Jupyter Lab environment construction

Jupyter Lab is a web-based interactive development environment that supports multiple programming languages. It provides a flexible workspace for data cleaning, visualization, machine learning modeling and other data science tasks.

Note: The factory image has already installed this environment, so there is no need to install it again. Just learn how to build it

1. Install Jupyter Lab

- Check the system python version

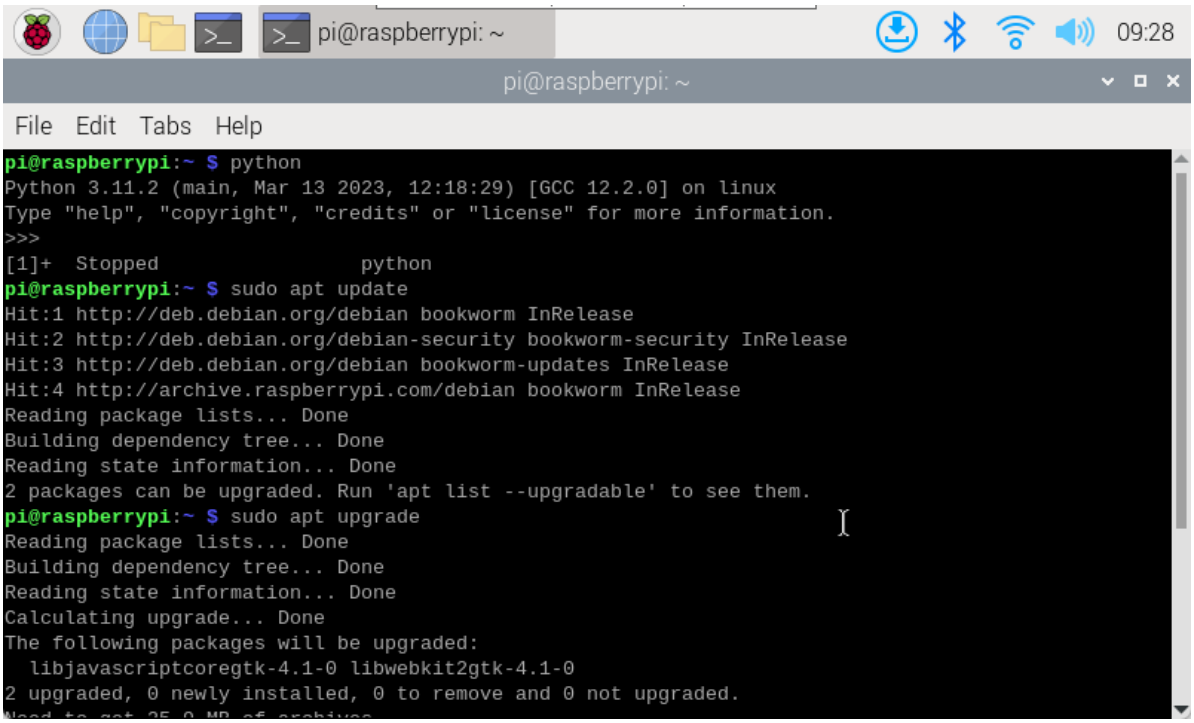
Enter the command in the terminal:

```
python
```

- Install Jupyter Lab

Update the repository list and software before installing the software:

```
sudo apt update
sudo apt upgrade
```



Install Jupyter Lab in the Python 3 environment and enter the command in the terminal:

```
sudo pip3 install jupyterlab
```

