

How to use a DD-WRT router to provide wifi access to an Broadband Mesh Network

How to connect two different router (wired connected) to use a mesh net router as primary router with DHCP and DNS services and a DD-WRT router as a WiFi Access Point to bridge to the mesh network. All WiFi clients will use the same DHCP server and will have access to shared resources on the mesh network.

Our goal: connect one DD-WRT router and one Broadband Mesh Node to share the same DHCP server for all the clients, allowing every client access to shared resources on the Mesh network.

- Connection between routers is wired.
- The Mesh Router has DHCP enabled.
- Clients can be on the same subnet.
- All clients can see one another in the network.
- All clients can access to shared resource (like Printer, HD USB, NAS,...).
- Minimal changes to the Mesh Router configuration

Configure the Mesh Node Router

The screenshot shows the 'Basic Setup' page of a router configuration interface. The top navigation bar includes 'Node Status', 'Basic Setup' (highlighted in black), 'Port Forwarding, DHCP, and Services', and 'Administration'. Below the navigation are buttons for 'Help', 'Save Changes' (highlighted with a red arrow #4), 'Reset Values', 'Default Values', and 'Reboot' (highlighted with a red arrow #5). The main configuration area includes fields for 'Node Name' (NB70-AP3), 'Password', 'Node Type' (Mesh Node), and 'Verify Password'. The configuration is divided into three panels: WiFi, LAN, and WAN.

WiFi		LAN		WAN	
Protocol	Static	LAN Mode	13 host Direct	Protocol	DHCP
IP Address	10.139.181.59	IP Address	10.187.83.177	DNS 1	8.8.8.8
Netmask	255.0.0.0	Netmask	255.255.255.240	DNS 2	8.8.4.4
SSID	BroadbandHamnet-20-v3	DHCP Server	<input checked="" type="checkbox"/>	Mesh Gateway	<input type="checkbox"/>
Mode	Ad-Hoc	DHCP Start	178		
Channel	1	DHCP End	190		
Active Settings					
Rx Antenna	Diversity				
Tx Antenna	Diversity				
Tx Power	19 dBm				
Distance	0				
Apply					

Red annotations with numbers 1 through 5 highlight specific configuration points:

- #1: IP Address in the LAN panel (10.187.83.177).
- #2: LAN Mode in the LAN panel (13 host Direct).
- #3: DHCP Server checkbox in the LAN panel (checked).
- #4: 'Save Changes' button.
- #5: 'Reboot' button.

Figure 1

1. In the Main Router determine what the Lan IP address and Netmask are.
 - a. #1 in Figure 1.
2. Change the Lan Mode to 13 host Direct
 - a. #2 in Figure 1.
3. Make certain that DHCP Server is checked
 - a. #3 in Figure 1.
4. Save these changes
 - a. #4 in Figure 1
5. Reboot the Mesh Node Router
 - a. #5 in Figure 1

Configure the DD-WRT Router

1. Restore DD-WRT factory defaults with a Hard Reset (30-30-30)
2. Connect the DD-WRT Router to a computer via LAN cable.
3. Access the router configuration using an internet browser (Default: <http://192.168.1.1>)
 - o the default username is **root** and the default password is **admin**

The screenshot shows the DD-WRT control panel with the following configuration steps highlighted:

1. Connection Type: Set to "Automatic Configuration - DHCP".
2. Router Name: Set to "nb70-mesh-wifi-access".
3. Host Name and Domain Name fields.
4. Local IP Address: Set to 10.187.83.178.
5. Subnet Mask: Set to 255.255.255.240.
6. Gateway: Set to 10.187.83.177.
7. DHCP Type: Set to "DHCP Forwarder".
8. DHCP Server: Set to 10.187.83.177.
9. Save button.

Other visible settings include:

- WAN Connection Type:** STP (Enable/Disable)
- Optional Settings:** MTU (Auto/1500)
- Network Setup:** Router IP (Local IP Address, Subnet Mask, Gateway, Local DNS), Network Address Server Settings (DHCP Type, DHCP Server), Time Settings (NTP Client, Time Zone, Summer Time (DST), Server IP/Name).
- Automatic Configuration - DHCP:** Description of common use by cable operators.
- Host Name:** Enter host name by ISP.
- Domain Name:** Enter domain name by ISP.
- Local IP Address:** Description of router address.
- Subnet Mask:** Description of subnet mask.
- DHCP Server:** Allows router to manage IP addresses.
- Start IP Address:** Address to start DHCP leases.
- Maximum DHCP Users:** Limit to 0 means static leases only.
- Time Settings:** Choose time zone and DST period.

