[Memo] Using Raspberry Pi 3 as a Wireless Router

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The Raspberry Pi 3, released in early March, comes with built-in WiFi and Bluetooth. Since it already has an Ethernet port, it is essentially a wireless router. I couldn't help but get one, intending to use it as a router and NAS. There are already many tutorials on making a router with a Raspberry Pi, mostly based on the Raspberry Pi 2. Versions before the 3 did not have built-in WiFi, so you needed to configure a wireless network card yourself. Since the 3 has built-in WiFi, configuration is much more convenient. I successfully configured it by referring to two foreign tutorials and am recording it here.

Reference tutorials:

- https://frillip.com/using-your-raspberry-pi-3-as-a-wifi-access-point-with-hostapd/
- https://gist.github.com/Lewiscowles1986/fecd4de0b45b2029c390#file-rpi3-ap-setup-sh

Configuring the Wireless Hotspot

The main software used are `hostapd` and `dnsmasq`:

```
sudo apt-get install hostapd dnsmasq
```

Then add the following to the end of `/etc/dnsmasq.conf` (modify the IP and network segment yourself; this file already exists and is a very detailed configuration file, but all lines are commented out with `#`):

```
interface=wlan0
dhcp-range=10.0.0.2,10.0.0.5,255.255.255.0,12h
```

Then create a new file `/etc/hostapd/hostapd.conf` and add:

```
interface=wlan0
hw_mode=g
channel=10
auth_algs=1
wpa=2
wpa_key_mgmt=WPA-PSK
wpa_pairwise=CCMP
rsn_pairwise=CCMP
wpa_passphrase=your_wifi_password
ssid=your_wifi_name
```

Next, modify `/etc/sysctl.conf` and change (if this line exists, just remove the `#`):

```
net.ipv4.ip_forward=1
```

Finally, add the following script before `exit 0` in `/etc/rc.local`:

```
ifconfig wlan0 down
ifconfig wlan0 10.0.0.1 netmask 255.255.255.0 up
iwconfig wlan0 power off
service dnsmasq restart
hostapd -B /etc/hostapd/hostapd.conf & > /dev/null 2>&1
sudo iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE
sudo iptables -A FORWARD -i eth0 -o wlan0 -m state --state RELATED,ESTABLISHED -j
    ACCEPT
sudo iptables -A FORWARD -i wlan0 -o eth0 -j ACCEPT
```

After restarting, you can see the hotspot. It's much simpler The WiFi signal strength of the Raspberry Pi is similar to the once-famous router toy WR703N.

Pitfalls and Solutions

I also configured offline downloading, NAS, automatic cloud synchronization, etc. Since I am not very familiar with Linux, I fell into many traps. I want to remind everyone that many commands on the Raspberry Pi need to start with `sudo`, and `sudo` on the Raspberry Pi does not require a password. However, having `sudo` and not having `sudo` are two completely different environments (two different users). For example, after `sudo screen -S sync`, you cannot see it with `screen -ls`; you must use `sudo screen -ls` to see it. Additionally, if you add commands to `/etc/rc.local` to run, they are executed as `sudo` by default (regardless of whether you added `sudo`). As a result, I added a `screen` task here, and after starting, I couldn't see it with `screen -ls` no matter what. It turned out I needed `sudo screen -ls`, I'm dizzy... Also, when running `autossh` for intranet penetration, you must add a `sleep 5` command before `autossh`, otherwise `autossh` won't work even if it runs

These were all traps I fell into for a whole day.