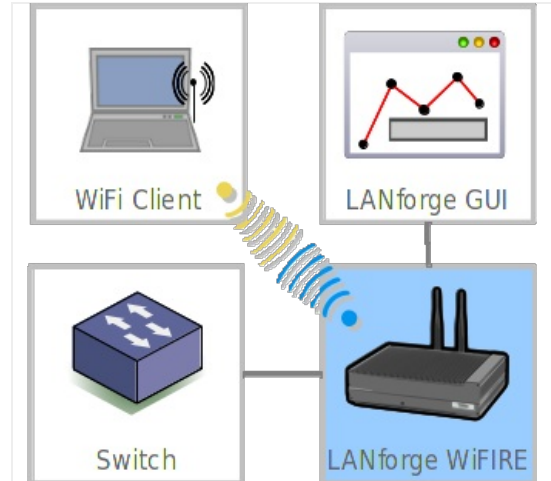
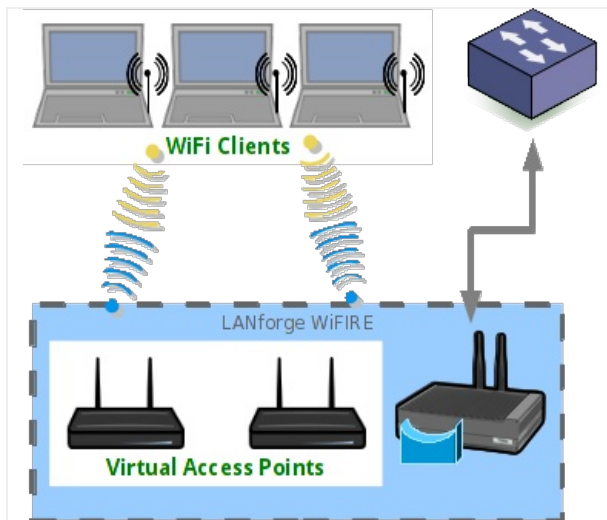


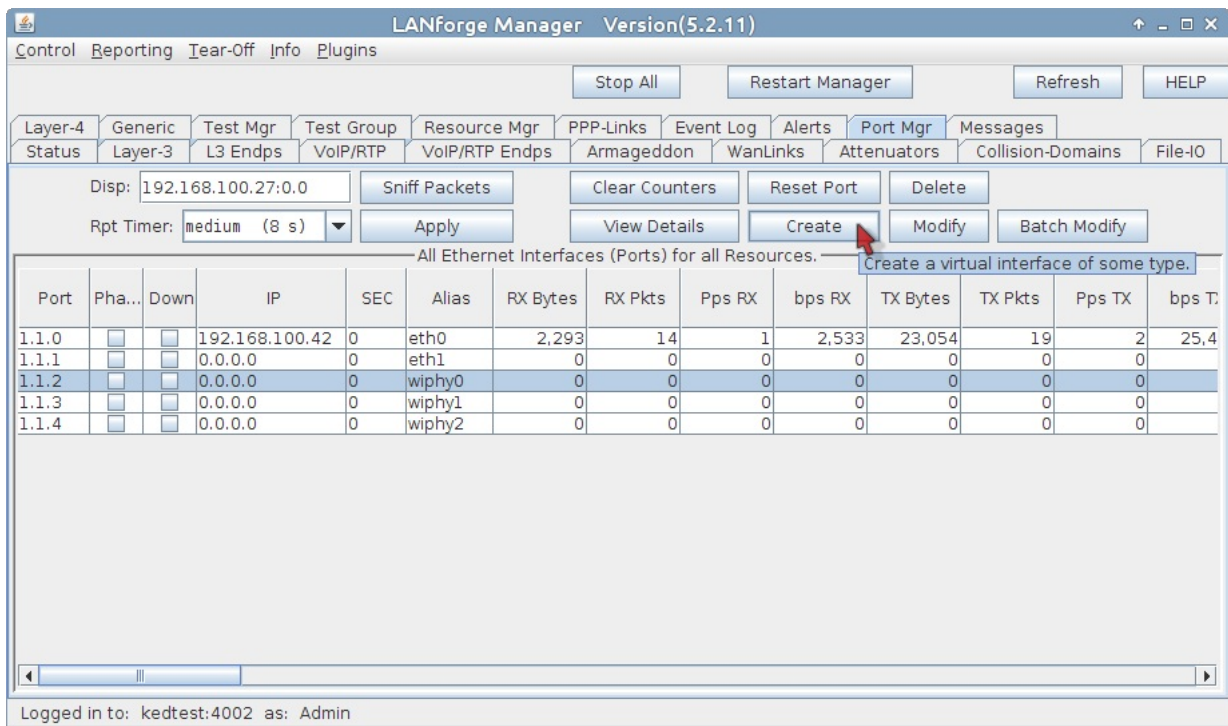
LANforge WiFi Dual Virtual AP Setup with Limited Stations

Goal: Configure Two virtual APs with a maximum of ten stations each.