Figure 2

1. In Setup -> Basic Setup tab:
 - a. Confirm Connection Type is Automatic Configuration – DHCP
 - i. #1 in Figure 2

- b. Enter a name for the Router
 - i. #2 in Figure 2
- c. Leave hostname and Domain Name Blank
 - i. #3 in Figure 2
- d. Set a static Router IP
 - i. Local IP Address: xxx.xxx.xxx.xxx
 - 1. #4 in Figure 2
 - a. (Mesh Node's IP address plus 1)
 - b. E.G. if Mesh Node router's IP is 10.187.83.177 then the DD-WRT router IP would be 10.187.83.178
 - ii. Subnet Mask: 255.255.255.240 (same as netmask in Mesh Node)
 - 1. #4 in Figure 2
 - iii. Gateway: xxx.xxx.xxx.xxx (Mesh Node IP address)
 - 1. #5 in Figure 2
 - iv. Local DNS: xxx.xxx.xxx.xxx (Mesh Node IP address)
 - 1. #6 in Figure 2
- e. Network Address Server Settings (DHCP)
 - i. DHCP type: DHCP forwarder
 - 1. #7 in Figure 2
 - ii. DHCP Server: xxx.xxx.xxx.xxx (Mesh Node IP address)
 - 1. #8 in Figure 2
- f. Save these changes
 - i. #9 in Figure 2