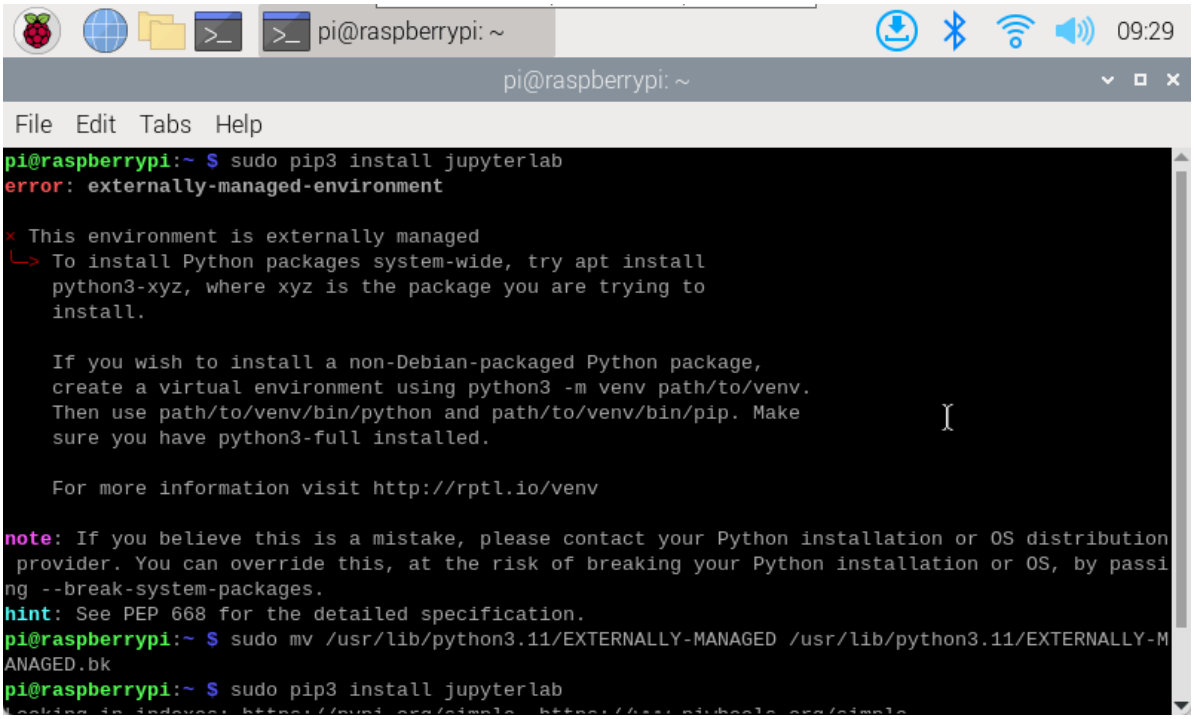
If multiple downloads fail, you can specify the Python package mirror address of Tsinghua University to speed up the domestic download speed:

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

- Error solution

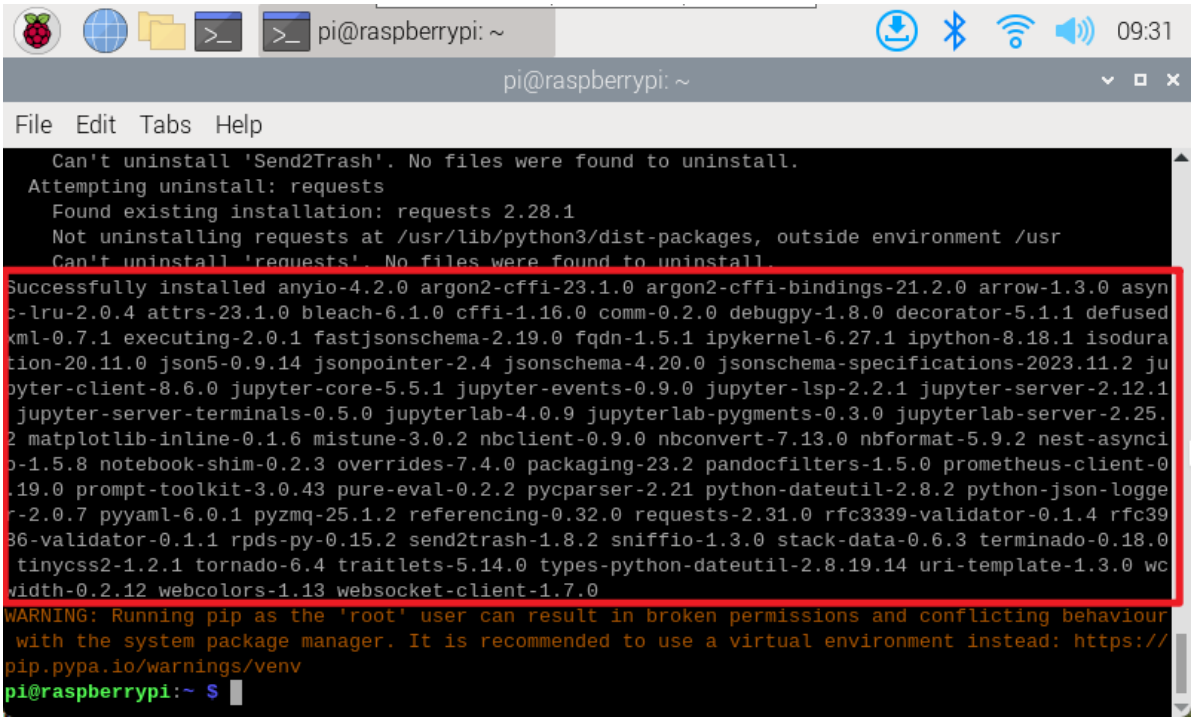
If you directly enter the Jupyter Lab installation command in the terminal, an error "error: externally-managed-environment" will appear. You can use the following command to solve it: The python version is modified according to the version of your system. My current system version is 3.11

```
sudo mv /usr/lib/python3.11/EXTERNALLY-MANAGED /usr/lib/python3.11/EXTERNALLY-MANAGED.bk
```