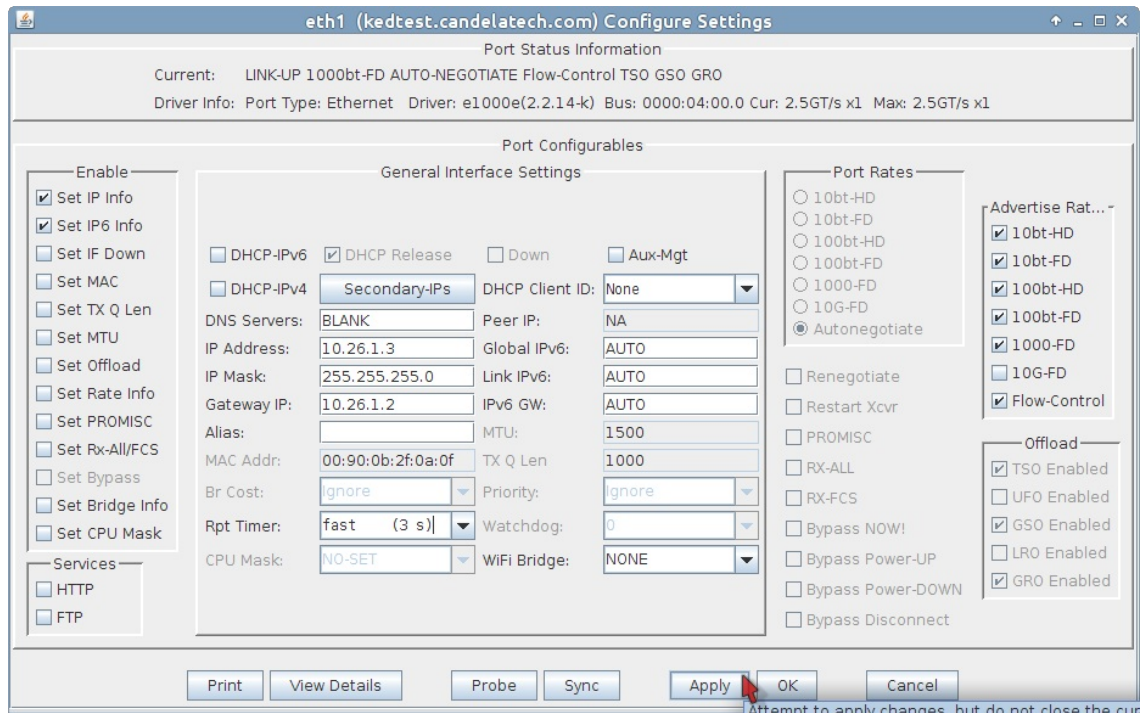
Requires at least a two-radio WiFIRE system such as a CT522, CT523 or CT525. This cookbook provides a basic setup to put a Virtual AP on each of two radios. Both APs are operating on separate channels but share the same SSID. We layout a basic constellation of APs in WPA2 mode that quickly fill up and force a station to search multiple channels for a free AP. This is the condition for issuing a **Code 17** association refusal. This is not a roaming setup (Wireless Roaming/HS2.0 or 802.11r) because it is not configuring enterprise authentication or roaming specifications.



