2. Jupyter Lab environment construction tutorial

1. Introduction to JupyterLab

JupyterLab is an interactive development environment and the next generation product of Jupyter notebook. It integrates more functions, supports plug-in extensions, and can be run through the web page. It is simple, convenient and powerful. It is a very worthwhile code editing tool.

2. Switch to the root user

You need to use the root user to install jupyterlab, and the root user of the Ubuntu Mate 20.04 system has no password by default and cannot be switched, so you need to set a password for root before you can use the root account.

Note: The password set for root here must be remembered. It is best to keep it consistent with the user's password so that it will not be easily forgotten. Once forgotten, the consequences are serious.

1. Enter the following command to set a password for root, and then enter the same password twice to confirm.

sudo passwd

```
dofbot@Dofbot:~$ sudo passwd
New password:
Retype new password:
passwd: password updated successfully
dofbot@Dofbot:~$
```

2. Switch to root user

sudo su

```
dofbot@Dofbot:~$ sudo su
root@Dofbot:/home/dofbot#
```

From the above picture, you can see that you have switched to the root user. And the $ symbol before the edit command has been changed to the # symbol.

3. Install JupyterLab

1. Install ffi library

apt-get install libffi-dev

```
root@Dofbot:/home/dofbot# apt-get install libffi-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
libffi-dev is already the newest version (3.3-4).
```

2. Install jupyter

pip3 install -i https://pypi.tuna.tsinghua.edu.cn/simple jupyter

```
root@Dofbot:/home/dofbot# pip3 install -i https://pypi.tuna.tsinghua.edu.cn/simp
le jupyter
Looking in indexes: https://pypi.tuna.tsinghua.edu.cn/simple
Collecting jupyter
  Using cached https://pypi.tuna.tsinghua.edu.cn/packages/83/df/0f5dd132200728a8
6190397e1ea87cd76244e42d39ec5e88efd25b2abd7e/jupyter-1.0.0-py2.py3-none-any.whl
(2.7 kB)
Collecting ipywidgets
  Using cached https://pypi.tuna.tsinghua.edu.cn/packages/56/a0/dbcf5881bb2f51e8
db678211907f16ea0a182b232c591a6d6f276985ca95/ipywidgets-7.5.1-py2.py3-none-any.w
hl (121 kB)
Collecting jupyter-console
```

3. Install jupyter lab

pip3 install -i https://pypi.tuna.tsinghua.edu.cn/simple jupyterlab

```
root@Dofbot:/home/dofbot# pip3 install -i https://pypi.tuna.tsinghua.edu.cn/simp
le jupyterlab
Looking in indexes: https://pypi.tuna.tsinghua.edu.cn/simple
Collecting jupyterlab
  Downloading https://pypi.tuna.tsinghua.edu.cn/packages/31/7b/cd66f306c31a84a53
c6a3a86e296586e8664f407a6ac5b7cfe6a433aa8c4/jupyterlab-2.2.9-py3-none-any.whl (7
.9 MB)
     |                                | 256 kB 499 kB/s eta 0:00:16
```

4. After the installation is complete, switch back to the normal user

su dofbot

```
root@Dofbot:/home/dofbot# su dofbot
dofbot@Dofbot:~$
```

4. Configure JupyterLab

1. Generate a configuration file

jupyter notebook --generate-config

```
dofbot@Dofbot:~$ jupyter notebook --generate-config
Writing default config to: /home/dofbot/.jupyter/jupyter_notebook_config.py
dofbot@Dofbot:~$ ls ~/.jupyter/
jupyter_notebook_config.py
dofbot@Dofbot:~$
```

2. Use ipython to generate the login password for jupyterlab.

ipython

In In [1], enter: **from notebook.auth import passwd**

In In [2], enter: **passwd()**

Then enter the same password twice and press Enter to confirm. Note that the password here is used to log in to the jupyterlab interface. For easy memorization, it can be consistent with the user password.

Then the system will output the ciphertext of the password. Copy the entire ciphertext. The ciphertext generated for each password may be different. Please copy the actual output ciphertext.