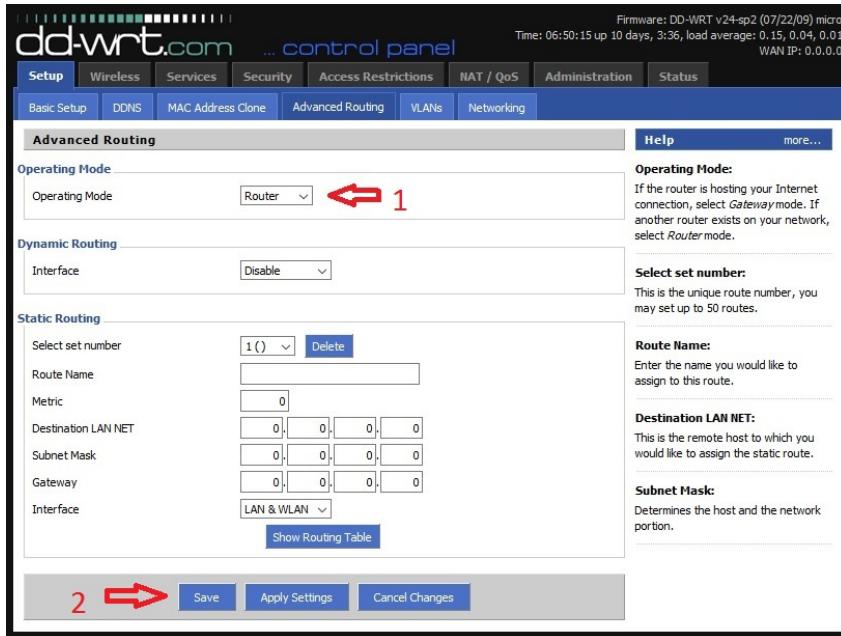


Figure 3

2. In Setup -> Advanced Routing tab:
 - a. Operation Mode: Router
 - i. #1 in Figure 3
 - b. Save this change

i. #2 in Figure 3

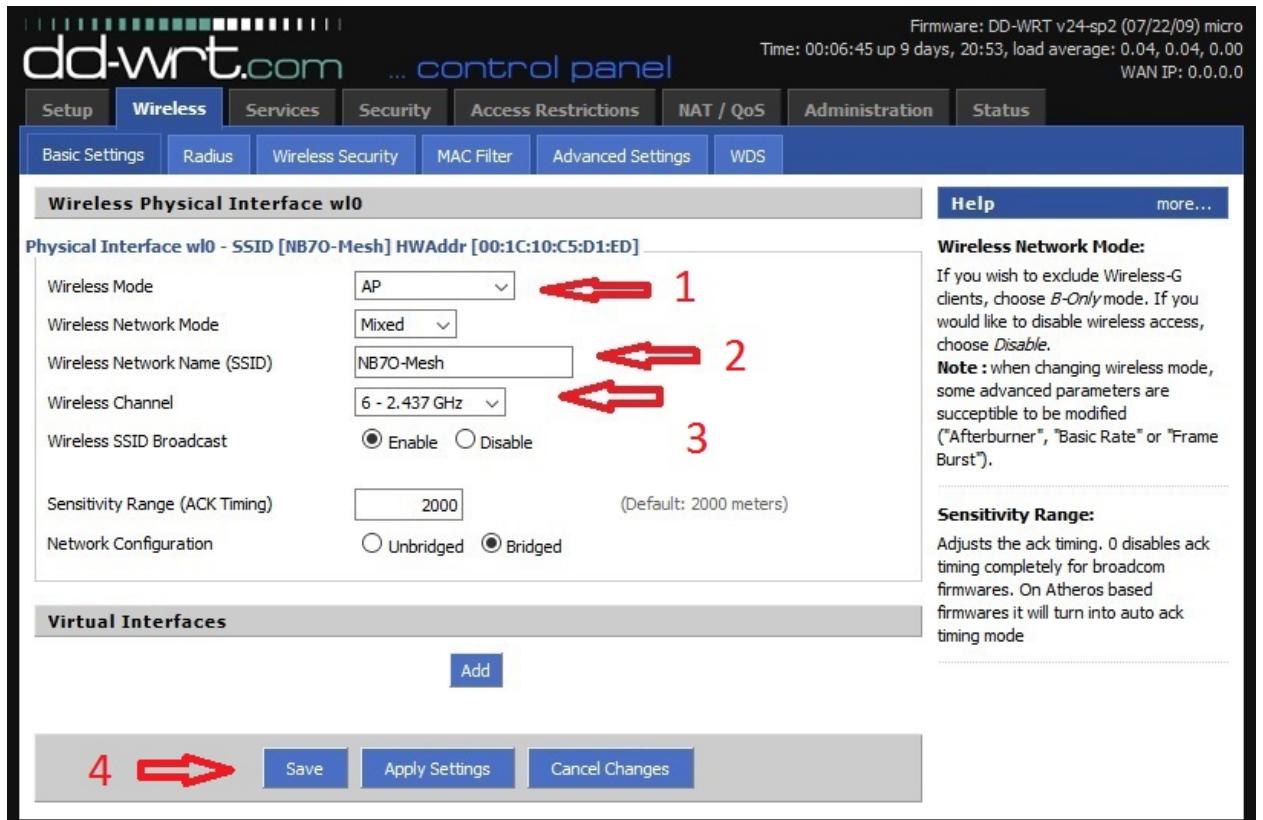


Figure 4

3. In Wireless -> Basic Settings tab:
 - a. Wireless Mode: AP
 - i. #1 in Figure 4
 - b. Wireless Network Name (SSID): enter an SSID that will advertise the presence of the WiFi router to users
 - i. #2 in Figure 4
 - c. Wireless Channel: select an appropriate channel for the location of the router. Do not use Channel one or two as those channels will be busy with the Mesh Nodes talking to each other.
 - i. #3 in Figure 4
 - d. Save these changes
 - i. #4 in Figure 4

