POLITECNICO DI TORINO

Politecnico di Torino

Lab #3 on Traffic Scheduling

"Computer network design and control" module of
Communication and network systems

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Chapter 1

Laboratory #3

The aim of this lab is to experiment with the behavior of various scheduling algorithms using a network simulation library called ns.py, available from https://github.com/TL-System/ns.py. Unlike Mininet, which emulates real hardware, ns.py simulates the essential components for the tests, including multiple flows and schedulers.

The lab's primary goal is to familiarize students with the use of network simulation tools, focusing on the performance and behavior of scheduling algorithms. The `ns.py` library automates the execution of predefined experiments, along with the collection and display of experiment results.

1.1 Starting the lab

To start the lab, follow the same procedure outlined in Lab 1 (also provided below for convenience).

For detailed instructions on using Crownlabs, please refer to the guide in Lab 1.

1. Navigate to the Crownlabs website: https://crownlabs.polito.it/
2. Click on the button "Login @Polito"
3. On the web page with the login form, click on the button "PoliTo SSO", which you can find at the bottom of the form
4. Log in using your PoliTo credentials (the same credentials you use to access the "Portale della didattica")
5. You will now be logged in to Crownlabs. Here, you will find yourself on the "Dashboard" tab, and on the UI, you should see the "Communication and Network Systems" workspace on the left of the user interface (UI)
6. Click on that workspace, and a new section will appear where you will find the VM called "Lab"
7. Click on the "Create" button, and a new instance of the VM will be created. Once the creation is complete, the "Connect" button will become active
8. When the "Connect" button is active, click on it, and a new web browser tab will open where you will be connected to the VM, and you will be able to see the VM desktop

Once you are connected to the VM, open a terminal and run the following command:

```
start-lab3
```

This will start a jupyter notebook and open the web browser on the associated link.

NOTE: it may take some time to start and open the web browser. So, once you run the above command, please be patient and wait for everything to be ready.

Once the browser page is ready, it will list the content of the `lab3/sdn_lab` directory. Click on the `schedulers.ipynb` jupyter notebook.

An interactive Python environment will open. The file `schedulers.ipynb` is a notebook containing text sections and Python code sections, that can be edited and run on-the-fly (e.g., similarly to a Matlab environment).

Before running the code, make sure to use the proper kernel, named sdn-lab-kernel. You can check which kernel is active below the Logout button on the top-right. To change kernel: `Kernel > Change kernel` and select sdn-lab-kernel.

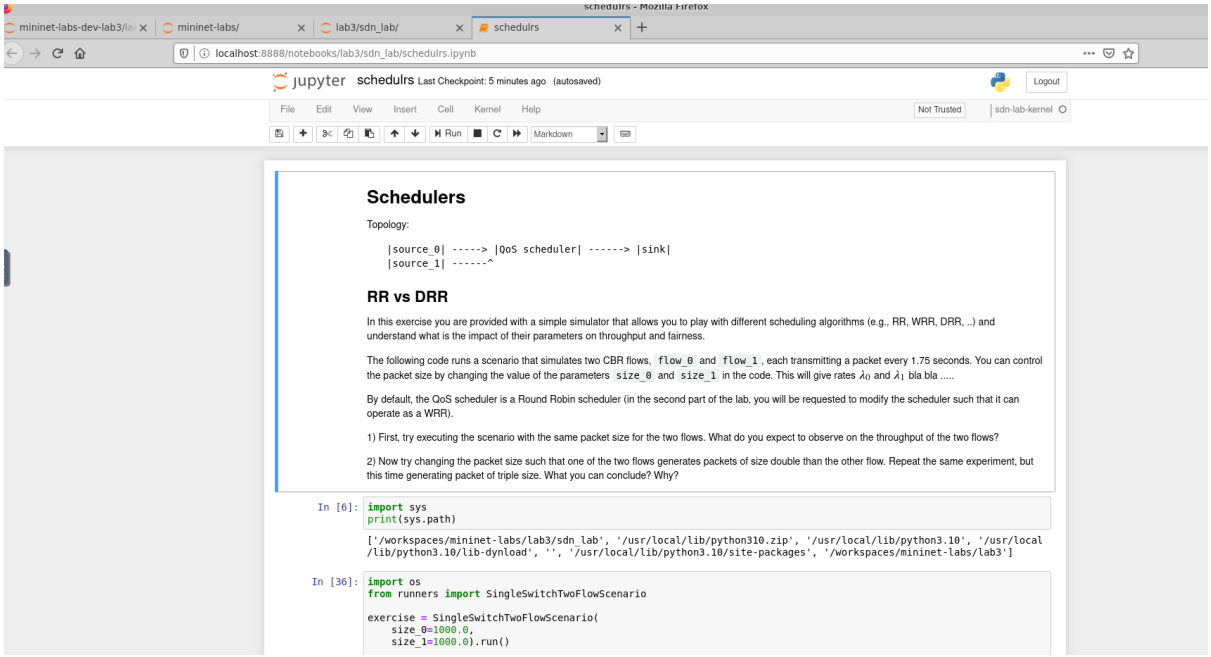

Figure 1.1: Jupyter notebook `schedulers.ipynb`

From this point on, please **follow the instruction you can find directly on the jupyter notebook**. It is designed to be self-explanatory, so all the information and steps you need to do can be found directly in the notebook.

1.2 Finishing the lab

Once you completed the assignment, remember to download your work.

To do so, follow these instructions:

1. From the Jupyter interface, click `File > Print Preview`. A pretty printed web page of the assignment will open.
2. Print the web page as a PDF via the browser.

3. Click `CTRL+P` and save the file on the VM disk.
4. Verify that the printed output appears as expected (you may optionally zoom out the page to a zoom level less than 100% from the printing settings)
5. Upload on an external storage the file. For this, we suggest you to store the file in the "MyDrive" directory you can find on the VM Desktop. That directory is connected to a persistent storage you can access from Crownlabs. For detailed instructions on how to do so, please refer to the guide in lab 1.