

4. Connect the Raspberry Pi to the Internet

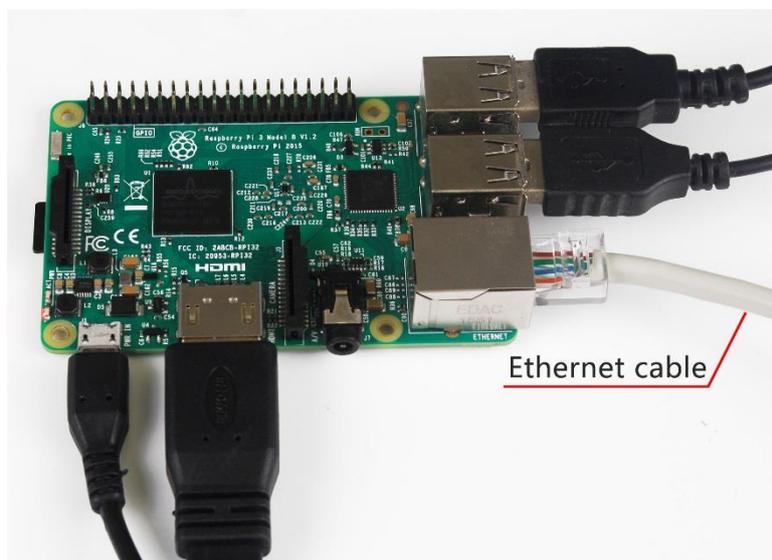
Sometimes you may wonder: is my Raspberry Pi power on? It's easy to tell with a screen since you can see the interface directly. However, how to check its status and how to handle it after booting without a screen may be an issue. But don't worry! We'll take a look at these problems. Let's see how to connect the Raspberry Pi to the network first.

4.1 The Ethernet

The easiest way for networking is to connect to the Ethernet with a network cable. You can insert one terminal of the cable into the Raspberry Pi and the other to the router in your house. You'd better prepare a router, especially if you do not have a screen.

With a screen:

After inserting the network cable, you will see the network icon showing signals at the top right corner. You can open a web browser to try surfing the Internet. Welcome to the Net!

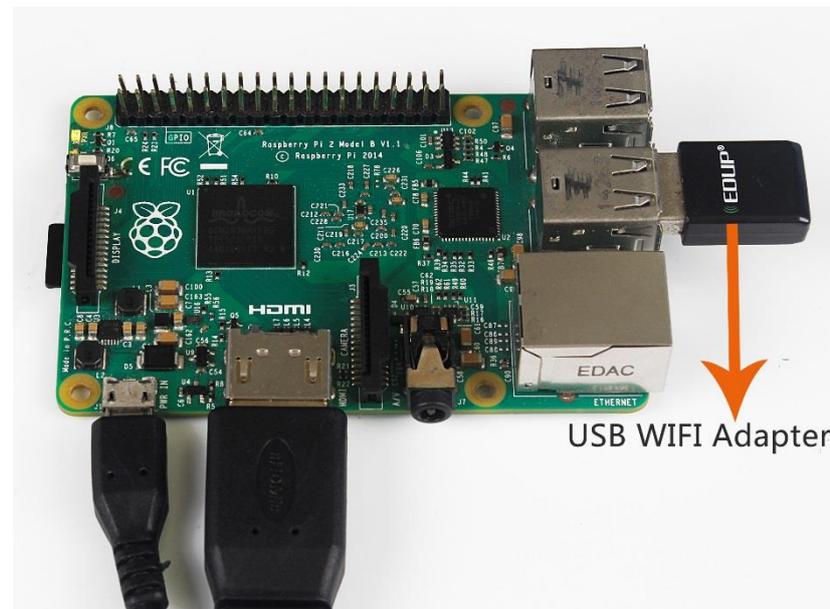


Without a screen:

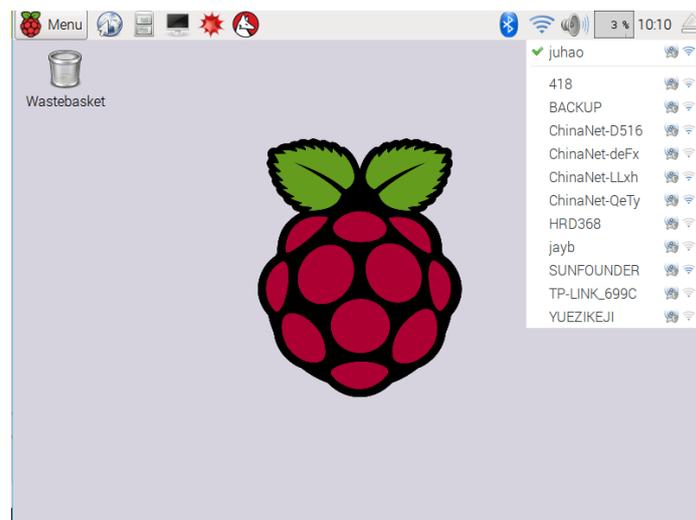
If you can't be sure whether your Raspberry Pi has been booted or not, you can log in and go to the setting interface of your router if you have one, The setting interface of each router is different; please consult the supplier for details. You will see the connection of a device named Raspberry Pi and its IP address. We will check how to remotely log into the Raspberry Pi in the lessons later.

