

Application Management

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Lectures

- 1 System administration introduction
- 2 Operating System installation
- 3 User management
- 4 **Application management**
- 5 System monitoring
- 6 Filesystem Maintenance
- 7 Local services
- 8 Network services
- 9 Security and Protection
- 10 Virtualization

Outline

- 1 Introduction
 - Goals
- 2 App installation process
- 3 Software deployment methods
- 4 Application location
- 5 Version maintenance
- 6 Other considerations

Goals

Knowledge

- Software distribution formats
- Software installation methods

Abilities

- App installation
 - Select install destination
 - Basic configuration
- Several versions maintenance

Outline

- 1 Introduction
- 2 App installation process**
 - Manual installation
 - Automatic installation
- 3 Software deployment methods
- 4 Application location
- 5 Version maintenance
- 6 Other considerations

Manual installation procedure

- 1 Select install destination
- 2 Create destination directories
 - Executable
 - Libraries
 - Support files
 - Configuration files
 - Log files (logs)
 - Documentation
- 3 Distribute application files
- 4 Initial application configuration

Manual installation procedure

- 1 Select install destination
- 2 Create destination directories
 - Executable → `$PREFIX/bin`
 - Libraries → `$PREFIX/lib` i `$PREFIX/lib64`
 - Support files → `$PREFIX/share`
 - Configuration files → `/etc`
 - Log files (logs) → `/var/log`
 - Documentation → `$PREFIX/share/doc`
- 3 Distribute application files
- 4 Initial application configuration

Automatic installation process

Depending of the software deployment method

- Automate previously defined steps
- Generic procedure
- Delivers default configurations
 - Usually not suitable in the particular installation environment

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- 1 Introduction
- 2 App installation process
- 3 Software deployment methods**
 - From source code
 - Self-installable binaries
 - Precompiled binaries
- 4 Application location
- 5 Version maintenance
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From source code

- 1 Decompress the package into a separate directory (/usr/src/app_name)
- 2 Read the documentation — README, INSTALL...
- 3 Install Dependencies
 - Any method may be used
- 4 Adjust the code to the system's particular needs
 - Available libraries
 - Library and file locations
 - autotools based

```
$ ./configure --prefix=...
```

- cmake based

```
$ cmake -DCMAKE_INSTALL_PREFIX=...
```

From source code

5 Compile

```
$ make
```

- Solve any existing error

6 Install

```
$ sudo make install
```

- Copy executables, libraries... to their final location
- Generate default configuration files

7 Base configuration

Self-installable binaries

- Installation system suited to the application
- Implemented by the same company developing the application — **Fits the application**
- Closed feature set

Examples

- Java
- Matlab
- Most closed applications

Precompiled binaries

- Installation system suited for the whole distribution

```
# apt-get install ...  
# dnf -i ...  
# yast2 ...
```

- Created by the same distribution — **Fits the system**
- Predefined set of features, changeable with some efforts

Exercise

Discuss about the pros and cons of each software deployment method

- Source code
- Binary (precompiled)
- Binary (self-installable)

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Application location and execution

- `$PATH` Environment variable
 - Determines the search path for executables
- Where to install the applications?
 - On its own directory
 - Then `$PATH` becomes very long
 - All in the same directory
 - Lack of organization and potential name clash
- Combine both options
 - Each application on its own directory
 - Creating soft-links to the executables in a common directory

Exercise

Where would you install the following applications?

- Libre Office - precompiled binaries
 - Text editor, spreadsheet, presentations
- Discord - Self installable binary
 - Development environment and Java virtual machine
- plasma/gnome - precompiled binaries
 - Window manager (graphical environment)
- vlc - source code
 - Multimedia player

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Exercise

Assumen we already installed the applications of the previous case...

- Where would you install the following applications?
 - python 3.8 if the previous one was 2.7

- Java 11 if we had version 8

Exercise

Assumen we already installed the applications of the previous case...

- Where would you install the following applications?
 - python 3.8 if the previous one was 2.7
 - Assuming that python was installed using precompiled binaries, in this case we could use any of the other alternatives considering that the application must have a \$PREFIX different than /usr. Alternatively we could use the distribution enable facilities for this.
 - Java 11 if we had version 8
 - In this case since there is no percompiled binaries we have to use self-installable binaries and install it into a different \$PREFIX, e.g., (/usr/local/java/jdk11)

Version maintenance

Only possible with very good planning

- Install the applications into different directories
 - It avoids filename and configuration clashes
- Keep a soft-link to the newest version (or more used)
 - Add old versions into each user's `$PATH`
 - Rename the old soft-link instead of removing it

Before installing a new version it must be checked that the changes do not impose issues for the previous versions

Outline

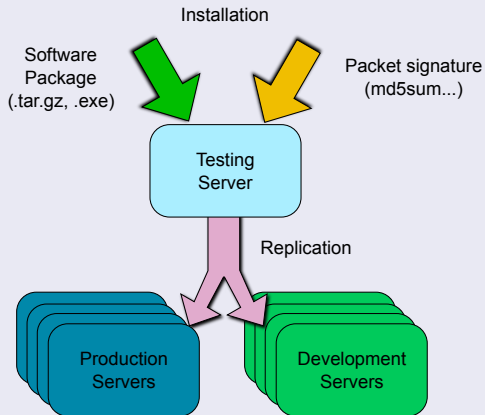
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Other considerations

- Is the installed software secure?
 - Known vulnerabilities
 - Modified source code
 - Modified binaries
- How to keep it up-to-date?
 - 500+ software packages. . .
 - . . . en 10+ servers
- Is the software stable?
 - +estable → -actual
 - Test server

Exercise

Discuss if the detailed issues are solved using this solution. . .



Homework

System monitoring commands

- ps, top
- iostat, vmstat
- w, last
- du, df