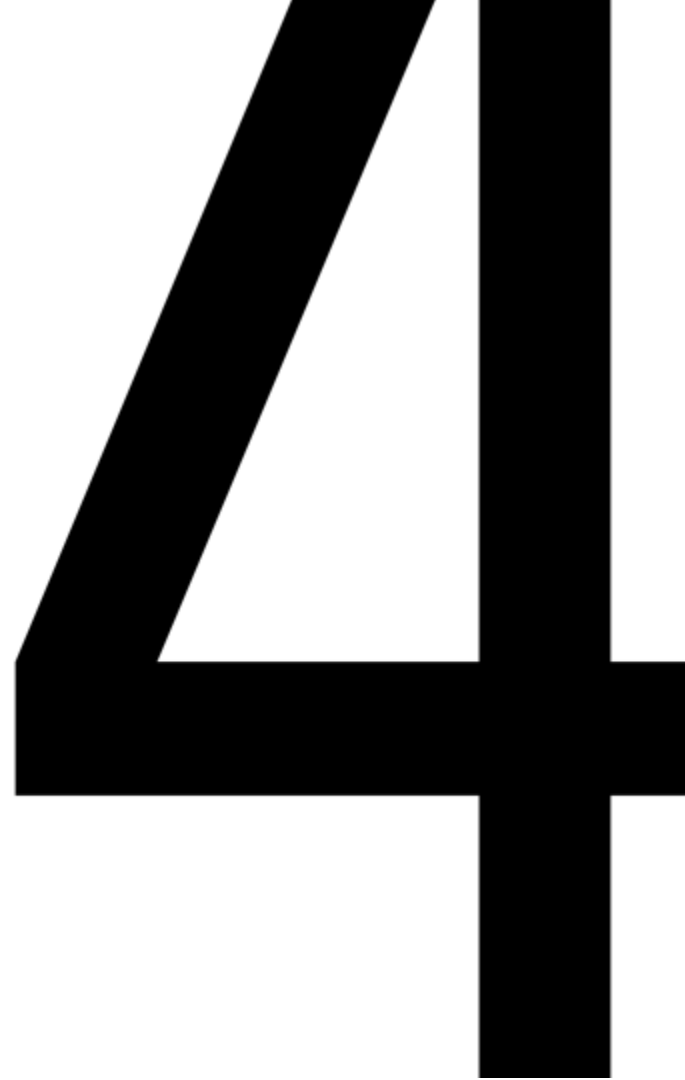# Installing software with package manager

2

Installing software

- On RedHat we use the package manager "**dnf**" (previously known as "**yum**")
- examples
  - sudo **dnf update**: update the info of the repositories and update all software
  - sudo **dnf update package**: update only 1 package
  - sudo **dnf install package**: install a package
  - sudo **dnf remove package**: remove a package
  - **dnf list**: show list of all packages in the repository
  - **dnf list installed**: show list of all installed packages
  - **dnf info package**: shows information about a package
  - **dnf search word**: search a package using a search-term
  - **dnf history**: show history of installing/removing/updating packages

Manage repositories

Manage repositories

- You can get a list of all repositories
  - **dnf repolist all**
- You can enable or disable repositories
  - sudo **dnf config-manager --set-enabled** <reponame>
  - sudo **dnf config-manager --set-disabled** <reponame>

Installing individual packages

4

Installing individual packages

- Normally you install packages from a repository (most secure)
- Sometimes software is delivered outside a repository
  - In RedHat this is through .rpm files
  - You download the package
  - You install it with
    sudo **rpm -i** </path/to/package.rpm>
  - If the package depends on other packages, these are NOT installed!
  - alternative: sudo **dnf install** </path/to/package.rpm> will also install dependencies

Managing individuele packages

- sudo **rpm -e packet**: removes a package
- **rpm -qf /path/to/file**: shows the package a file belongs to

Comparison
RedHat/Debian

5

Aspect	RPM-based systems	DEB-based systems
Typical Distros	RHEL, Fedora, CentOS, Rocky, AlmaLinux, openSUSE	Debian, Ubuntu, Linux Mint, Pop!_OS
Package format	`.rpm` (Red Hat Package Manager)	`.deb` (Debian package)
High-level package manager	`dnf` (or legacy `yum`)	`apt` (or legacy `apt-get`)
Repository metadata	Stored in `/etc/yum.repos.d/*.repo`	Stored in `/etc/apt/sources.list` and `/etc/apt/sources.list.d/`
Add/remove package	`dnf install/remove <pkg>`	`apt install/remove <pkg>`
List all packages in repos	`dnf list`	`apt list`
List installed packages	`dnf list installed`	`` `apt list --installed ``
Low-level tool	`rpm`	`dpkg`
Install local package	`rpm -ivh file.rpm` or `dnf install ./file.rpm`	`dpkg -i file.deb` or `apt install ./file.deb`
List installed packages	`rpm -qa`	`dpkg -l`

Exercises

Exercises

- KdG
  - 13.6.1
  - 13.6.2
  - 13.6.3
  - 13.6.4
- RedHat
  - ch12s04
  - ch12s06
  - ch12s08
  - ch12s09