Enter in In [3]: **exit()**

```
In [1]: from notebook.auth import passwd

In [2]: passwd()
Enter password:
Verify password:
Out[2]: 'argon2:$argon2id$v=19$m=10240,t=10,p=8$LGOUnIQ/uacA9Uay8ttsFg$0X5ESjL3H
pLKqDKQYpJMzg'

In [3]: exit()
dofbot@Dofbot:~$
```

3. Compile the jupyter configuration file

nano ~/.jupyter/jupyter_notebook_config.py

Go directly to the end and add the following content:

c.NotebookApp.ip = '0.0.0.0'

c.NotebookApp.open_browser = False

c.NotebookApp.password = Entire password ciphertext

c.NotebookApp.port = 8888

```
  GNU nano 4.8    /home/dofbot/.jupyter/jupyter_notebook_config.py
# TerminalManager(LoggingConfigurable) configuration
#------------------------------------------------------------------------
##

## Timeout (in seconds) in which a terminal has been inactive and ready to be
#  culled. Values of 0 or lower disable culling.
#  Default: 0
# c.TerminalManager.cull_inactive_timeout = 0

## The interval (in seconds) on which to check for terminals exceeding the
#  inactive timeout value.
#  Default: 300
# c.TerminalManager.cull_interval = 300

c.NotebookApp.ip = '0.0.0.0'
c.NotebookApp.open_browser = False
c.NotebookApp.password = 'argon2:$argon2id$v=19$m=10240,t=10,p=8$LGOUnIQ/uacA9U>
c.NotebookApp.port = 8888

                        [ Wrote 1258 lines ]
```

Finally save and exit.

5. Install jupyterlab plugin

1. Install nodejs and npm

sudo apt install nodejs npm

```
dofbot@Dofbot:~$ sudo apt install nodejs npm
正在读取软件包列表... 完成
正在分析软件包的依赖关系树
正在读取状态信息... 完成
下列软件包是自动安装的并且现在不需要了：
  apt-clone archdetect-deb cython3 dctrl-tools dpkg-repack fltk1.3-doc fluid
  fonts-lato gazeboll gazeboll-common gazeboll-plugin-base girl.2-json-1.0
  girl.2-nma-1.0 girl.2-timezonemap-1.0 girl.2-xkl-1.0 grub-common
  ignition-tools libarmadillo-dev libarpack2-dev libatk-bridge2.0-dev
  libatspi2.0-dev libavdevice-dev libavfilter-dev libblas-dev libcfitsio-dev
  libcfitsio-doc libcharls-dev libdap-dev libdapserver7v5
  libdart-collision-bullet-dev libdart-collision-ode-dev libdart-dev
  libdart-external-ikfast-dev libdart-external-odelcpsolver-dev
  libdart-utils-dev libdart-utils-urdf-dev libdart6 libdart6-collision-bullet
```

2. Install jupyter widget extension plugin. Since it needs to be downloaded and compiled, it takes a long time to run and may fail. If an error occurs, re-run the installation.

sudo jupyter labextension install @jupyter-widgets/jupyterlab-manager

```
dofbot@Dofbot:~$ sudo jupyter labextension install @jupyter-widgets/jupyterlab-m
anager
[sudo] dofbot 的密码：
Building jupyterlab assets (build:prod:minimize)
dofbot@Dofbot:~$
```

3. Install statusbar plugin

sudo jupyter labextension install @jupyterlab/statusbar

```
dofbot@Dofbot:~$ sudo jupyter labextension install @jupyterlab/statusbar
Building jupyterlab assets (build:prod:minimize)
dofbot@Dofbot:~$
```

4. At this point, jupyterlab has been installed.

6. Start jupyterlab

1. Enter the directory where you want to run the code. Here, we take a new test folder as an example.

mkdir test

cd test

```
dofbot@Dofbot:~$ mkdir test
dofbot@Dofbot:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  test  Videos
dofbot@Dofbot:~$ cd test
dofbot@Dofbot:~/test$
```

2. Open jupyterlab

jupyter lab

```
dofbot@Dofbot:~/test$ jupyter lab
[I 16:19:05.401 LabApp] Writing notebook server cookie secret to /home/dofbot/.l
ocal/share/jupyter/runtime/notebook_cookie_secret
[I 16:19:06.045 LabApp] JupyterLab extension loaded from /usr/local/lib/python3.
8/dist-packages/jupyterlab
[I 16:19:06.045 LabApp] JupyterLab application directory is /usr/local/share/jup
yter/lab
[I 16:19:06.052 LabApp] Serving notebooks from local directory: /home/dofbot/tes
t
[I 16:19:06.052 LabApp] Jupyter Notebook 6.1.4 is running at:
[I 16:19:06.052 LabApp] http://Dofbot:8888/
[I 16:19:06.052 LabApp] Use Control-C to stop this server and shut down all kern
els (twice to skip confirmation).
```