1. Configure two radios to serve the role of Virtual APs.

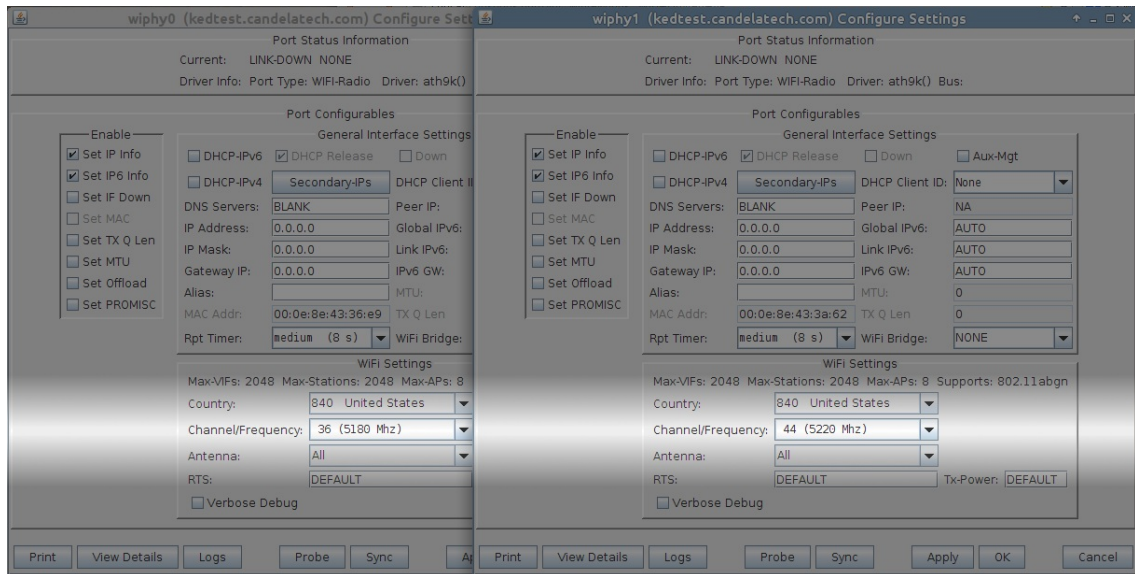


- A. Start at the **Ports** tab. We will configure our second ethernet port as the upstream port for the virtual APs.



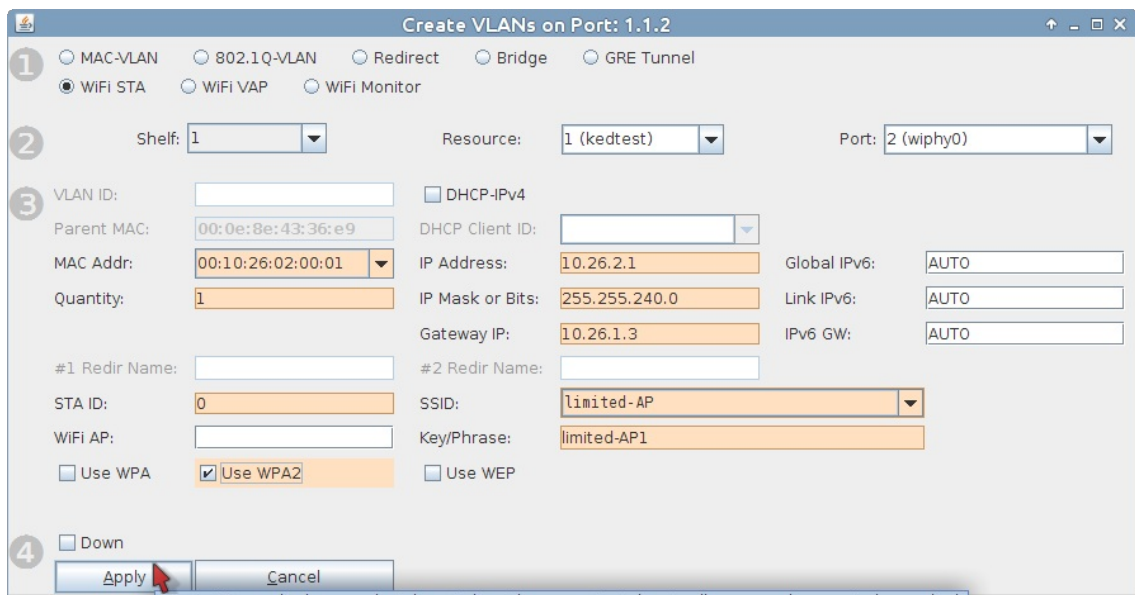
- Highlight port **eth1** and click **Modify**
- Set the IP address to **10.26.1.3**
- and the netmask to **255.255.255.0**
- with a gateway address of the **10.26.1.2**. (This gateway address matches the eth1 port of a separate system that hosts stations.
- Click **OK**

- B. In the **Ports** tab, select radios **wiphy0**, **wiphy1** and click **Modify**. You will get two modify windows that you will want to place side by side.



- A. Set the channel of wiphy0 to **36**
- B. and the channel of wiphy1 to **44**
- C. Click **OK** in both windows.

- C. Time to create the first virtual AP. In the **Ports** tab, select **wiphy0** and click **Create**.



