VirtualBox setup and configuration

Installing and running VirtualBox

If you are using a lab's PC, VirtualBox is already installed, so you can skip this section and go directly to the section 'Importing the custom Iso'.
If you are using your PC, please follow these instructions in order to install VirtualBox.

Linux

For debian-based systems VirtualBox is already available in the package manager.
You can install it by running in the terminal window:

```
apt-get update
apt-get install virtualbox
```

In case the apt package manager cannot locate the virtualbox package, run the following commands to add the official Oracle repository, then try again.

```
deb [arch=amd64] https://download.virtualbox.org/virtualbox/debian
xenial contrib

wget -q https://www.virtualbox.org/download/oracle_vbox_2016.asc -O- | sudo
apt-key add –

wget -q https://www.virtualbox.org/download/oracle_vbox.asc -O- | sudo apt-
key add -
```

Please make sure once it is installed to enable the VB-specific kernel modules by executing:

```
sudo modprobe vboxdrv
sudo modprobe vboxnetflt
```

After the installation you can open VirtualBox by typing `virtualbox` in the terminal window.

For non-debian based systems please refer to
https://www.virtualbox.org/wiki/Linux_Downloads

Mac OS

You can download the installation package from
https://download.virtualbox.org/virtualbox/6.1.30/VirtualBox-6.1.30-148432-OSX.dmg
Follow the installation process with the default choices. Once finished VirtualBox will open automatically.

Windows

You can download the executable installer from
https://download.virtualbox.org/virtualbox/6.1.30/VirtualBox-6.1.30-148432-Win.exe
Follow the installation process with the default choices. Once finished VirtualBox will open automatically.

Importing the custom Iso

If you are using a lab's PC, the iso file has been already downloaded and it's available in the directory 'C:\\Computer Network'
If you are using your PC, you can download from
https://www.dropbox.com/t/VfXRSz9JDJwqxSrS the iso file (lab-p4.iso).
Once VirtualBox is started you must create a new virtual machine.
1. Click on "New" inside the main page
2. In the newly opened window select the following parameters and click on "Next"
   a. Name: "SDN Lab"
   b. Type: "Linux"
   c. Version: "Ubuntu (64-bit)" or "Debian (64-bit)"
3. In the following window allocate at least 2048MB of RAM and click on "Next"
4. In the following window select "Do not add a virtual hard disk" and click on "Create".

If everything has been done correctly a new virtual machine will be visible on the main page of VirtualBox.
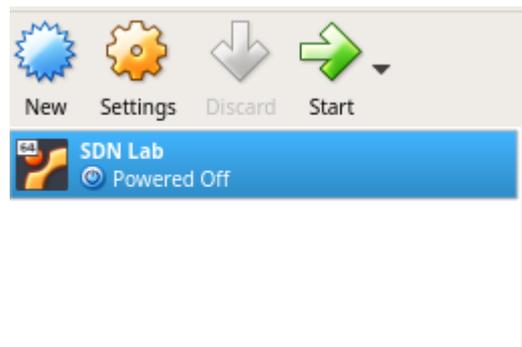