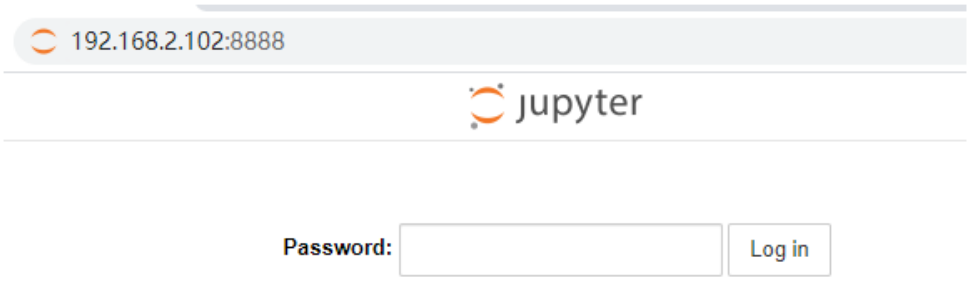
This port number is the port number we need to access. By default, it is the port number indicated by c.NotebookApp.port in the jupyter configuration file in the previous step. If you open a jupyterlab service, the port number will automatically increase by 1, so that different jupyterlab services can be distinguished.

7. Remote access to jupyterlab

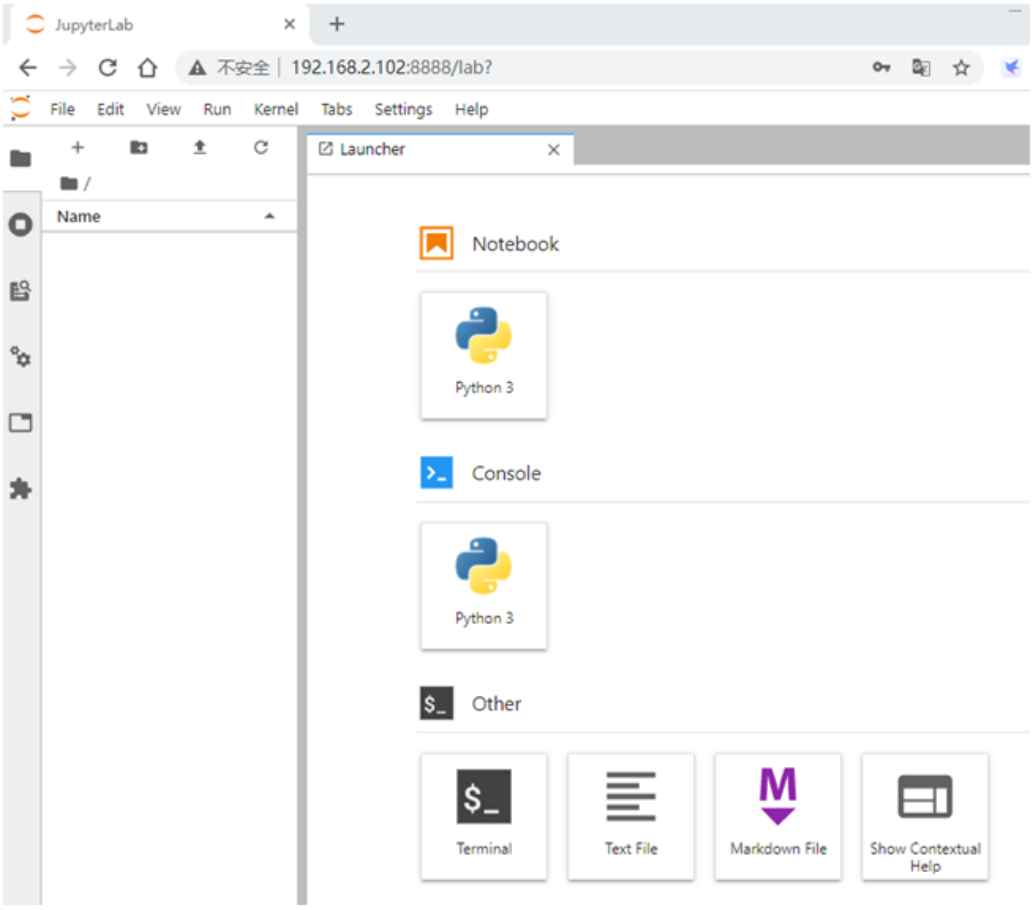
1. Open the browser on the computer (Chrome or Firefox is recommended), and then enter the motherboard IP: port number. Here, take IP 192.168.2.102 and port 8888 as an example.

http://192.168.2.102:8888/

The jupyterlab interface will pop up and ask you to enter the password. Just fill in the jupyterlab login password set above.



2. If you see the following interface, it means that the remote login to jupyterlab is successful. You can create a new Python3 program to run.



8. Exit jupyterlab

Press Ctrl+C twice on the terminal where jupyterlab was just opened to exit jupyterlab.