- Installation success prompt

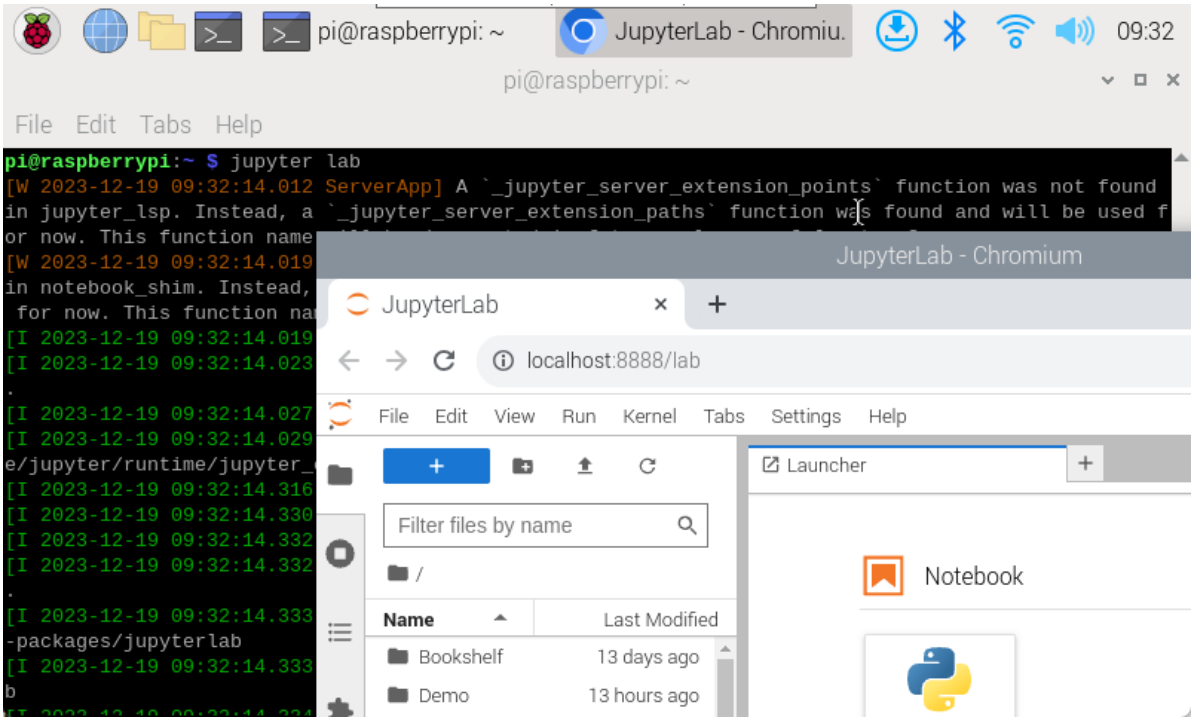
The following prompt indicates that the installation is successful.



2. Open Jupyter Lab

Input jupyter lab in the terminal. If a password is required, you can set the password according to the fourth step of the tutorial before using it!

```
jupyter lab
```



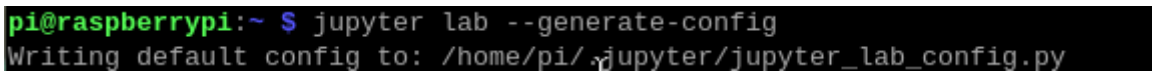

```
Before installing jupyter lab, select the system default browser, otherwise
jupyter lab will not be started directly from the browser;
Use the sudo command to install the jupyter lab command, and the warning message
that appears can be ignored.
```

3. Set up LAN access to jupyter lab

- Create a configuration file

The generated configuration file path is the path to modify the file later

```
jupyter lab --generate-config
```

