DATA7201 Practical session

In this session, we are going to learn how to connect to a Hadoop cluster and work out some basic HDFS commands. To work with Hadoop, we need to:

1. Get your zone id.
2. Connect to your zone.

1. Get your zone id:

To connect to a cluster node, we need to login into systems/computers that have access to it. These systems/computers are called *zones* (which is a virtual machine hosted in the private UQ cloud).

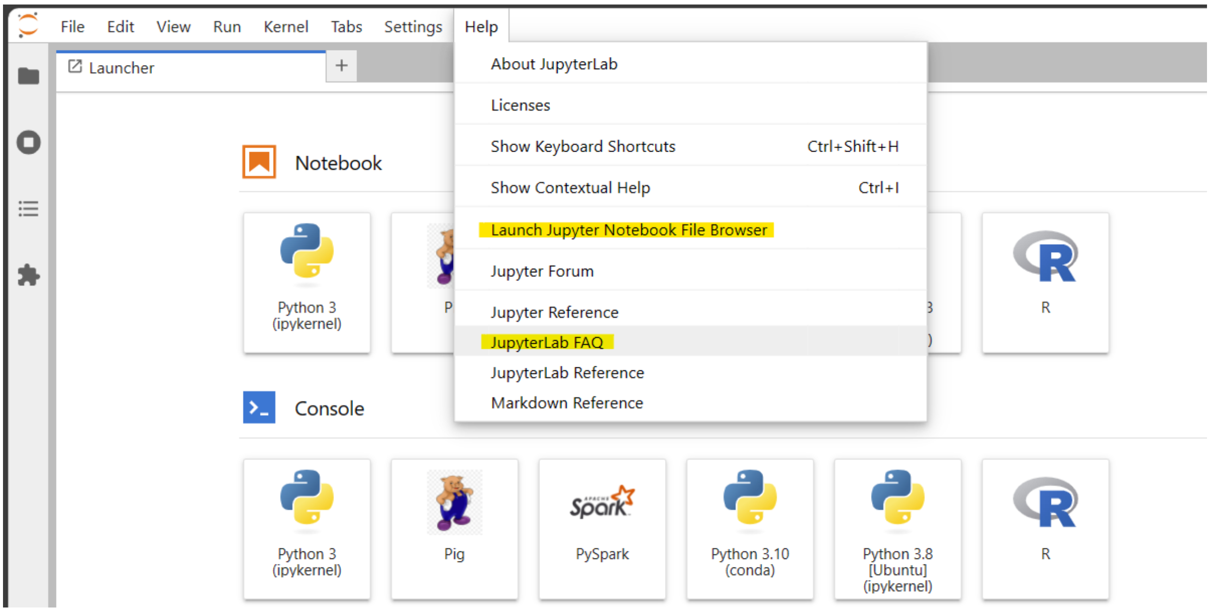
Each student in DATA7201 has his/her own zone to connect to. You will need to find your zone's hostname from the Zone Manager Page (https://coursemgr.uqcloud.net/data7201) The examples below demonstrate a zone id "7da3f7d2" and a student id of uqbrogas (this will be your s1234567 student id)

2. Connect to your zone:

Open Jupyter Lab by visiting https://data7201-yourzoneid.uqcloud.net/jupyter/lab with a web browser. Eg: https://data7201-7da3f7d2.uqcloud.net/jupyter/lab