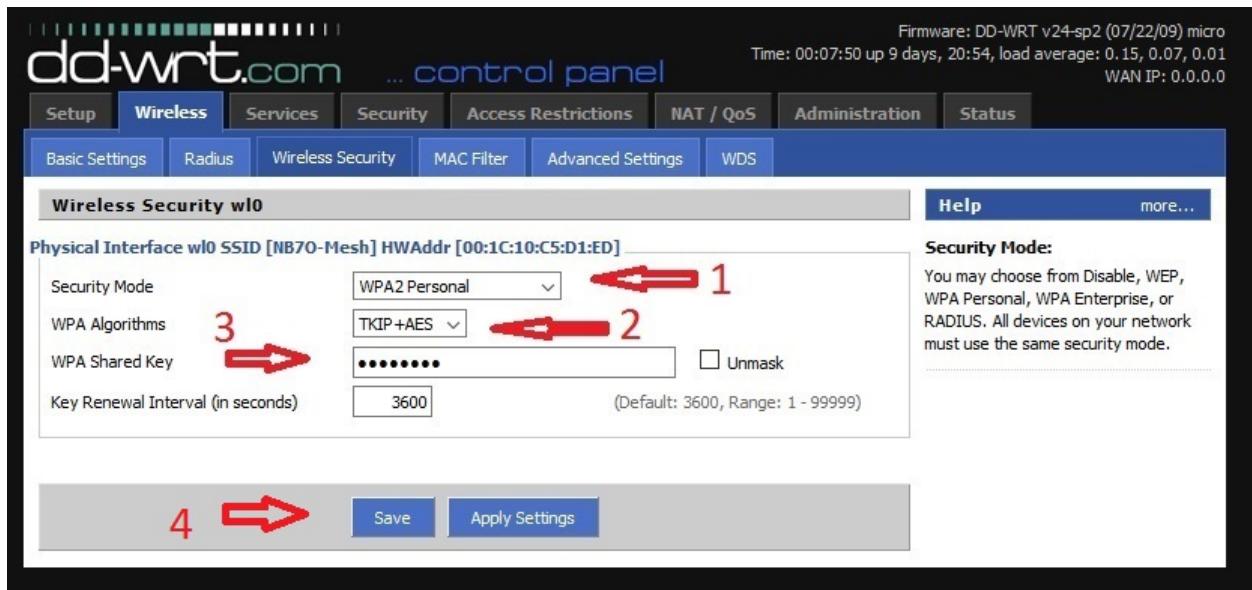


Figure 5

4. In Wireless -> Wireless Security tab:
 - a. Security Mode: WPA2 Personal (*recommended*)
 - i. #1 in Figure 5
 - b. WPA algorithms: TKIP+AES (*recommended*)
 - i. #2 in Figure 5
 - c. WPA Shared Key: *enter a password that you can remember*
 - i. #3 in Figure 5
 - d. Save these changes
 - i. #4 in Figure 5