- A. Select **WiFi VAP**
- B. Enter a **MAC address**: 00:10:26:02:00:01
- C. **Quantity** is 1
- D. **IP** of 10.26.2.1
- E. Let's use a typical **subnet mask**: 255.255.255.0
- F. **Gateway IP** will be from eth1: 10.26.1.3
- G. We will setup **WPA2** with the **SSID** limited-AP and **Key/Phrase** limited-AP1
- H. Click **Apply** to commit.
- I. Click **Cancel** to close the window.

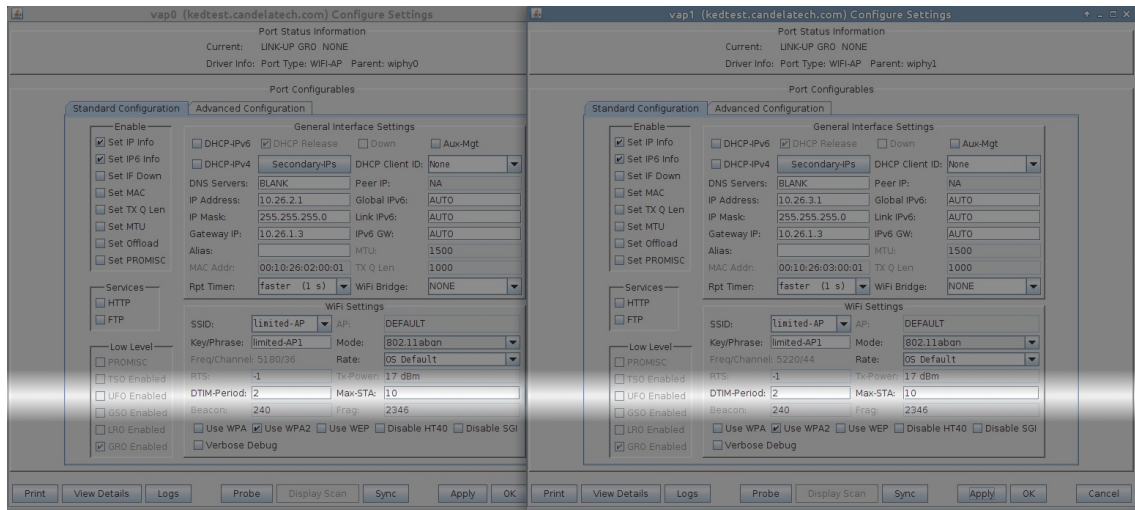
D. Now craft a second virtual AP. In the **Ports** tab, select **wiphy1** and click **Create**.

- A. Select **WiFi VAP**
- B. Enter a **MAC address**: 00:10:26:03:00:01
- C. **Quantity** is 1
- D. **IP** of 10.26.3.1
- E. And a typical **subnet mask** of 255.255.255.0
- F. **Gateway IP** will be from eth1: 10.26.1.3
- G. We will setup **WPA2** with the **SSID** limited-AP and **Key/Phrase** limited-AP1
- H. Click **Apply** to commit.
- I. Click **Cancel** to close the window.

E. We now have two virtual access points on two radios on separate channels. Each is on their own subnet. Now we limit the number of stations that can connect to them.

