The Linux Environment

Linux Basics

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Linux installation

❖ There are many possibilities to setup a UNIX-like (Linux) environment

➢ For detailed information search on the WWW

▪ The most common Linux versions, for example, https://ubuntu.com/

▪ Various keywords SUCH AS

● Cygwin, Linux LIVE, multi-boot, Virtual Machine, Windows Linux Subsystem

Linux installation

❖ Linux inside a Virtual Machine

➢ There are applications for hardware emulation

➢ These applications are called **virtualizers**

➢ The most important

- Virtualbox
  - For AMD64 and Intel64
  - Available for Windows, Linux, MAC OS X, Solaris
  - WWW: https://www.virtualbox.org/
- WMWare
- Qemu
- Virtual Machine Microsoft
- Virsh (CentOS)
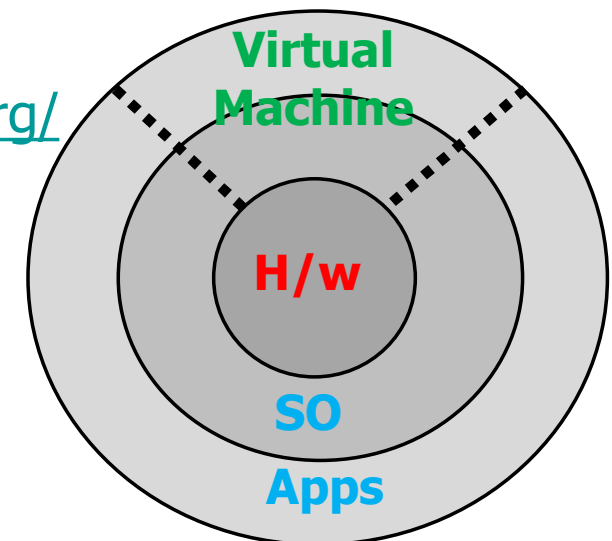
Linux installation

❖ A virtual machine creates the illusion of the availability of multiple personal computers, each with its own processor and memory

❖ Attention

➢ Verify that the PC/laptop allows virtualization

▪ It can be checked in the bios

▪ With VirtualBox, after installing Linux, it is recommended to install the "Guest Addition"

➢ Search: "VirtualBox"

Linux installation

- ❖ Windows Subsystem for Linux (WSL)
- ❖ Originally named "bash on Ubuntu on Windows" or "LXSS, Linux Windows Subsystem"
- ❖ This is not virtualization, because Microsoft has implemented a subsystem which exhibits the same Application Programming Interface (API) of a Linux kernel
- ❖ It is likely more efficient and requires less resources than virtualization
- ❖ Requirements:
  - ➢ Windows 10
    - ▪ From Windows 10 1607 Anniversary Update (i.e., from 2016)
    - ▪ 64 bit version

Linux installation

❖ **Windows Subsystem for Linux (WSL)**

➢ Installation procedure

▪ Follow the following or others installation guides

▪ https://docs.microsoft.com/it-it/windows/wsl/install-win10

▪ The missing software must be explicitly installed, e.g., for Ubuntu you can use:

● sudo apt install <packetName>

➢ Search: "WLS on Windows 10"

Which linux?

❖ Mint or Ubuntu

➢ Ubuntu in Nguni Bantu language means "humanity" or "I am because we are"

➢ A new version released each 6 months

➢ A new LTS (Long Term Support) version released each 24 months (supported for 5 years)

- 2012 12.04 LTS Precise Pagolin
- 2014 14.04 LTS Trusty Tahr
- 2016 16.04 LTS Xenial Xerus
- 2018 18.04 LTS Bionic Beaver
- 2020 20.04 LTS Focal Fossa (fossa focale)

Updated in April, with several sub-versions (e.g., 20.04.1, …)

Versioni sotto GNU GPL (General Public Library)

Session

❖ **Opening a local working session**

> Linux is case-sensitive

```
login: <username>
password: <password>
```

❖ **Opening a remote working session**

```
ssh <username@hostname>
ssh -X <username@hostname>
```

> -X → Display X11

> Secure Shell connection protocol to open a secure session through a command-line interface on a network host

> In Windows is possible to use the SSH client.
> **putty**: Free software, combined with an emulator for remote terminals

Session

❖ Closing a working session

```
exit
logout
ctrl-d
```

Commands

```
command [options] [arguments]
```

❖ Unix-like command syntax

❖ The name of the command is associated to the action performed

❖ The options (optional, 0 or more) have conventionally two formats

- The character '-' followed by only another character
  - $-ch_1$ $-ch_2$ ...
- The two characters "--" followed by a string
  - $--str_1$ $--str_2$ ...

❖ Arguments are optional

Also
$-ch_1$ ch_2 ch_3

Commands

❖ Available

➢ Automatic command completion (Tab)

➢ Up-down arrows for retrieving previously submitted commands

❖ Command parsing

➢ Long commands can be continued on the next line using '\' as the last character of the current line

➢ Two or more commands can be given on the same line, separated by ';'

▪ command1 ; command2 ; …

▪ Commands on the same line are executed **sequentially**

Help manual

❖ All commands are documented in manual pages

```
man comando
```

> e.g.,
> man ln
> man wc
> ...

➤ Related commands

```
apropos comando
whatis comando
whereis comando
```

➤ Many commands allow the help option

```
comando -help
comando --version
```

Filesystem

❖ The Linux filesystem is

➢ Hierarchic

➢ Organized by means of tree directories

▪ The root tree directory is `'/'` (slash)

▪ The current directory is indicated by `'.'` (dot)

▪ The parent directory is indicated by `'..'` (dot dot)

▪ Directories are separated by means of a `'/'` (slash)

➢ Uniform notation (disks, directories, files, special files, …)

Path

❖ A file is specified by its pathname

➢ Absolute pathname

▪ From the filesystem root

- /dir1/dir2/file

➢ Relative pathname

▪ From the current working directory

- ./subdir1/subdir2/file
- subdir1/subdir2/file