

Technical introduction for European GNU Radio days

European GNU Radio days team

<https://gnuradio-fr-19.sciencesconf.org/>

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1 Programming environnement

The training takes place in a room of the ENSMM (Mechanics and MicroEngineering School) in Besançon, on computers on a virtual machine is installed. The virtual machine contains a Debian distribution with the useful packages to be able to handle GNU Radio with a Adalm Pluto SDR. We have not detailed here the installation of these packages which is described at <https://wiki.analog.com/grdayseu2019>.

You can try to do complete the lab sessions on your own computer, but the “create your block in GNU Radio” part will only work if you are on a GNU/Linux machine (Ubuntu or Debian distributions). You can most easily complete this part on the virtual machine.

To launch it you must first launch `virtualbox` (open a terminal and type `virtualbox`). Then select the machine `debian` for `gnuradio tutorial` and start there (double click on it). This machine has the following characteristics:

- The login on this virtual machine is `user`, there is no password
- The user ‘`user`’ is `sudo`
- The ‘`root`’ password on the VM is `root`
- If the keyboard is not configured the way you want, the key combination to switch between French and English layout is: `Alt-Shift`.
- You may not be able to access the internet from the virtual machine, but you can set up a shared directory accessible in the virtual machine and on the host machine. (see Appendix A.2 for the configuration of a shared directory on the virtual machine)
- The Adalm Pluto is accessible from the VM through its TCP/IP address `192.168.2.1`: the guest operating system has access to this IP on the host operating system through the first network interface configure as a NAT (see Appendix A.2 for the correct configuration of the USB on the virtual machine)
- You should now be able to use the Pluto bloc in GRC. On windows platform, you will have to configure the Pluto sink or source bloc with the Pluto IP that should be `192.168.2.1` . On Linux, it should not be necessary because the Pluto is accesse by USB.

A Configuring the use of the virtual machine

A.1 USB configuration

To be able to use the USB port on the virtual machine from VirtualBox, to use the pluto or a USB stick.

- first install the Virtualbox Extension Pack package. The easiest way is to go to the <https://www.virtualbox.org/wiki/Downloads> page, check the version of your Virtualbox and go to the link titled VirtualBox older builds, click on the appropriate version and recover the corresponding Virtualbox Extension Pack.
- Next, the user running virtualbox on the host machine must be in the vboxusers group, so the following command must be executed on the host machine:

```
sudo addgroup $ USER vboxusers
```

And **reboot the host machine** once this command is executed (a logout / login should be enough).
- Finally one must check the use of USB is enabled on the virtual machine (→ USB configuration), possibly add a USB filter and modify it with lssusb information on the host machine.

A.2 Configuring the shared directory on the virtual machine

You can not copy and paste between the virtual machine and the host machine. However, you can have a shared directory between the virtual machine and the host machine.

- It must be set up in configuration → Shared Folder. We need to delete the shared folders that exist and that can block new shared folders. On the virtual machine, the directory will appear in `mnt/sf_thenameyougave`.
- It is necessary that the user on the virtual machine is in the group vboxsf, thus to execute, in the virtual machine, the command: `sudo addgroup $USER vboxsf`