Click on "Start" to turn on the virtual machine. You will be prompted with a new window.
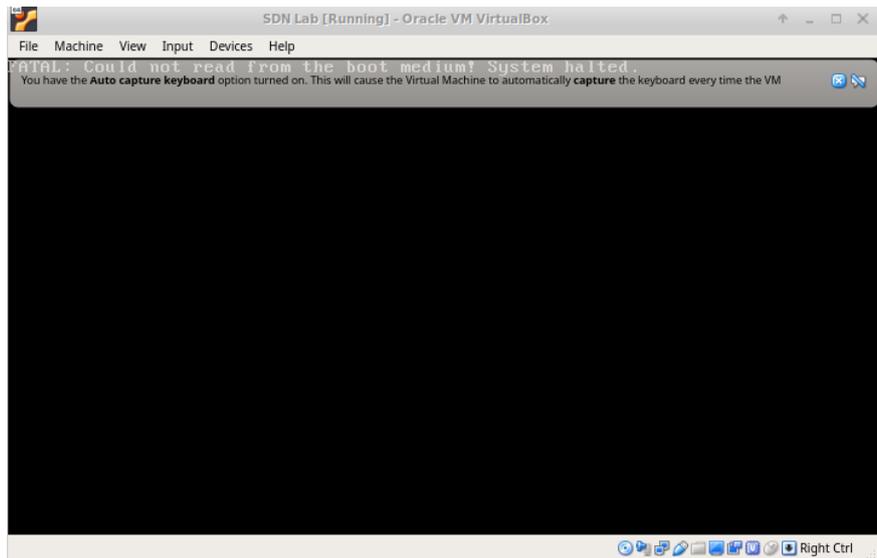
On top of the new window select "Devices->Optical Drives->Choose/create a disk image". A new window will open prompting you to select the iso file. Locate the lab-p4.iso file downloaded before and double click it. Once done select "Machine->Reset".

If everything has been done correctly, after a while you will be presented with the following window
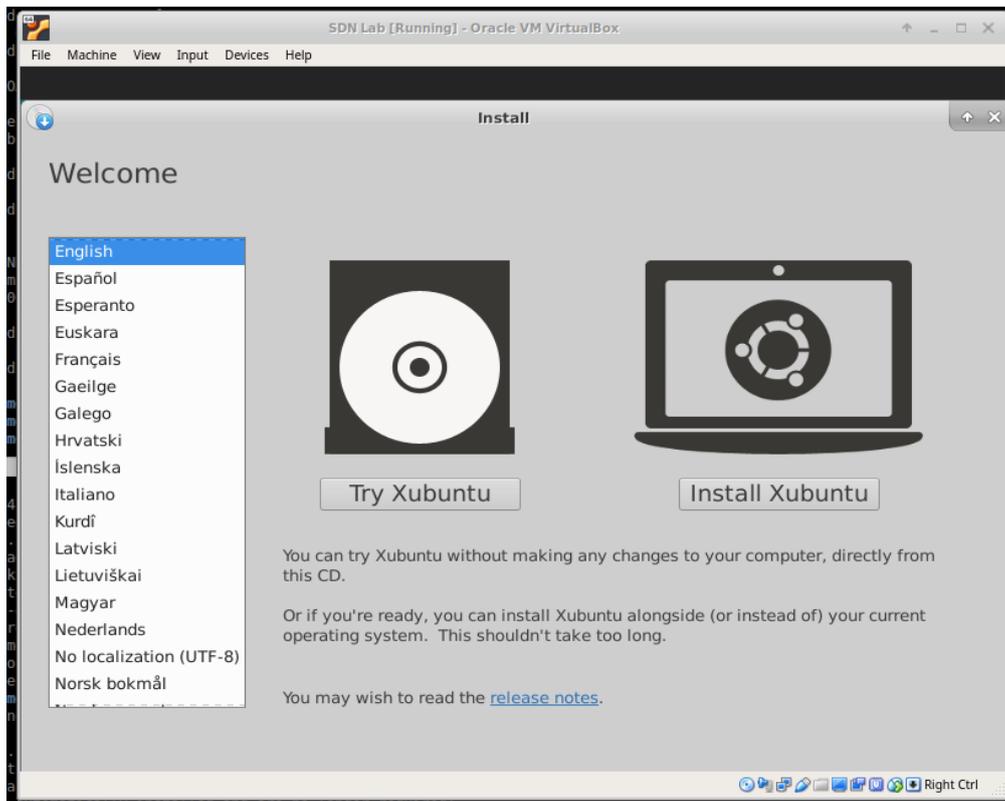
Click on "Try Xubuntu" and wait for the system to load. Once loaded use the password **studente** to login.

Open a new terminal window
- either right click with the mouse on the window and select Open Terninal Here
- or select the symbol at the top left of the window and select Terminal Emulator.

