

Raspberry Pi Dual Wi-Fi Network Configuration Guide (Updated)

This document explains how to configure a Raspberry Pi to use two Wi-Fi networks simultaneously — one for Internet access and one for local/internal communication — using **NetworkManager**. The example uses `wlan0` for Internet and `wlan1` for local network access.

1. Check active network interfaces

Run the following command to verify which interfaces are managed by NetworkManager:

```
nmcli device status
```

Example output:

DEVICE	TYPE	STATE	CONNECTION
wlan0	wifi	connected	Free-TAU
wlan1	wifi	connected	Controllab

This shows that both Wi-Fi interfaces are active and managed by NetworkManager.

2. List NetworkManager connections

List all saved Wi-Fi connections:

```
nmcli connection show
```

Example:

NAME	UUID	TYPE	DEVICE
Free-TAU	aaaaaaaa-bbbb-cccc-dddd-eeeeeeeeeee	wifi	wlan0
Controllab	1b1fbf73-2f42-4e03-bb97-92a7438adfe3	wifi	wlan1

3. Configure the Internet Wi-Fi (wlan0)

Assign the Internet connection (`Free-TAU`) a **low route metric** (high priority) and allow it to set the default route:

```
sudo nmcli connection modify "Free-TAU" ipv4.route-metric 100 ipv4.never-default no
sudo nmcli connection modify "Free-TAU" ipv4.dns "8.8.8.8 1.1.1.1"
```

Expected [ipv4] section in /etc/NetworkManager/system-connections/Free-TAU.nmconnection :

```
[ipv4]
method=auto
route-metric=100
never-default=false
dns=8.8.8.8;1.1.1.1;
```

4. Configure the Local Wi-Fi (wlan1)

Add a second connection for your internal network (Controllab). Example configuration file:

```
[connection]
id=Controllab
uuid=1b1fbf73-2f42-4e03-bb97-92a7438adfe3
type=wifi
interface-name=wlan1
timestamp=1762953146

[wifi]
mode=infrastructure
ssid=Controllab

[wifi-security]
key-mgmt=wpa-psk
psk=Controllab

[ipv4]
method=auto
never-default=true
route-metric=400
```

This configuration ensures that: - wlan1 connects to the internal Wi-Fi network named Controllab. - It does not set a default Internet route (never-default=true). - Its route metric is higher (lower priority) than the Internet network.

Alternatively, you can set it via command line:

```
sudo nmcli connection modify "Controllab" ipv4.route-metric 400 ipv4.never-default yes
```

5. Apply and test the configuration

Restart both connections to apply the new settings:

```
sudo nmcli connection down "Free-TAU" && sudo nmcli connection up "Free-TAU"  
sudo nmcli connection down "Controllab" && sudo nmcli connection up "Controllab"
```

Verify your routing table:

```
ip route
```

Expected output:

```
default via 172.30.0.1 dev wlan0 proto dhcp src 172.30.9.224 metric 100  
172.30.0.0/16 dev wlan0 proto kernel scope link src 172.30.9.224 metric 100  
192.168.0.0/24 dev wlan1 proto kernel scope link src 192.168.0.120 metric 400
```

Check which interface is used for Internet traffic:

```
ip route get 8.8.8.8
```

Expected result: traffic routes through `wlan0`.

6. Verify persistence

Configuration files are stored at:

```
/etc/NetworkManager/system-connections/
```

The changes persist across reboots and image clones.

7. Cloning to other Raspberry Pis

If you clone the SD/SSD image for other Pis:
- Remove any `mac-address=` lines from `.nmconnection` files.
- Verify `interface-name=wlan0` and `interface-name=wlan1` are correct.
- If adapters differ, adjust interface names with:

```
sudo nmcli connection modify "Free-TAU" connection.interface-name wlan0  
sudo nmcli connection modify "Controllab" connection.interface-name wlan1
```

- Restart NetworkManager:

```
sudo systemctl restart NetworkManager
```

✓ Final Expected Routing Table

```
default via 172.30.0.1 dev wlan0 metric 100  
172.30.0.0/16 dev wlan0 proto kernel scope link src 172.30.9.224 metric 100  
192.168.0.0/24 dev wlan1 proto kernel scope link src 192.168.0.120 metric 400
```