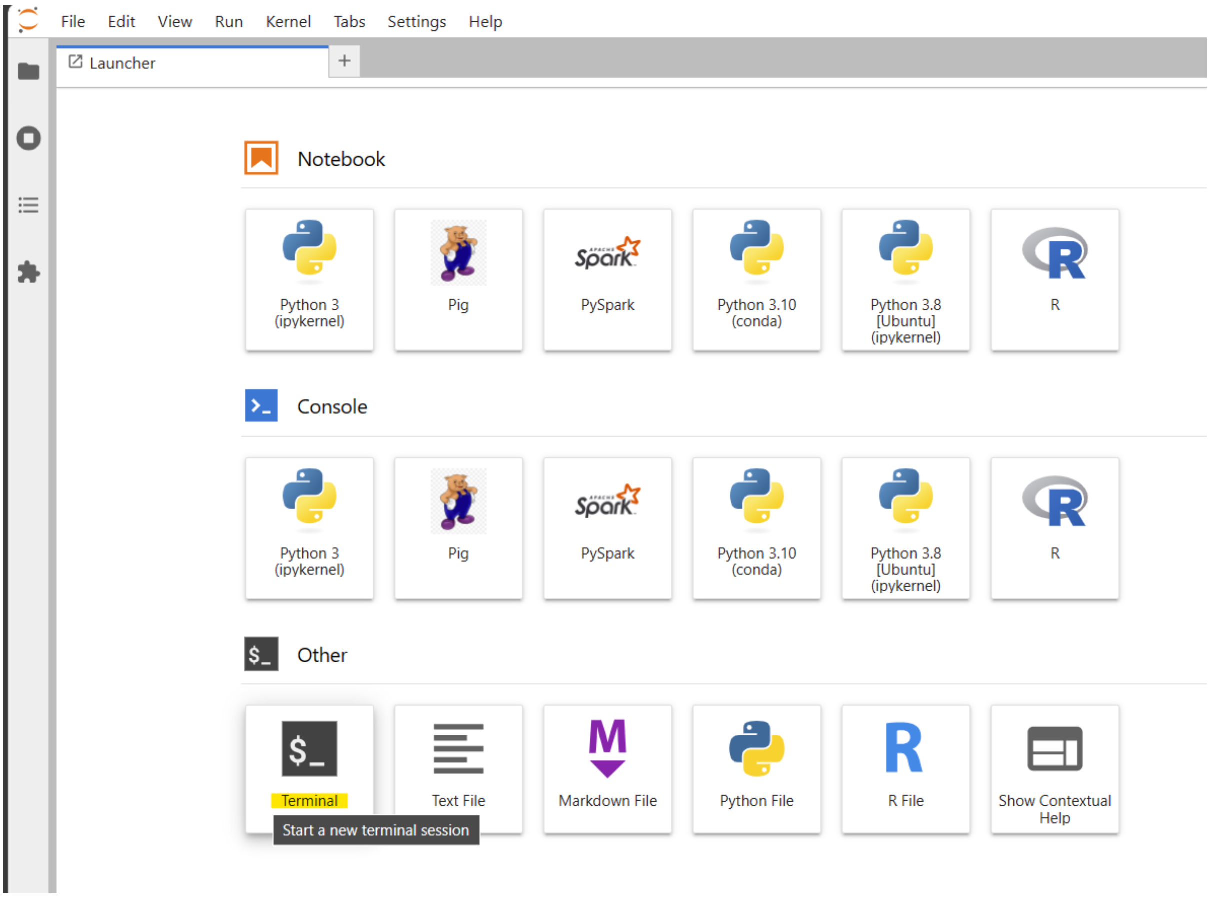
JupyterLab brings the classic notebooks, text editor, terminal, console, and file directory viewer all under one place. It provides a more flexible layout with a drag and drop interface.

If you are new to JupyterLab interface, you can refer to the user guide available under the Help tab -> 'JupyterLab FAQ' section. Or if you like to stick with the older classic Jupyter notebook interface, click on Help tab -> 'Launch Jupyter Notebook File Browser'. For the practical session, we will stick with the JupyterLab interface.



We will work from Terminal to interact with the cluster node.

Choose `Terminal’ from Launcher tab as shown below.



Interacting with the cluster via command line

Here are some basic commands you can use once logged in to the cluster node.