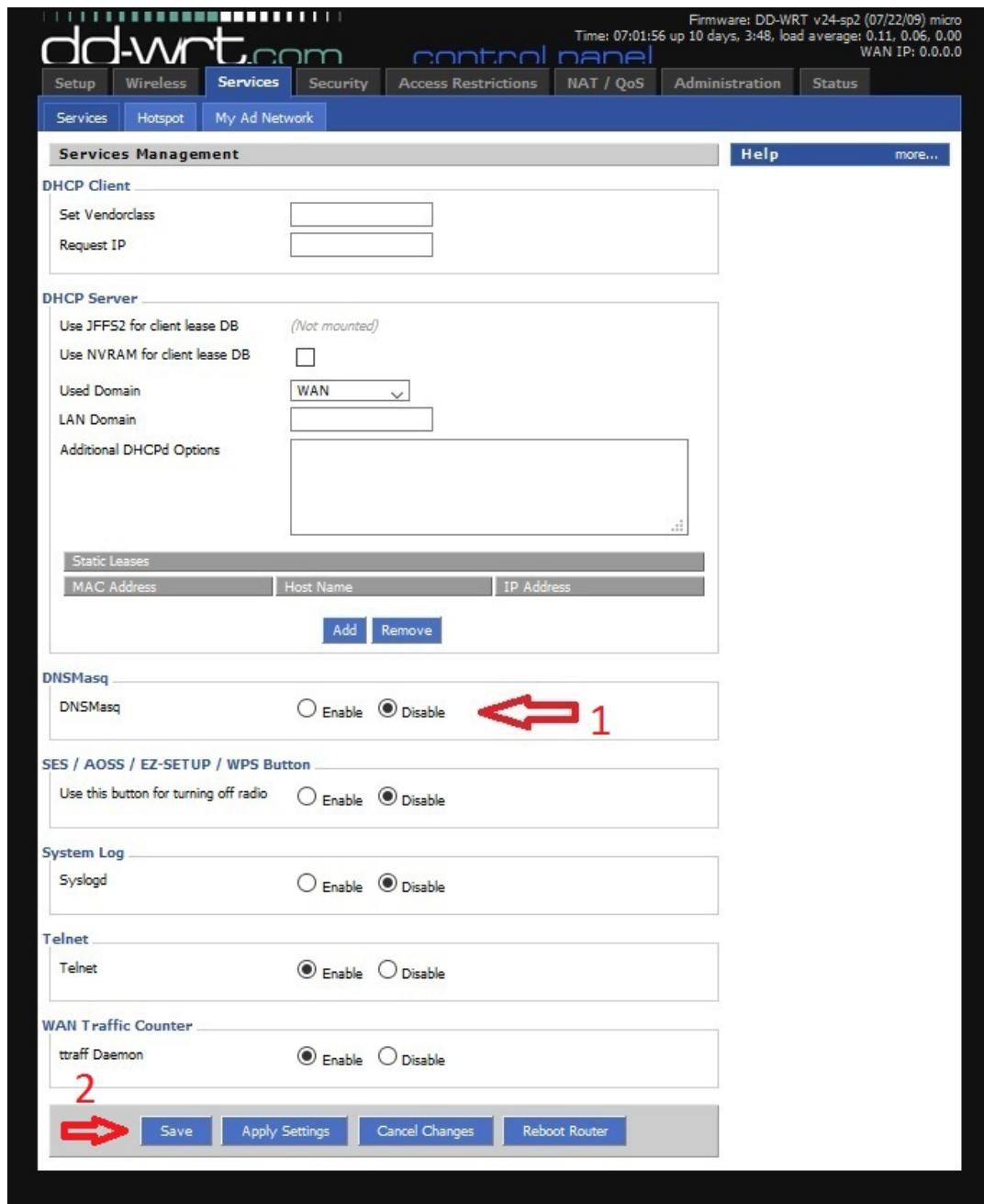


Figure 6

5. In Services -> Services tab:

- DNMasq: disabled
 - # 1 in Figure 6
- Local DNS: disabled
 - Not shown in Figure 6 – Not available in this version DD-WRT
- Save these changes
 - #2 in Figure 6