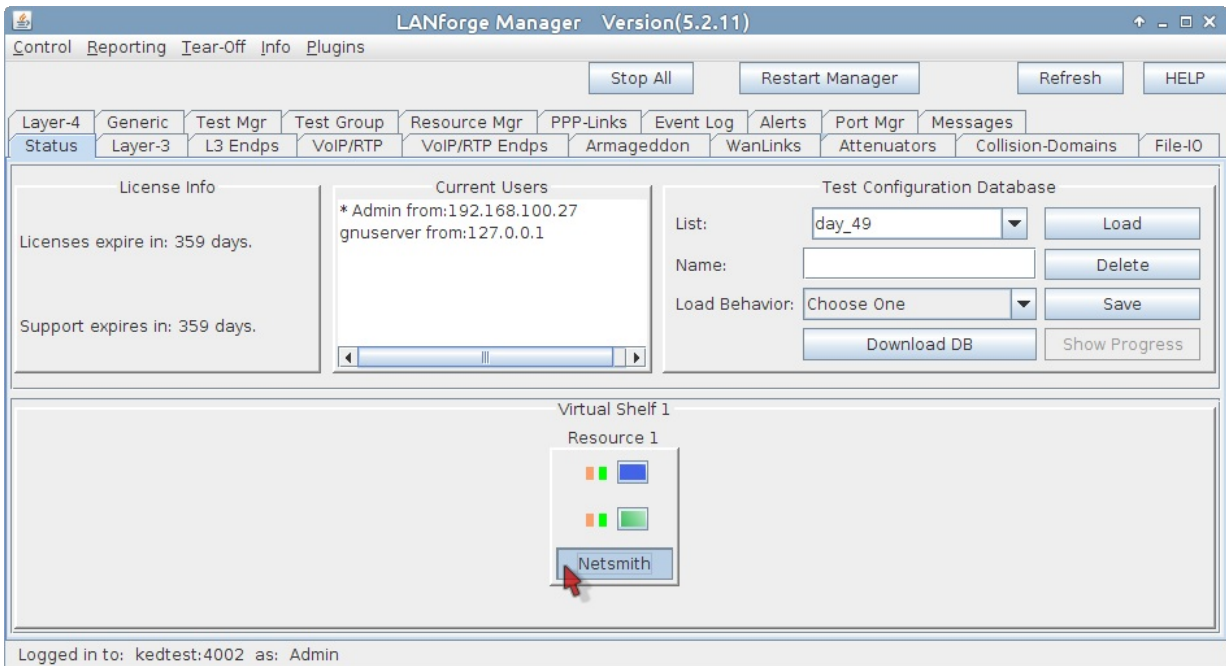
Port	Pha...	Down	IP	SEC	Alias	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps TX	bps TX	Co
1.1.0			192.168.100.42	0	eth0	215,641	1,852	5	4,841	1,437,091	1,572	4	31,513	
1.1.1			10.26.1.3	0	eth1	3,234	21	0	75	532	6	0	0	
1.1.2			0.0.0.0	0	wiphy0	43,037,...	284,906,...	3,025,030	3,655,668	1,659,0...	258,114...	2,740,568	140,924...	6,4
1.1.3			0.0.0.0	0	wiphy1	0	0	0	0	0	0	0	0	
1.1.4			0.0.0.0	0	wiphy2	0	0	0	0	0	0	0	0	
1.1.5			10.26.2.1	0	vap0	0	0	0	0	684	7	0	141	
1.1.6			10.26.2.2	0	vap1	0	0	0	0	576	6	0	119	

F. In the **Ports** tab, highlight endpoints **vap0** and **vap1** and click **Modify**

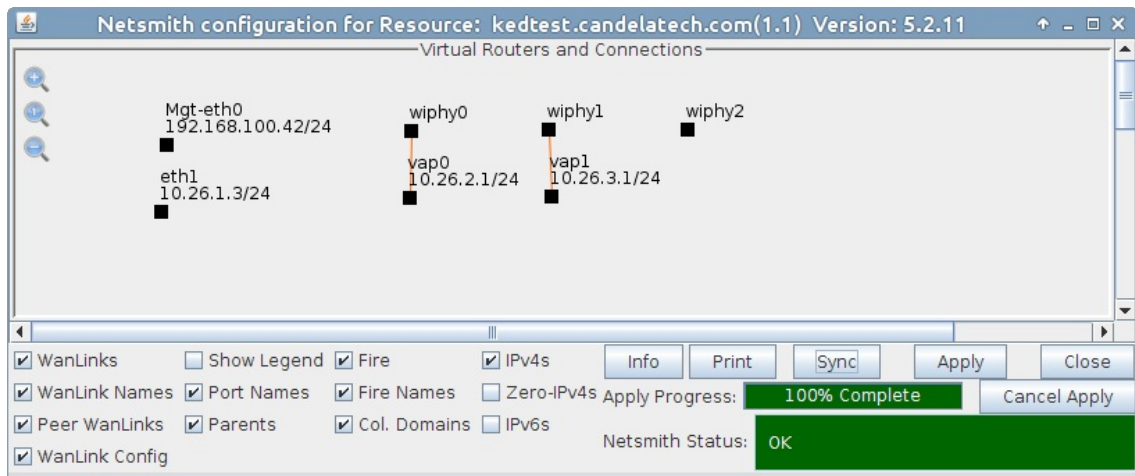


- At the bottom of the **Port Configure Settings** window for **vap0**, change **Max-STA** to **10**
- Click **OK**
- Repeat this for **vap1**