4.2 Wi-Fi

The built-in Wi-Fi is available of the Raspberry Pi 3 model B. Have a try! Or, if you are using other models, you can check the Wi-Fi adapter supported by the Raspbian here: http://elinux.org/RPi_VerifiedPeripherals#USB_Wi-Fi_Adapters. Please choose from the list in case some cannot be recognized by the Raspberry Pi. Then insert the Wi-Fi adapter into the USB port.



It's simple for the users with a screen display at hand. After booting the Raspberry Pi, find the connection icon at the top right corner where the Wi-Fi has been configured.

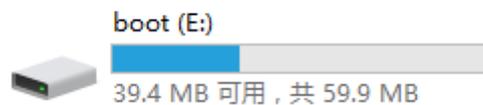


If you do not have a screen, you can modify the Wi-Fi configuration file `wpa-supPLICANT.conf` of the SD card.

As for the file system of Raspbian, the SD card will be divided into two partitions after the Raspbian is burnt. One is the `/boot/` directory with the files in FAT32 format, and the other is the root directory of `/` with ext4 files. It means, if you insert the SD

card into a PC running on Linux, you will see all the files on both partitions and be able to modify them. But if it runs on Windows, you can only check and modify the files under `/boot/`.

The file `wpa-supplciant.conf` is in the `/etc/wpa-supplciant/`, namely, under the `/` directory. If your PC runs on Linux, you can modify this file directly. But if it runs on Windows, you won't be able to do so.



Luckily, the latest Raspbian Jessie has offered a solution for this problem (screenshot from the raspberrypi.org website):

• If a `wpa_supplicant.conf` file is placed into the `/boot/` directory, this will be moved to the `/etc/wpa_supplicant/` directory the next time the system is booted, overwriting the network settings; this allows a Wifi configuration to be preloaded onto a card from a Windows or other machine that can only see the boot partition.

Namely, for Windows users, you only need to add the file `wpa_supplicant.conf` to `/boot/` (a 60M folder that can be recognized by Windows), and it will be moved to `/etc/wpa_supplicant/` automatically the next time the system is booted and cover the previous file. So Windows users now can also configure the Wi-Fi by modifying this file.

Here is the content of the configuration file:

```
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
country=GB

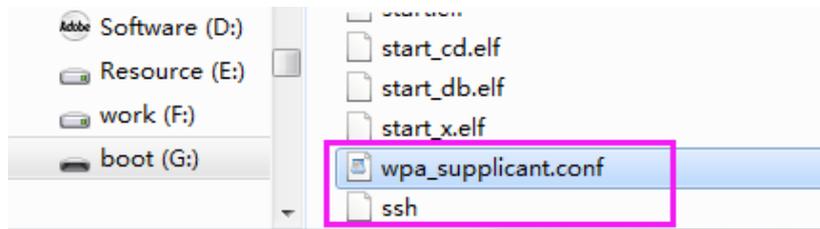
network={
    ssid="juhao"
    psk="sunfounder"
    key_mgmt=WPA-PSK
}
```

`ssid= "(name of the Wi-Fi)"`
`psk= "(your Wi-Fi password)"`

When both `ssid` and `psk` are correct, the Raspberry Pi can connect to this network the next time the system is booted.

Notes:

1. For the 2016-11-25 release or above, SSH (a protocol securing remote login session and other network service) is Disabled by default. Therefore, when you need to log in remotely, you need to create a file named "ssh" under /boot/ to enable it.



2. If you've used NOOBS to install the system, you can set the Wi-Fi by modifying the wpa-supplciant.conf file. But you may not manage it by connecting the SD card to the computer; instead, you need to log into the Raspberry Pi to modify the file there.

IP Address of the Raspberry Pi

There are two situations for acquiring the IP address of a Raspberry Pi.

Scenario A: The Raspberry Pi has been connected with an HDMI display.