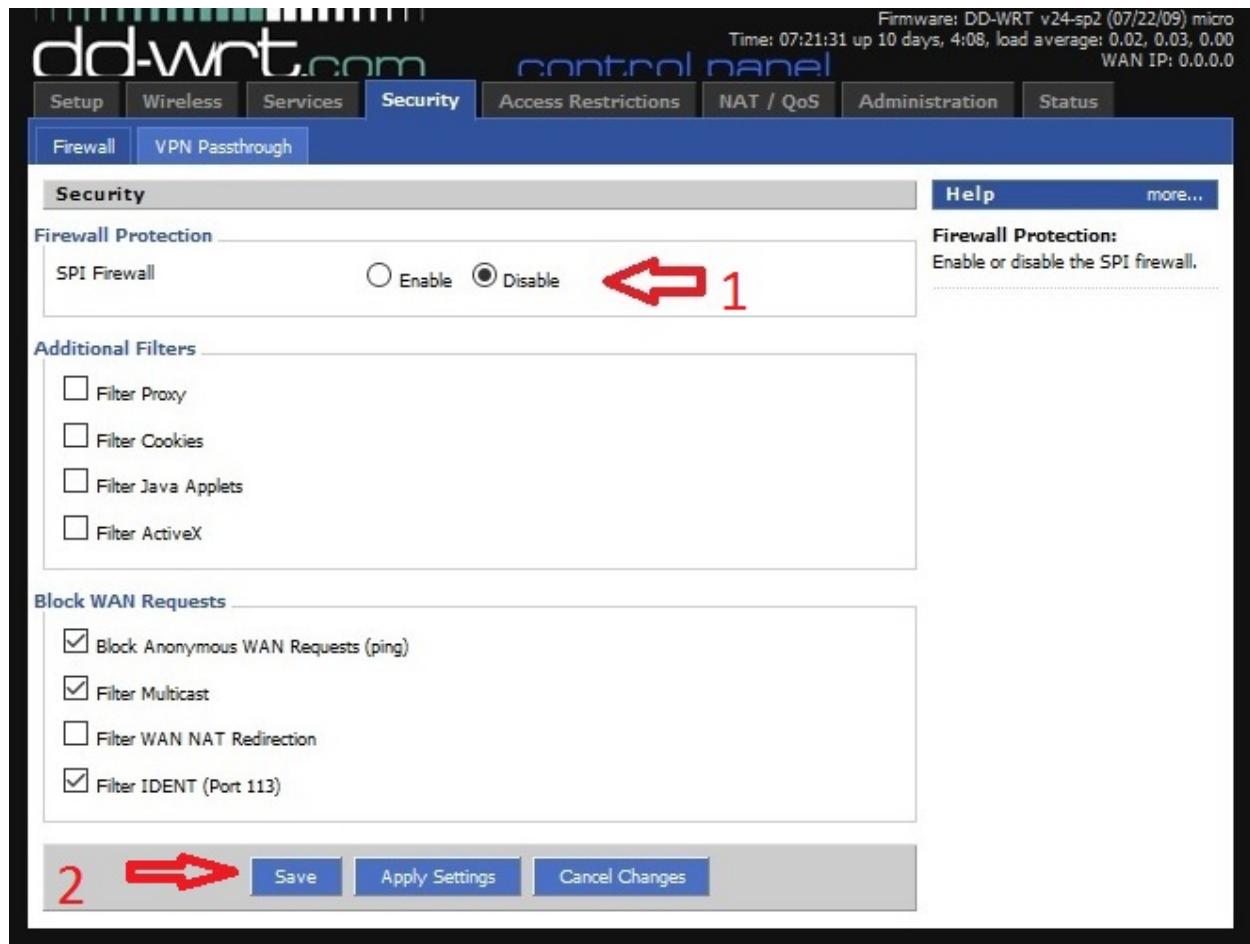


Figure 7

6. In Security -> Firewall tab:
 - a. SPI Firewall: disabled
 - i. #1 in Figure 7
 - b. Save this change
 - i. #2 in Figure 7

dd-wrt.com ... control panel

Firmware: DD-WRT v24-sp2 (07/22/09) micro
Time: 00:11:11 up 9 days, 20:57, load average: 0.11, 0.07, 0.01
WAN IP: 0.0.0.0

Setup Wireless Services Security Access Restrictions NAT / QoS Administration Status

Basic Settings Radius Wireless Security MAC Filter Advanced Settings WDS

Advanced Wireless Settings

Advanced Settings

Authentication Type: Auto Shared Key (Default: Auto)

Basic Rate: Default (Default: Default)

Transmission Fixed Rate: Auto (Default: Auto)

CTS Protection Mode: Auto Disable (Default: Auto)

Frame Burst: Enable Disable

Beacon Interval: 100 (Default: 100ms, Range: 10 - 65535)

DTIM Interval: 1 (Default: 1, Range: 1 - 255)

Fragmentation Threshold: 2346 (Default: 2346, Range: 256 - 2346)

RTS Threshold: 2347 (Default: 2347, Range: 0 - 2347)

Max Associated Clients: 128 (Default: 128, Range: 1 - 256)

AP Isolation: Enable Disable (Default: Disable)

TX Antenna: Auto (Default: Auto)

RX Antenna: Auto (Default: Auto)

Preamble: Long (Default: Long)

Shortslot Override: Auto (Default: Auto)

TX Power: 200 (Default: 71, Range: 1 - 251mW) 1

Afterburner: Disable (Default: Disable)

Bluetooth Coexistence Mode: Disable (Default: Disable)

Wireless GUI Access: Enable Disable (Default: Enable)

Radio Time Restrictions

Radio Scheduling: Enable Disable (Default: Disable)

Wireless Multimedia Support Settings

WMM Support: Enable Disable (Default: Enable)

No-Acknowledgement: Enable Disable (Default: Disable)

EDCA AP Parameters (AP to Client)

CWmin	CWmax	AIFS	TXOP(b)	TXOP(a/g)	Admin Forc
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2

Figure 8

7. In Wireless – Advanced Settings

- Adjust the Tx Power to a level that will meet your needs.
 - #1 in Figure 8
 - I regularly run 200 mW's without any problems with the router overheating
- Save this change
 - #2 in Figure 8

c. Close the Browser

8. Reboot the DD-WRT router by cycling the power.
9. Plug a computer network cable into one of the four DD-WRT router's "LAN" port on the back side of the DD-WRT Router
10. Plug the other end of the computer network cable into any of the four "LAN" ports on the back side of the "Mesh Node" Router.
11. Log into the DD-WRT Wifi connection using the advertised SSID and AP password.

