

CS Basics - Exercises

Install and configure Linux

E. Benoist

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1 Presentation

The goal of this exercise is to let you install and manipulate a Unix computer (in our case Linux).

2 Prepare

Download Virtual box for the server:

- Virtual box: <https://www.virtualbox.org/wiki/Downloads>

Download the install DVD of Linux (Ubuntu 64 bits):

- From Ubuntu's web site: <http://www.ubuntu.com/download/desktop> (Attention! You should not pay, it is for free, just download the 64 bit version)

If you have problems downloading the files, contact the professor he has USB-Memory sticks as a backup.

3 Installation

Install virtual box. The install is more or less automatic.

In Virtual box, you have to create a virtual machine for Linux.

Machine > New

Dans la fenetre "Create a new Virtual machine",

Name: "Ubuntu - CS Basics"

Type: "Linux"

Version: Ubuntu (64 bits)

If you do not find *Ubuntu (64 bits)* in the list of possible architecture, you have to try to reboot your machine (the real one). If the problem persists, it means that your BIOS is misconfigured.

Memory size depends on your computer (the host). 1024MB is recommended, it is a minimum. If your computer has more than 8 GB of RAM, you should select 2GB (i.e. 2048 MB) your system will work better.

You have to create a new virtual disk wich type is VDI (the default one) and which size is dynamically allocated. Select 16GB for the size of the disk.

In VirtualBox, you have to start the new virtual machine. Click on the name of the machine and then the "start" button.

You then select the iso file downloaded from the Ubuntu web site. Start installation. Select "Download update while installing" and "install third party software".

You can *erase disk and install Ubuntu*, since the disk is virtual it will not erase anything.

Select a Swiss keyboard with the right language (you should test special chars).

You have to create a user. This password must be secure but you also have to remember it. A secure password is at least 10 characters long, contains Capital letters (not at the begining of the word), contains numbers and special chars like `-*%&/()=?!$-.:;`

In order to have a very convenient environment, you should install the virtual box addition CD: In the menu of the application: **Devices / Insert Guest Addition CD Image**. Once installed, you need to eject this CD.

Before doing anything on your computer, you need to update and upgrade all installed packages, start a terminal ("Term" in the search window):

```
> sudo apt-get update
> sudo apt-get upgrade
```

You will need to do this, each time you start your machine, to be sure to have allways uptodate packages.

4 Install other softwares

You will use the Linux package manager to install the following softwares:

- Bless (a hexadecimal editor for binary files)
- Emacs (an editor for text files)
- NASM (the assembler)
- DDD (the debugger)

You have to install the following packages:`bleess`, `emacs24`, `nasm`, `ddd`. The remaining software will be automatically installed if needed.

You will use the following command to install a package:

```
sudo apt-get install [package-name]
```

You also have to update the index package and upgrade all installed packages (you can find the syntax in the slides).

5 Install Git and clone the repository

The documents of this course (slides, exercises, examples) are available through a git server. You need to install git:

```
sudo apt-get install git
```

Copy the private and public keys you generated into a hidden SSH directory : `~/.ssh/`
First: create the `.ssh` directory inside your home dir.

```
cd  
mkdir .ssh
```

Then copy your keys from your own computer into the virtual machine. You first need to configure your Virtual Box, to share folders.

Create a directory for our course, and change to this directory.

```
mkdir csbasics  
cd csbasics
```

Then you need to clone our repository to access the information (adapt the URL to your own class: I1A, I1B or I1P).

```
git clone git@git.bfh.ch:staff/bie1/BTI7061classI1A2017
```

Each time, we will change information on the repository, you will need to update the information:

```
git pull ....
```

6 Manipulate files

You have the image `boy.bmp` in the directory `resources`. You can see it using the following command:

```
$ > eog boy.bmp &
```

Start the hexadecimal editor `bless`, using the following command:

```
$ > bless boy.bmp &
```

The ampersand `&` stands for a process that is started in background.

Then you can change some pixels in the image. Inside the Editor, find and replace all the bytes starting with a `F` (`FFh` to `F0h`) and replace them with `00`. Be very careful, not to touch any byte with an address smaller than `36h`. It would produce a not consistent file. Look at the resulting file.