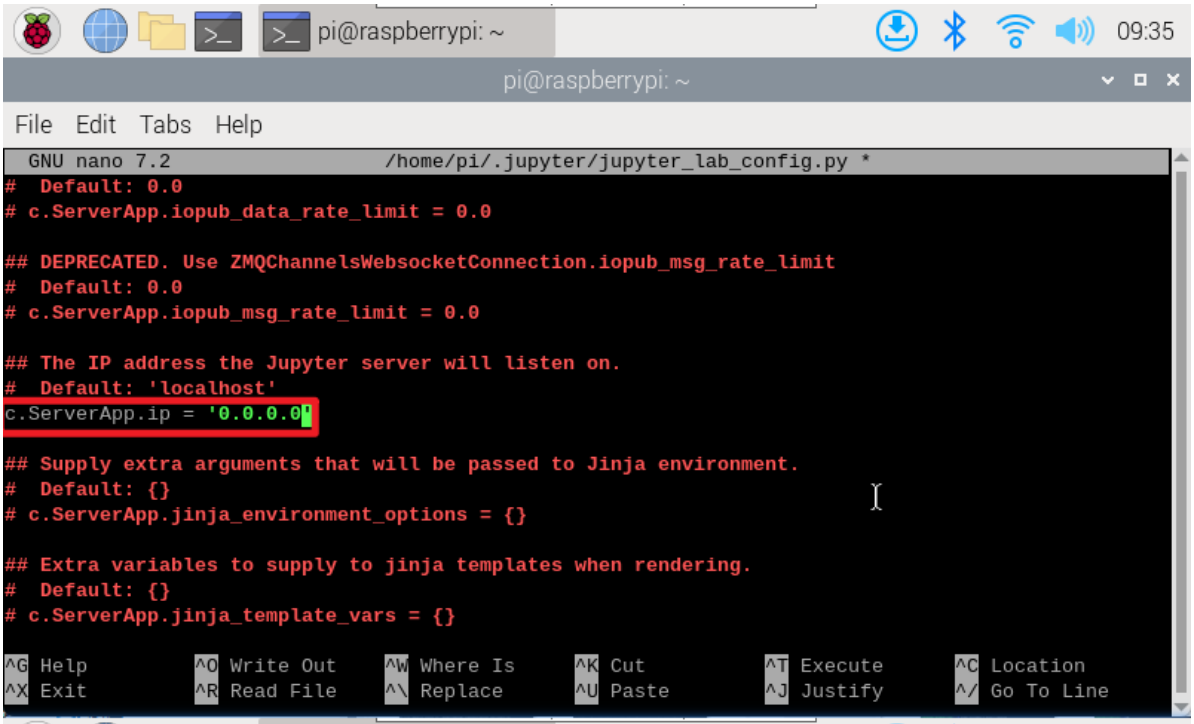


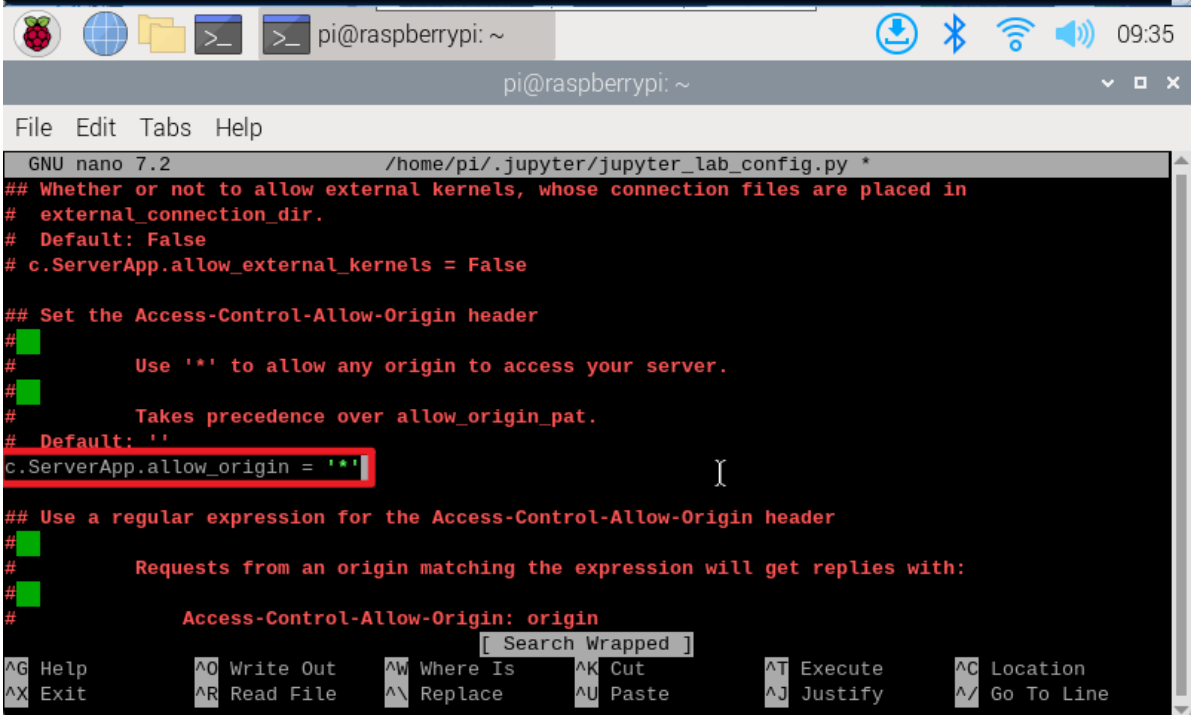
- Modify the configuration file

```
sudo nano /home/pi/.jupyter/jupyter_lab_config.py
```

```
Remove the comments from the file and modify it to the following: In the nano
editor, you can use the Ctrl+W shortcut key to search for keywords
c.ServerApp.allow_origin = '*'
c.ServerApp.ip = '0.0.0.0'
```

