About working with Linux

Several courses of the M1 Mosig requires running Labs on a Linux system.

This document presents existing solutions to work on a Linux system.

Summary

4 solutions are available for students to work on Linux:

1) **The machines from the lab rooms**
   - Main advantage: Accessible to anyone
   - Main drawback: Limited to the opening hours of the building
2) **The eBureau service**
   - Main advantage: Not intrusive – Only requires a Web browser
   - Man drawback: Requires a *good* Internet connection
3) **A virtual machine**
   - Main advantage: Installed on your laptop
   - Main drawback: Installed on your laptop
4) **Dual boot**
   - Main advantage: The full Linux experience
   - Main drawback: Most *intrusive* solution

The machines from the lab rooms

Nothing more to be said.

The eBureau service

- Service provided by IM2AG, accessible to all Mosig students.
- Requires being connected to the network of the university (physically or through VPN)

The steps To access the service from your laptop:

1) Install the UGA VPN

- Read the Documentation

2) Access the service

- EBureau

Additional comments

- Same system as in the lab rooms
- Gives access to your home directory as in the lab rooms
- The only limitation: You depend on the network connection

A Virtual Machine

Virtual machines (VM) allow emulating several machine on top of a single real machine. A different operating system can be installed in each VM and executed at the same time on the hardware.

- Allows running Linux on top of Windows (or MacOS)
  - Window runs the VM in which Linux runs
- No risk for Windows
- Might be slow on old hardware

The steps

1) Select the virtualization tool you will use:
   - Virtualbox (Solution we recommand for Windows users)
   - VMware Fusion (Solution we recommand for Mac users)
   - Etc.
2) Installation
   - Install VirtualBox (or VMware Fusion) on your machine
   - Download a image (.iso) of the distribution you want to install
     - See below how to choose your Linux distribution
   - Create a new VM in VirtualBox
   - Use the image you downloaded to configure the VM
   - . . . that's almost it!

Several tutorials are accessible online: for instance, here

About the choice of a Linux distribution

- Linux is the name of the operating system kernel
- A Linux distribution is an operating system made from a software collection, which is based upon the Linux kernel
- Distributions are free and provide a full set of softwares and tools.
- Distributions mainly differ by the set of applications they provide and the way manage software installation.

Some of the main distributions:

- ArchLinux
- Debian
- Fedora
- Gentoo
- Linux Mint
- OpenSuse
- **Ubuntu**

Our recommendation

- For now, in the lab rooms, Ubuntu 22.04 is used but it will be upgraded to Ubuntu 24.04 during the semester
- We recommend using **Ubuntu 24.04** since it is a recent LTS version of Ubuntu
  - Widely used
  - Well documented on the Internet
  - Distribution that will be used soon on the machines at UFR IM2AG

Detailed comments (including the case of ARM processors)

Ubuntu 24.04 (Desktop version): Although the main web page https://ubuntu.com/download/desktop seems to suggest that the Desktop version of Ubuntu 24.04 is only available for x86, it is in fact also available for arm64. The ISO images are available from the following links:

- For Intel/AMD x86
- For arm64

Virtualization software

- Virtualbox:
  - Free & open-source software
  - Older versions only support Intel/AMD x86. Recent versions support both Intel/AMD x86 and arm6
  - https://www.virtualbox.org

  - Work on Windows and MacOS
- VMware:
  - Commercial software but free for personal use. Requires a (free) Broadcom account.
    * https://knowledge.broadcom.com/external/article/368667/download-and-license-vmware-desktop-hype.html
  - On Windows:
    * VMware Workstation
    * Currently (as of August 2025) only supports Intel x86
    * https://www.vmware.com/products/desktop-hypervisor/workstation-and-fusion#resources
  - On MacOS:
    * VMware Fusion
    * Supports both Intel/AMD x86 and arm64
    * https://www.vmware.com/products/desktop-hypervisor/workstation-and-fusion#resources
- UTM (based on QEMU)
  - Only on MacOS (Less mature than the other solutions)
  - Free & open-source software
  - Supports both Intel/AMD x86 and arm64.
  - Can also work (but much more slowly) to emulate x86 on top of arm64 or vice versa.
  - Does not support virtual machine snapshots (unlike VirtualBox and VMware Fusion) https://mac.getutm.app

Dual boot

Not recommended on Mac

Install two operating systems side-by-side on the machine to have the possibility to start one or the other:

- A boot loader allows selecting the operating system to start at boot time.
- It requires having at least 2 disk partitions, one for each OS.
- **Warning:** Creating new partitions on a disk where Windows is already installed might be risky.
- Can be a bit complex to set up on recent computers (windows security + UEFI)

The steps

- Check some tutorials online
  - The tutorial used by Ensimag students (In French) is accessible here