Hover the cursor on the Wi-Fi icon at the top right corner on the desktop and you will see the connection status of the Wi-Fi including the information about the IP address a few seconds later.

Scenario B: Without an HDMI display

Method a: Checking via the router

If you have the privilege to log into the router (like of the home network), you can check the IP address that the router has distributed to the Raspberry Pi in the management interface of the router.

The default hostname of the Raspbian system is [raspberrypi](#), so just find it out.

(If you are using the ArchLinuxARM system, go to find alarmpi. If the hostname has been changed before, find whatever you've changed to.)

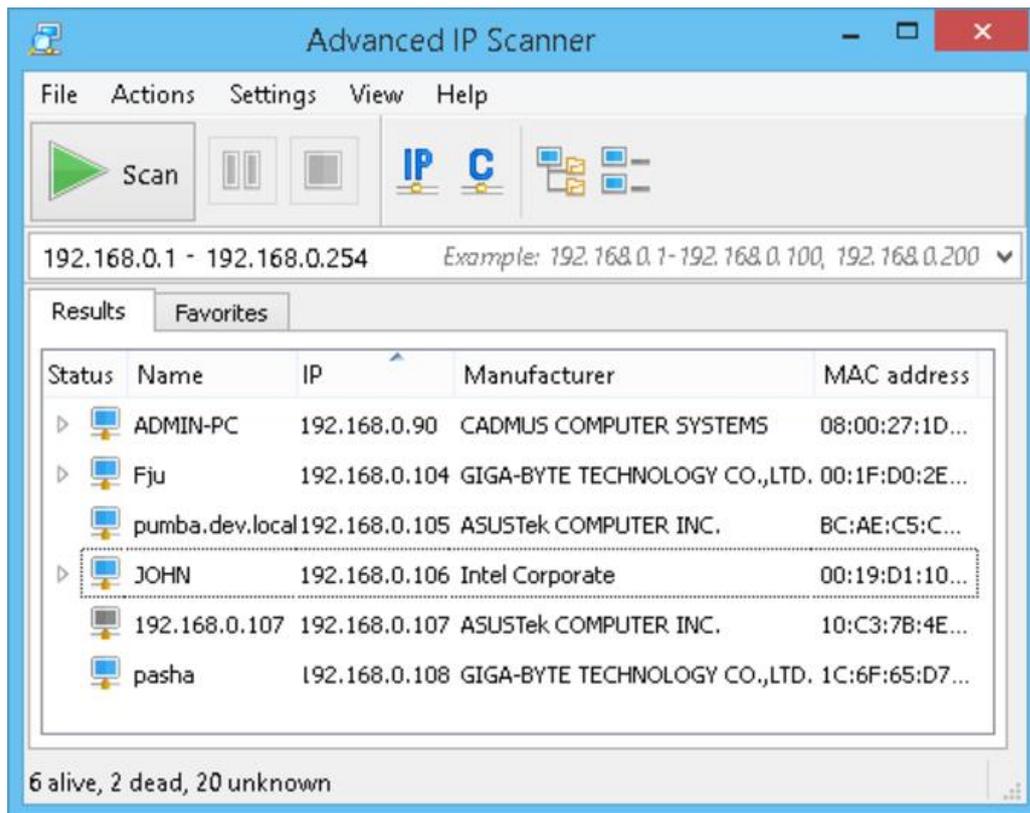
If you cannot log into the router and have no display, you can try the following method.

Method b: Network Segment Scanning

There are many network scanners available, and here we recommend the [Advanced IP scanner](#).

This software will detect the network segment of the computer and decide the scan range automatically. For example, when the IP is 192.168.1.101 of the computer, its scan range is 192.168.1.*

Click **Start** to start the scanning and you will see a computer list within the same network segment.



One advantage of this software is that it can find out the manufacturer of the network devices.

The device whose manufacturer is [Raspberry Pi Foundation](#) is the Raspberry Pi. And the IP address is helpful when you log into the Raspberry Pi remotely later.

