Raspberry Pi - Install Ubuntu

Official OS on Raspberry Pi is a Debian distro which is lightweight and more stable but slowly updated. Running Ubuntu on Raspberry Pi gives user a richer user experience and up-to-date software. Moreover, Ubuntu is the main OS that ROS natively supports.

#raspberry-pi #linux

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1. Ubuntu

Ubuntu Desktop comes with a rich desktop environment which consumes a bit high system resource and performance. Therefore, other lightweight version of Ubuntu will be chosen.

In December 2019, Canonical published a support roadmap for the latest Raspberry Pi 4 single-board computer on their Ubuntu Server operating system and pledged to fully support Ubuntu on all Raspberry Pi boards.

Ubuntu currently supports Raspberry Pi 2, Raspberry Pi 3, and Raspberry Pi 4 models, and images are available for the latest version of Ubuntu LTS (Long-Term Support) at https://ubuntu.com/download/raspberry-pi.

Old-releases archived images

Visit https://old-releases.ubuntu.com/releases/ see the list of prebuilt images for older versions.

2. Supported boards

Ubuntu supports :

- Raspberry Pi 2
- Raspberry Pi 3
- Raspberry Pi 4
- Raspberry Pi 400
- Raspberry Pi CM4

All boards have 2 version: `64-bit` and `32-bit`, except Raspberry Pi 2 which has only 32-bit version.

64-bit version

This version is built for 64-bit mode of the CPU used in Raspberry Pi boards. It has `arm4` tag in the image name.

32-bit version

This version is built for 32-bit mode of the CPU used in Raspberry Pi boards. It has `armhf` tag in the image name.

Choose an OS version

3. Flash image to mSD Card

Follow the instruction of using Etcher to flash the image.

Launch Etcher and select the image file and the target SD card. The process will take a few minutes, so be patient. When Etcher is done, follow the headless mode setup if needed as the installed Ubuntu version is for server.

Boot up

Login with the default user:

- Login: `ubuntu`
- Password: `ubuntu`

Right after the first time logging in, default password have to be changed.

4. Wifi setup

Starting from Ubuntu 18.04 LTS, Ubuntu uses Netplan to configure network interfaces by default. Netplan is a utility for configuring network interfaces on Linux. Netplan uses YAML files for

configuring network interfaces. YAML configuration file format is really simple. It has clear and easy to understand syntax.

Edit the Netplan YAML configuration file `/etc/netplan/50-cloud-init.yaml` with the following command:

```
sudo nano /etc/netplan/50-cloud-init.yaml
```

Add the WiFi access information. Make sure not to use tab for space, use the spaces to create the blank.

```
# This file is generated from information provided by
# the datasource.  Changes to it will not persist across an instance.
# To disable cloud-init's network configuration capabilities, write a file
# /etc/cloud/cloud.cfg.d/99-disable-network-config.cfg with the following:
# network: {config: disabled}
network:
    version: 2
    ethernets:
        eth0:
            optional: true
            dhcp4: true
    # add wifi setup information here ...
    wifis:
        wlan0:
            optional: true
            access-points:
                "YOUR-SSID-NAME":
                    password: "NETWORK-PASSWORD"
            dhcp4: true
```

Change the `SSID-NAME` and the `NETWORK-PASSWORD` with the Wifi AP information. Close and save the file using `Ctrl` + `X` and press yes.

Now, check whether there's any error in the configuration file with the following command:

```
sudo netplan --debug try
```

If any error encounters then check with this command for detailed error information:

```
sudo netplan --debug generate
```

Apply the configuration file with the following command:

```
sudo netplan --debug apply
```

4.1. Setup priority

By default, Ethernet has higher priority to route network packets through it.

Run:

```
route -n
```

will show the `metric` value for `eth0` is 100 and that value of `wlan0` is 600. Lower value has higher priority.

```
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         192.168.0.1     0.0.0.0         UG    100    0        0 eth0
0.0.0.0         192.168.1.1     0.0.0.0         UG    600    0        0 wlan0
192.168.0.0     0.0.0.0         255.255.255.0   U     0      0        0 eth0
192.168.0.1     0.0.0.0         255.255.255.255 UH    100    0        0 eth0
192.168.1.0     0.0.0.0         255.255.255.0   U     0      0        0 wlan0
192.168.1.1     0.0.0.0         255.255.255.255 UH    600    0        0 wlan0
```

To make Wifi has higher priority, add a config line in netplan configuration:

```
sudo nano /etc/netplan/50-cloud-init.yaml
```

```
wifis:
wlan0:
  access-points:
    "SSID":
      password: "pasword"
  dhcp4: true
  dhcp4-overrides:
    route-metric: 50
  optional: true
```

Then regenerate network configs and apply them:

```
sudo netplan --debug generate && \
sudo netplan --debug apply
```

Run again:

```
route -n
```

to see the `metric` for `wlan0` is now set to 50:

```
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         192.168.1.1     0.0.0.0         UG    50     0        0 wlan0
0.0.0.0         192.168.0.1     0.0.0.0         UG    100    0        0 eth0
192.168.0.0     0.0.0.0         255.255.255.0   U     0      0        0 eth0
192.168.0.1     0.0.0.0         255.255.255.255 UH    100    0        0 eth0
192.168.1.0     0.0.0.0         255.255.255.0   U     0      0        0 wlan0
192.168.1.1     0.0.0.0         255.255.255.255 UH    50     0        0 wlan0
```

Netplan configuration

Refer to https://netplan.io/reference/

5. Install Desktop Environment

The installed Ubuntu version is for server which is designed to use minimal resources. To install a very lightweight desktop environment run bellow command:

```
To install a very lightweight desktop environment run bellow command
```

or

```
sudo apt-get install lubuntu-desktop
```

Lubuntu vs Xubuntu

If you are looking for the most lightweight, Lubuntu is the choice to go. It uses the least system resources and comes with the fewest installed applications, unlike Xubuntu which packs some punch in polish and features meaning a lot more resource use. Xubuntu is relatively lightweight, as in, it's lighter than Ubuntu and Kubuntu but Lubuntu is actually lightweight.

Ubuntu Mate

This is an alternative Ubuntu version using MATE desktop environment. The latest version is available at https://ubuntu-mate.org/download/, while old releases are listed in https://releases.ubuntu-mate.org/archived.