Optional: If you are using a non-us keyboard and you want to change the keyboard layout type on the terminal

```
setxkbmap <language_code>
```

where `<language_code>` is your desired keyboard layout (e.g., for Italian layout type `setxkbmap it`)
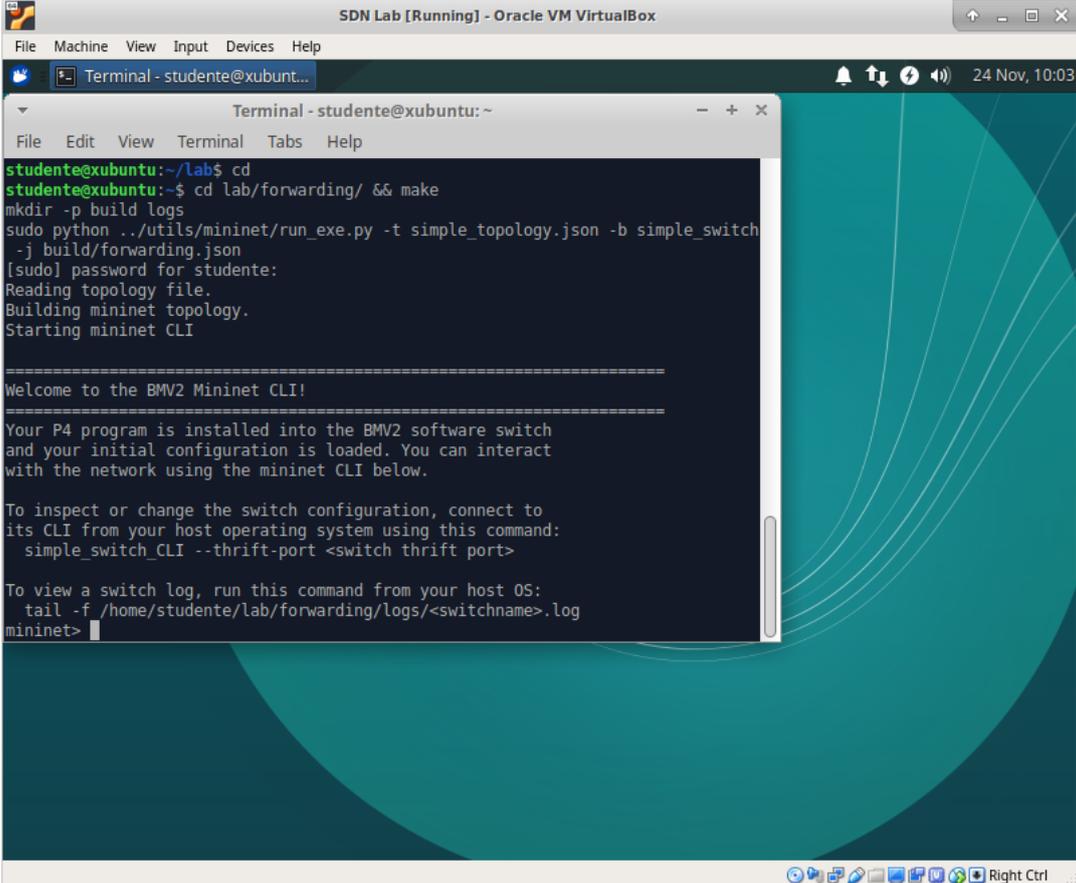
Test the installation

To test if the system is functioning correctly, type the following commands

```
cd /home/studente/lab/forwarding
sudo make
```

followed by the password **studente**.

You should see the Mininet CLI as depicted in the picture below.

Optional: the performance of the virtual machine highly depends on the CPU of your physical machine. By default a single core of your CPU is allocated to the virtual machine. If you notice that the virtual machine is running slow follow the following procedure.

1. Shut down the virtual machine by closing the virtual machine window and selecting "Power off the machine".
2. In the main VirtualBox window right-click on the virtual machine and select "Settings"
3. On the left panel select "System" and navigate to the tab "Processor"
4. Set the number of desired cores for the virtual machine as shown below