

# Wireless Mesh Network with Small and Low Cost Devices

The goal of this project is to implement a wireless mesh network that provides connectivity and multimedia services in a geographic area such as a small campus.

Mesh networking performance is directly related to the number of available radio channels. Particularly, a mesh node with one wireless LAN chipset is able to transmit and receive on a single channel. As a result, a wireless mesh network rarely can fully exploit the aggregate bandwidth available in the radio spectrum provisioned by the standards. For a scientific explanation of this problem, please refer to this [research team page](#).

In order to overcome this problem, we implement in this project low cost multi-channel mesh devices consisting of a wireless router with an additional WLAN adapter. Here is typical material that can be used for implementing the project:

- TP-Link [MR3020](#) wireless router.
- USB WLAN adapter based on the [Ralink RT5370](#) chipset.
- Raspberry Pi [Model B](#).

Make sure you have the [attitude adjustment](#) release of OpenWRT on your TP-LINK MR3020. For more information on how to flash the firmware on your router and take basic control, please refer to [this article](#).

Start by updating the package list and installing the necessary packages for the USB WLAN adapter.

```
root@MeshNode:~# opkg update
root@MeshNode:~# opkg install kmod-rt2800-lib kmod-rt2800-usb kmod-rt2x00-lib kmod-rt2x00-usb
```



Figure 1. MR3020 with WLAN adapter

Plug the WLAN adapter on the USB port of your router and verify that it is detected:

```
root@MeshNode:~# wifi detect
config wifi-device radio2
    option type mac80211
    option channel 11
    option macaddr 00:e0:4c:81:88:8a
    option hwmode 11ng
```

```
option htmode HT20
list ht_capab GF
list ht_capab SHORT-GI-20
list ht_capab SHORT-GI-40
list ht_capab RX-STBC1
# REMOVE THIS LINE TO ENABLE WIFI:
option disabled 1
```

```
config wifi-iface
option device radio2
option network lan
option mode ap
option ssid OpenWrt
option encryption none
```

Now, copy the detected WiFi modules into the wireless configuration of your MR3020.

```
root@MeshNode:~# wifi detect > /etc/config/wireless
```

Your wireless configuration file should be similar to the following:

</etc/config/wireless>

```
config wifi-device radio0
option type mac80211
option channel 11
option macaddr f8:d1:11:bd:62:ce
option hwmode 11ng
option htmode HT20
list ht_capab SHORT-GI-20
list ht_capab SHORT-GI-40
list ht_capab RX-STBC1
list ht_capab DSSS_CCK-40

config wifi-iface
option device radio0
option network lan
option mode ap
option ssid OpenWrt1
option encryption none

config wifi-device radiol
option type mac80211
option channel 11
option macaddr 00:e0:4c:81:88:8a
option hwmode 11ng
option htmode HT20
list ht_capab GF
list ht_capab SHORT-GI-20
list ht_capab SHORT-GI-40
list ht_capab RX-STBC1
```

```
config wifi-iface
    option device    radio1
    option network   lan
    option mode      ap
    option ssid      OpenWrt2
    option encryption none
```

Check that both antennas are working:

```
root@MeshNode:~# wifi up
Configuration file: /var/run/hostapd-phy0.conf
Using interface wlan0 with hwaddr f8:d1:11:bd:62:ce and ssid "OpenWrt1"
Configuration file: /var/run/hostapd-phy1.conf
Using interface wlan1 with hwaddr 00:e0:4c:81:88:8a and ssid "OpenWrt2"
```



The USB WLAN adapter does not seem to be supported in the latest Barrier Breaker release of OpenWRT. Additional packages are installed correctly but the adapter is not detected as a WLAN module.

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