

# Virtual Machine Installation

Fonaments dels Computadors – Grau en Intel·ligència Artificial – 2021-2022 Q1

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This document will guide you with the installation of a framework to let you use a software-based computer system, called virtual machine. This is critical to guarantee all students are using the same or similar environment and ease the understanding of the course. Although most of the different Linux distributions can be used to implement the exercises of FC, we recommend the Ubuntu release environment referenced in this document. If you have a native Linux distribution in your laptop, and in particular an Ubuntu environment, it should be enough to fulfill the exercises of this course. Anyway, double check it with the lecturer to guarantee there is no problem.

Thus, firstly the concept of virtual machine will be introduced at the beginning of the document. The installation procedure is explained under different Operating Systems (i.e. the software that manages the system), such as Windows, Linux, and MAC OS. Finally, we provide the links to download the environment provided by FIB to be used in the virtual machine. In particular, for Ubuntu systems.

## Background

**Virtual Machines** (VMs) are a feature of modern systems, allowing almost any Operating System (OS) to be run on top of another OS installation. The contents of a virtual machine can be captured and saved, like a snapshot, into a single file, called **image**. The new environment is said to be virtualized (i.e. the act of creating something that actually is not there), and the resources seen inside (processor cores, memory, devices) may be different from those in the physical machine. Thus, the real computer in which you have installed the virtual machine is called “Host”, and the system that represents the virtual machine is called “Guest”. That means, the Guest requires resources from the Host. And, in fact, the performance of the Guest is lower than it was a Host, as well as if the Host has very low specs, it is likely the Guest performance can be very poor.

In this course we will use virtual machines to represent a similar environment to the lab, mainly the OS and its setup, but in the students' laptop, regardless the laptop or OS the student is using.

## Image Download

Download the following files in your machine. You can do so visiting the website

<https://softdocencia.fib.upc.edu/software/> :

- **Linux Ubuntu 20.04 LTS 64 bits Aules SO:**

<https://softdocencia.fib.upc.edu/software/Ubuntu-2021.zip>

This image requires at least 15 GBytes to be uncompressed on your machine.

## VM Framework: Download & Installation

You can use both VMware as indicated on the FIB website ([VMware player](#)), or [Virtual BOX](#) to run those images. We recommend **Virtual Box** because it provides better support for versions on:

- Windows

(<https://download.virtualbox.org/virtualbox/6.1.26/VirtualBox-6.1.26-145957-Win.exe>)

- Linux

([https://www.virtualbox.org/wiki/Linux\\_Downloads](https://www.virtualbox.org/wiki/Linux_Downloads))

- MAC/OS

(<https://download.virtualbox.org/virtualbox/6.1.26/VirtualBox-6.1.26-145957-OSX.dmg>)

Download the program depending on the OS you are currently using and install it according to the indications of the following Section. Follow the indications shown by the installer. In case you have any issue, you can check the User Manual from the [link](#).

## Troubleshooting

There are computers that, by default, prevent the installation of a VM, since require to change a particular setting of the computer. If you have any issue during all this process, please ask to the lecturer of this session.

### IMPORTANT NOTE for Mac users:

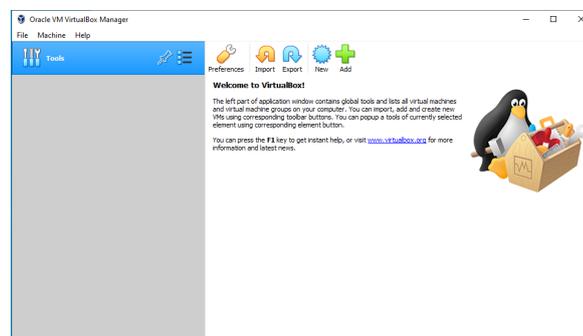
There is a particular subset of Mac computers, in particular M1-Mac, that due to the architecture of the processor (ARM based chip) there are serious incompatibilities with either vmware and virtualbox software.

If you are not sure whether your system is a M1-Mac, go to the Apple menu and then “about this mac” and check the chip field.