Press Ctrl+X, enter Y, and then press Enter to save and exit editing!





4. Set up access to jupyter lab

Enter the command to set the password in the terminal. You need to enter it twice. The input content will not be displayed after entering the password

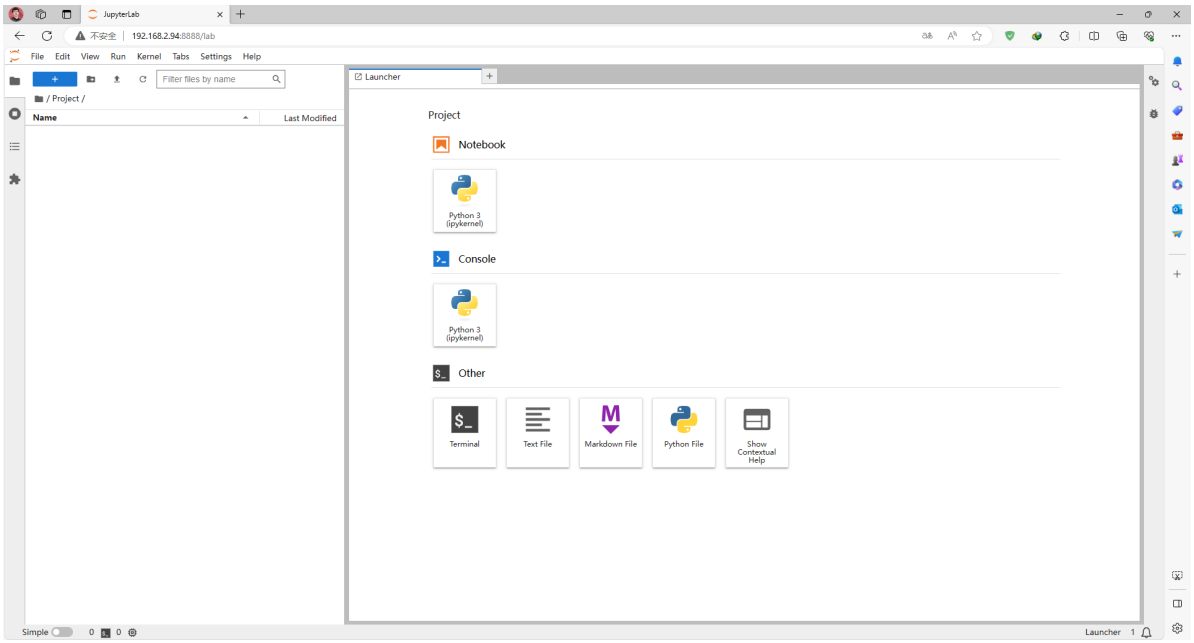
```
jupyter lab password
```

Restart the Raspberry Pi after setting the password!

- Verification

Devices in the same LAN can enter IP:8888 in the browser to access!

```
The password is the password set before: yahboom
```



5. Set Jupyter Lab to start automatically

After completing the above steps, you need to enter the command in the terminal each time you use Juypter Lab. For more convenient use, we can configure Jupyter Lab to start automatically.