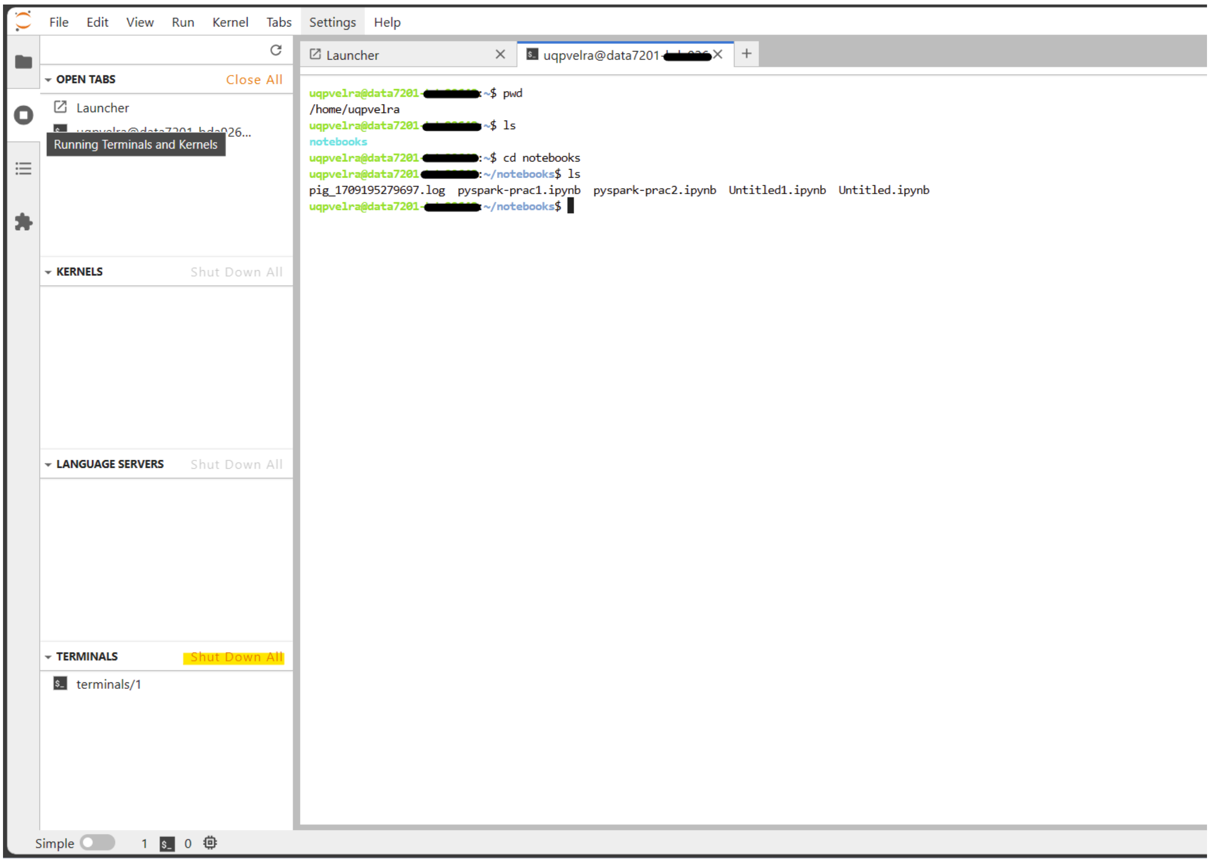
Basic Linux terminal commands

pwd - tells you about your current location in the local filesystem, e.g., /home/s1
mkdir - allows you to create a new directory, e.g., mkdir myfolder
cd – allows you to change your current location to another directory e.g., cd myfolder
ls – lists the content of the current folder.
cp – copies files from a place to another, e.g., cp /home/s1/filename /home/s1/myfolder/filename
mv – move files from one place to another, e.g., mv /home/s1/filename /home/s1/myfolder/filename.
unzip – decompresses zip files, e.g., unzip file.zip.
df –h – shows you the local disk usage.
wget – downloads data from a web URL, e.g., wget http://bbc.com /home/sxxxxxx
chmod – change access control to a file or a folder.
top – Shows monitor panel of the server’s resources.
wc -l <filename> - count lines in a txt file.

and much more. See, e.g.:
https://www.hostinger.com/tutorials/ssh/basic-ssh-commands
https://www.howtogeek.com/437958/how-to-use-the-chmod-command-on-linux/

More help: Each command has an attached manual explaining its usage and functionalities. It can be accessed by the command **man**, e.g., man ls.

Example screenshot is shown below. You can work on multiple terminals and Jupyter notebooks concurrently. If terminals or notebooks are not in use, shutdown it by accessing the collapsible Left side bar -> ‘Running Terminals and Kernels’.



```
uqpvelra@data7201-[redacted]:~$ pwd
/home/uqpvelra
uqpvelra@data7201-[redacted]:~$ ls
notebooks
uqpvelra@data7201-[redacted]:~$ cd notebooks
uqpvelra@data7201-[redacted]:~/notebooks$ ls
pig_1709195279697.log  pyspark-prac1.ipynb  pyspark-prac2.ipynb  Untitled1.ipynb  Untitled.ipynb
uqpvelra@data7201-[redacted]:~/notebooks$ 
```

1. Exercise

Download moby10b.txt (URL available on blackboard Week3/Practical session) in a new folder called “prac-1” under your home directory using wget.

- How many lines does moby10b.txt have?

```
mkdir prac-1
cd prac-1
wget https://www.gutenberg.org/files/2701/old/moby10b.txt
wc -l moby10b.txt
23244 lines
```

- What permissions does moby10b.txt have?

(-l — displays the details of the files, such as size, modified date and time, the owner, and the permissions).

```
ls -l
-rw-r--r-- 1 uqpvelra sysadmin 1256167 Jun 22  2000 moby10b.txt
```

2. Exercise

HDFS Access

Now that you have access to a cluster node, you can put some data onto HDFS (from data7201-xxxxxx). Type and execute “hdfs dfs” command.

- Which of the basic terminal commands are in hdfs dfs?

pwd: no
mkdir: yes
cd: no
ls: yes
cp: yes
mv: yes
unzip: no
df -h: no
wget: no
chmod: yes
top: no
wc -l: no

Also, a full list of available commands can be found here:

https://hadoop.apache.org/docs/r2.4.1/hadoop-project-dist/hadoop-common/FileSystemShell.html

3. Exercise

Create a new folder “prac-1” in HDFS and insert moby10b.txt from your own node. As a hint, you can check the following commands:

hdfs dfs –ls / shows the content of the root folder. This is equivalent to “ls /” on the local file system.
hdfs dfs –mkdir creates a directory in HDFS, e.g., hdfs dfs –mkdir /user/sxxxxxx/myfolder
hdfs dfs –put copies files from the local file system to HDFS, e.g., “hdfs dfs -put localfile /user/sxxxxxx/myfolder”
hdfs dfs –rm deletes files from HDFS.

Another hint, you have assigned a working folder in HDFS at “/user/sxxxxx”

- What permissions does moby10b.txt have?

```
hdfs dfs -mkdir prac-1
hdfs dfs -put moby10b.txt prac-1
hdfs dfs -ls prac-1
-rw-r--r--   1 uqpvelra hdfsadmingroup    1256167 2024-02-28 12:00 prac-1/moby10b.txt
```