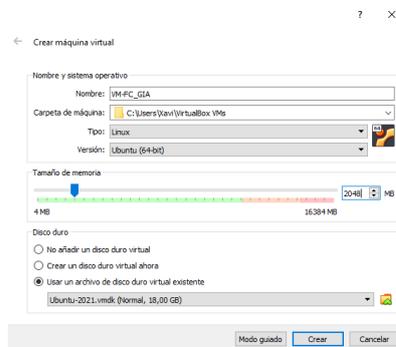
For this set of computers, we recommend to use the UTM software to install the Ubuntu 20.04 based Virtual Machine. You can find the guideline and software in the following link: <https://mac.getutm.app/gallery/ubuntu-20-04>. In case you are interested to find more information about UTM, please check <https://mac.getutm.app/>.

## Creating a VM with the Guest Image

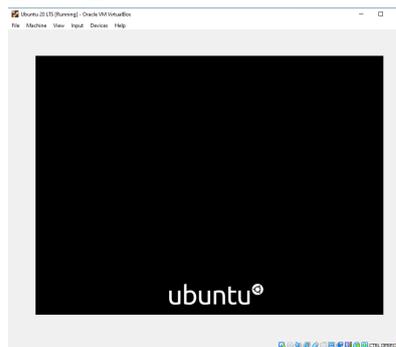
Double-clicking on this icon will start Virtual Box, and you will be presented with the manager of VMs similar to the following window:



Press the “New” button or “Machine->New” to create a new VM. Then, write a name, select type “Linux”, and Version “Ubuntu (64-bit)”. It is recommended to assign 2048 MB at least of memory, although you can modify this in the future. Finally, in the hard disk section, select the option to use a file, browse to find the uncompressed image downloaded in the first step, and select the only file with format “.vmdk” (i.e. the largest file).



When finished, you can already start the Virtual Machine by pressing “Start” and you will be seeing how your image boots:



The booting may take some time, depending on the resources your host computer has. In any case, a VM requires significant resources to run. When presented with the “Login” window, you can enter the system with the credentials listed in the FIB website. In the case of “Ubuntu” you may select any username (although we recommend “**alumne**”) and introduce the password “**sistemes**”.

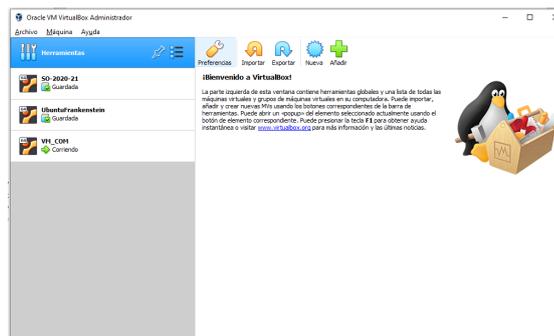


## Installing the Extension Pack

By default, the VM is installed with a default set of functionalities. However, if you want to fully enjoy the functionalities of the Guest system, we strongly recommend to install the extension pack. This pack allows to use the VM at fullscreen, increase resolution, among others. To do so, you have to follow the indications from the following [link](#), and in particular from this [link](#), as well as downloading the file from this [link](#).

The detailed steps to follow are:

- 1) Download the extension pack file from the above link
- 2) Open the main VirtualBox window, select “tools” option and “preferences” as shown in the picture



- 3) Once opened “preferences”, select “extensions” option, and then the “Oracle\_VM\_VirtualBox\_Extension\_Pack-6.1.14.vbox-extpack” file.
- 4) Press “Install”

After fulfilling the installation of the Extension pack, go to the window of the virtual machine you created. In particular, go to the “devices” option from the menu of the virtual machine window and select the option “Insert the CD image of “Guest Additions””. As a result, a new shortcut icon (cd-like icon) will be shown in the desktop of the virtual machine.

Now, as a final step, you have to open a terminal. Go to the icon of the left-down corner and open the “term”. This icon will open a terminal and an icon like:



And then write the following command lines (the “\$” character does not have to be written, it only means the beginning of the command line in the terminal, also known as “prompt”). The cmdlines that start with sudo need the password (it will be cached for some minutes). Thus you have to introduce again “sistemas”:

```
$ sudo mkdir --parents /media/cdrom
$ sudo mount /dev/cdrom /media/cdrom
$ sudo /media/cdrom/VBoxLinuxAdditions.run
$ reboot
```

After reboot open again a terminal and type:

```
$ modinfo vboxguest
$ sudo usermod --append --groups vboxsf -- "$USER"
```

At this point everything is ready. To validate this you can maximize the virtual machine and the contents should properly scale, without losing resolution.