For Windows Users

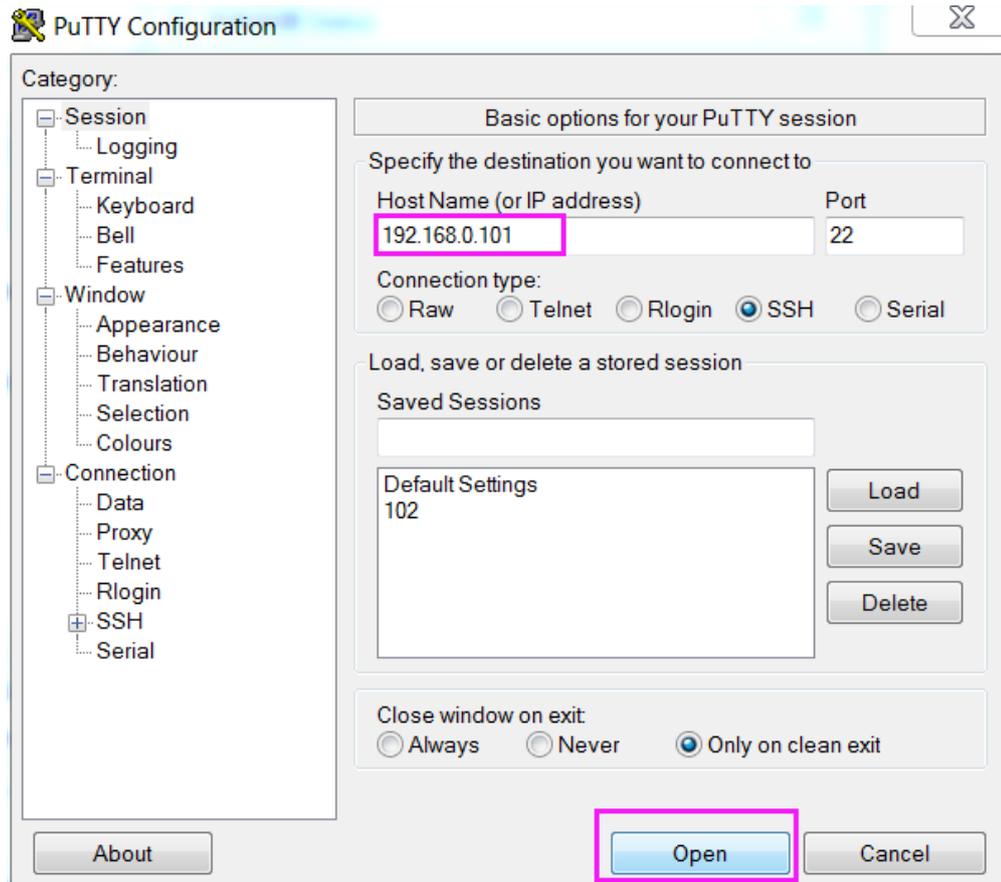
If your computer runs on Windows, you need to pen the Bash shell with the help of some software. Here we recommend a tool PuTTY.

NOTE :

2016-11-25:

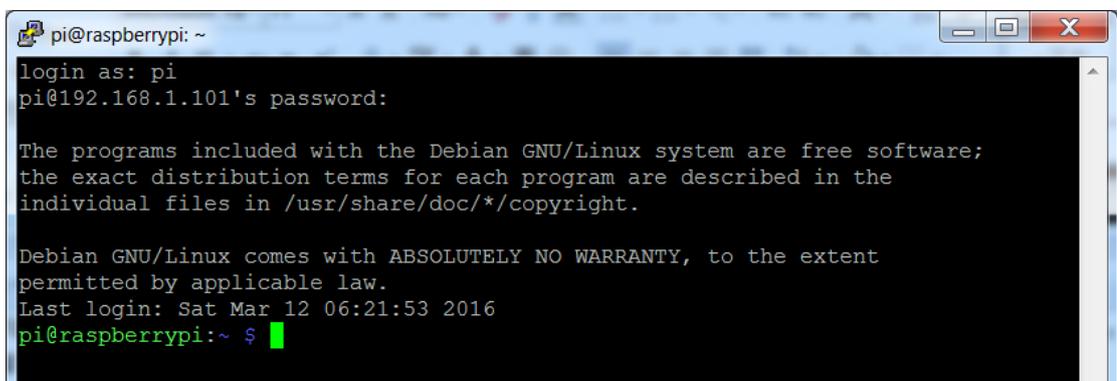
* SSH disabled by default; can be enabled by creating a file with name "ssh" in boot partition

1. Download PuTTY
2. Open PuTTY and click **Session** on the left tree-like structure (generally it's collapsed upon PuTTY startup). Enter the IP address of the RPi you just got in the textbox under Host Name (or IP address) and 22 under Port (by default it is 22)



3. Click **Open**. Note that when you first log in to the Raspberry Pi with the IP address, you'll be prompted with a security reminder. Just click **Yes**. When the PuTTY window prompts login as: type in the user name of the RPi: pi, and password: raspberry (the default one, if you haven't changed it).

Pay attention: when you're typing the password in, the window shows nothing just null, but you're in fact is typing things in. So just focus on typing it right and press **Enter**. After you log in the RPi successfully, the window will display as follows.



This window is just like the Command Line window in Linux.