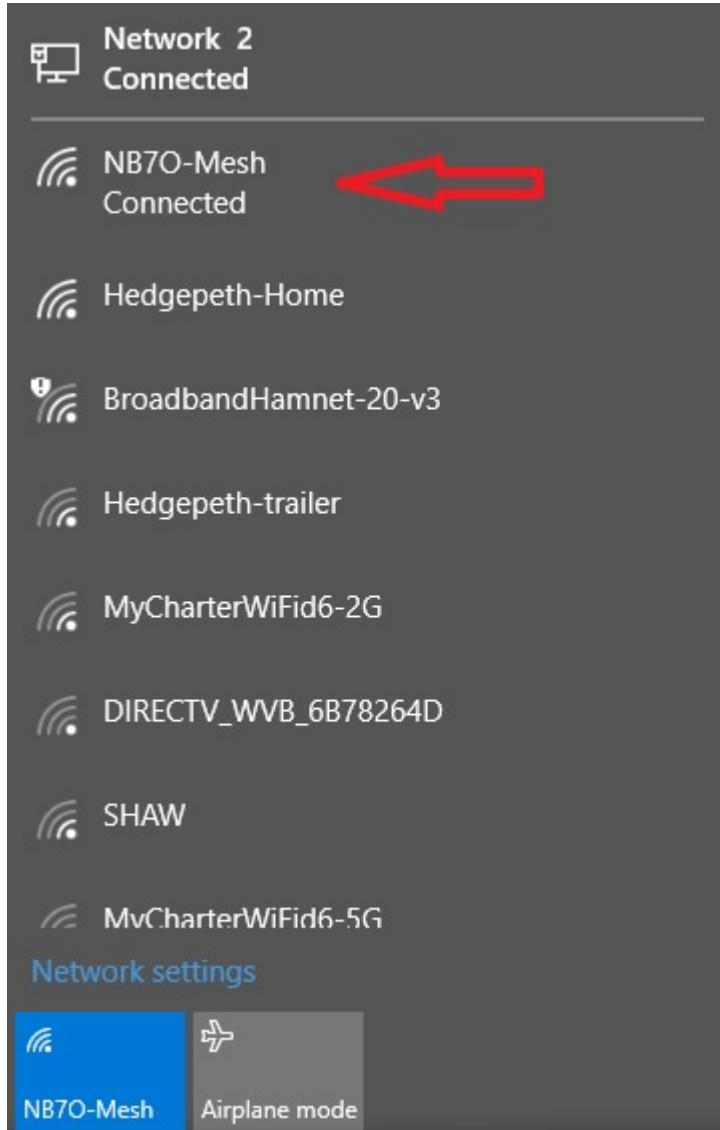


Figure 9

12. Figure 9 shows that my laptop is connected to the DD-WRT WIFI with an SSID of NB7O-Mesh (also refer to Figure 4)

Node Status Basic Setup Port Forwarding, DHCP, and Services Administration

Help Save Changes Reset Values Refresh

DHCP Address Reservations

Hostname	IP Address	MAC Address	Del
Kevin-PC	10.187.83.181	bc:77:37:31:6d:f7	Del
	- IP Address -		Add

Advertised Services

Name	Link	URL	Del
Web_Ser	<input checked="" type="checkbox"/>	http://Kevin-PC:80/index.htm	Del
Hamchat	<input checked="" type="checkbox"/>	http://NB70-AP3:8080/cgi-bin/ha	Del
	<input type="checkbox"/>	://NB70-AP3: /	Add

Current DHCP Leases

MSI	IP Address	dc	Add
MSI	10.187.83.184	dc:53:60:48:85:96	Add

Figure 10

13. Figure 10 shows that my laptop has been assigned an IP address from the DHCP server that is in the Mesh Node
 - a. #1 in Figure 10
14. Figure 10 also shows another PC, named Kevin-PC, that has a DHCP address reserved for it. Even though this second laptop is attached to the mesh node it is not listed in the DHCP lease list because it has an IP reserved for it.
 - a. #2 in Figure 10
15. Kevin-PC is a web, and other facilities, server. The web server is an advertised Service under the Mesh Node
 - a. #3 in Figure 10.

By using a DD-WRT router as a WiFi access point for a Broadband Mesh Network you will have the added power that will provide more range of coverage, better security, and an easier method to manage your wifi access point. Additionally, you do not need to use one of the few versions of WRT54G or Ubiquiti Routers as your access point. You can use one of the many routers that can be inexpensively purchased and flashed with the DD-WRT firmware.

Seven three and have fun with your Broadband Mesh Network

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