- Configure startup items

Enter the following command in the terminal:

```
sudo nano /etc/systemd/system/jupyter.service
```

Add the following content to the file:

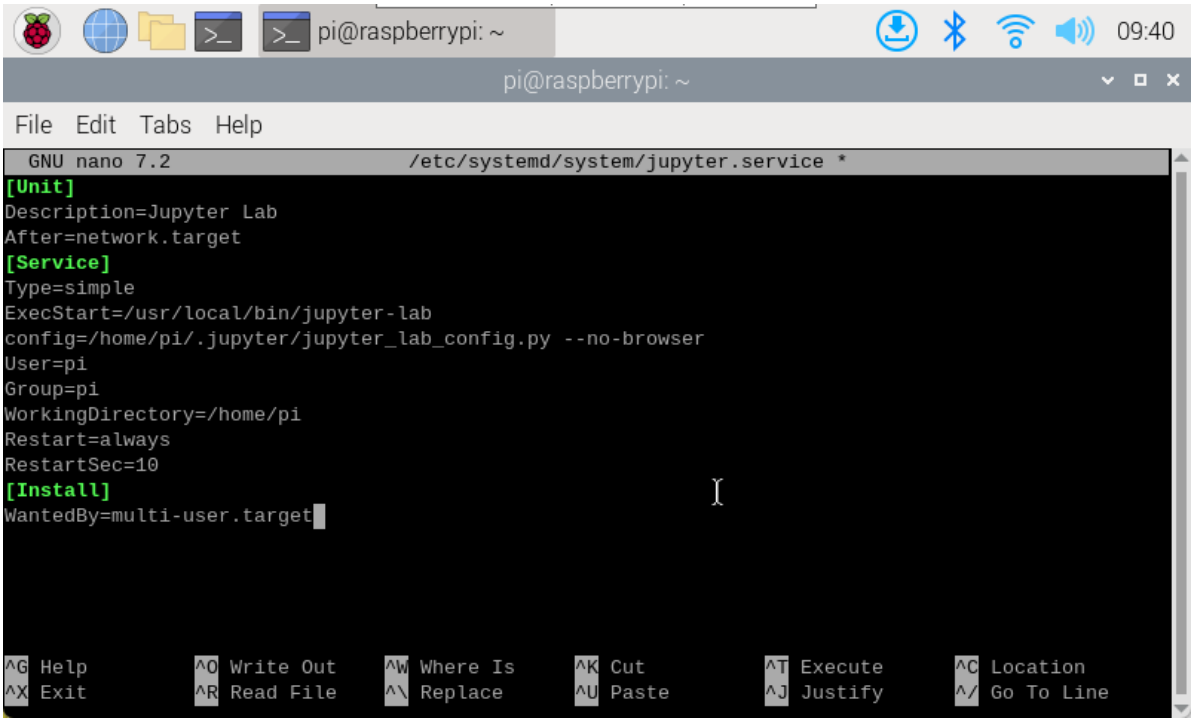
```
[Unit]
Description=Jupyter Lab
After=network.target
[Service]
Type=simple
ExecStart=/usr/local/bin/jupyter-lab
config=/home/pi/.jupyter/jupyter_lab_config.py --no-browser
User=pi
Group=pi
WorkingDirectory=/home/pi
Restart=always
RestartSec=10
[Install]
WantedBy=multi-user.target
```

pi: my current system user name

ExecStart: command to start Jupyter lab, change to JupyterLab installation path and configuration file path (if the steps are all in accordance with our operation, then enter the same path)

```
Check Jupyter-lab installation path: which jupyter-lab
The configuration file path refers to the path of the configuration file
generated above
```

WorkingDirectory: Jupyter-lab's working directory, which can be changed at your own discretion



- jupyter.service service

Enable automatic startup

```
sudo systemctl enable jupyter
```

Disable automatic startup

```
sudo systemctl disable jupyter
```

Start the service

```
sudo systemctl start jupyter
```

Stop the service

```
sudo systemctl stop jupyter
```

Check the service status

```
sudo systemctl status jupyter
```

Enter the command to enable the jupyter.service service to start automatically and restart the Raspberry Pi system.

```
pi@raspberrypi:~ $ sudo nano /etc/systemd/system/jupyter.service
pi@raspberrypi:~ $ sudo systemctl enable jupyter
Created symlink /etc/systemd/system/multi-user.target.wants/jupyter.service → /etc/systemd/system/
jupyter.service.
pi@raspberrypi:~ $ sudo systemctl start jupyter
```

After completing the above steps, you can access the LAN without entering jupyter lab in the terminal!