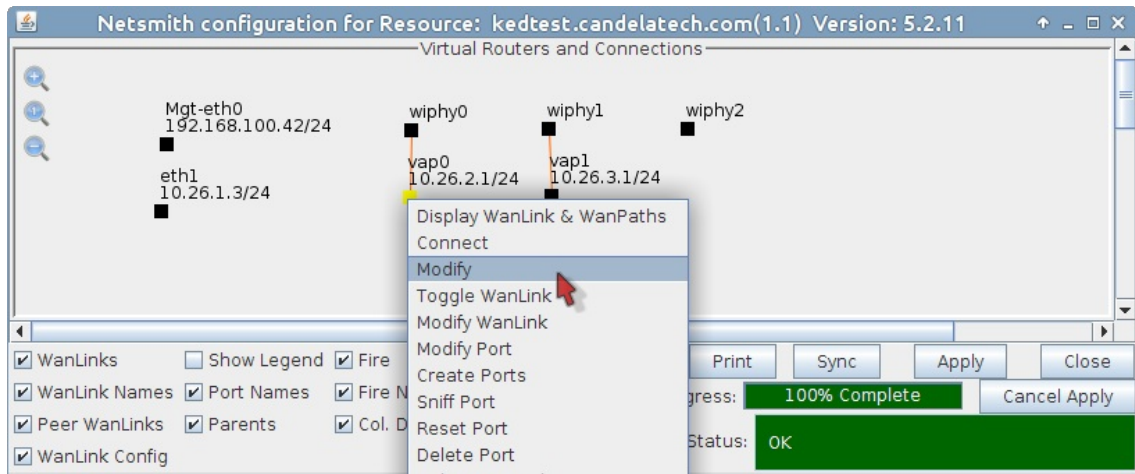
- We now have two virtual access points that can both accept a small number of stations. We put them on different subnets because configuring DHCP on each VAP is simpler than adding a bridge device..
- Let's proceed to configuring **DHCP** for the 10.26.2.0/24 and 10.26.3.0/24 networks.
- In the **Status** tab, click on **Netsmith**



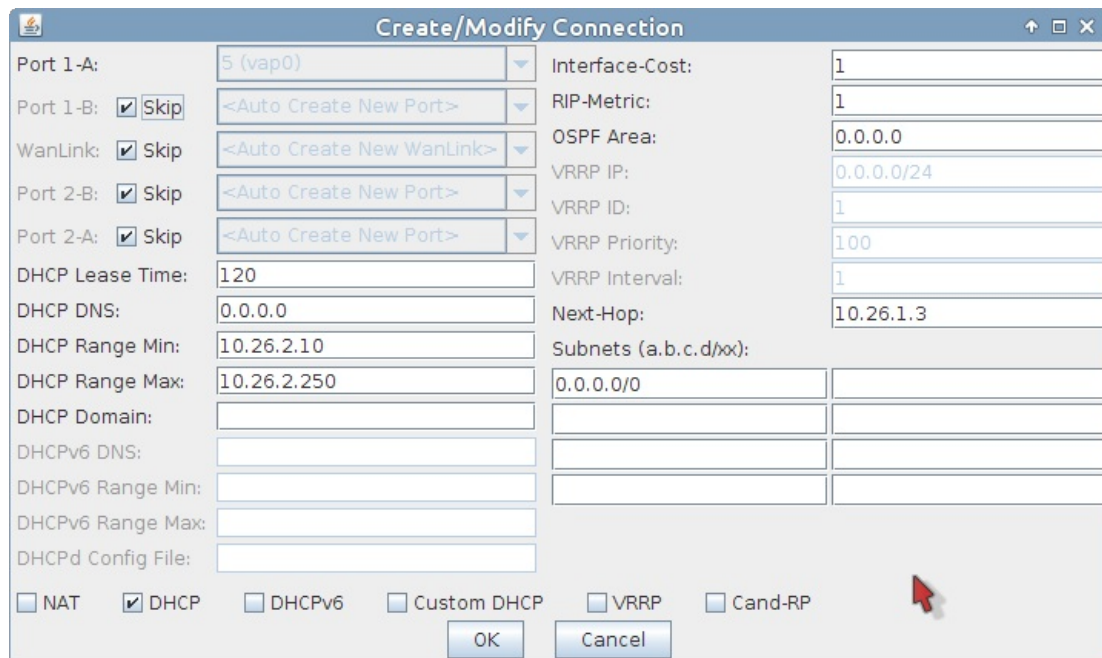
- A. Arrange your ports in the **Netsmith** windows and click **Apply**



- B. Select **vap0** and right click, choose **Modify**



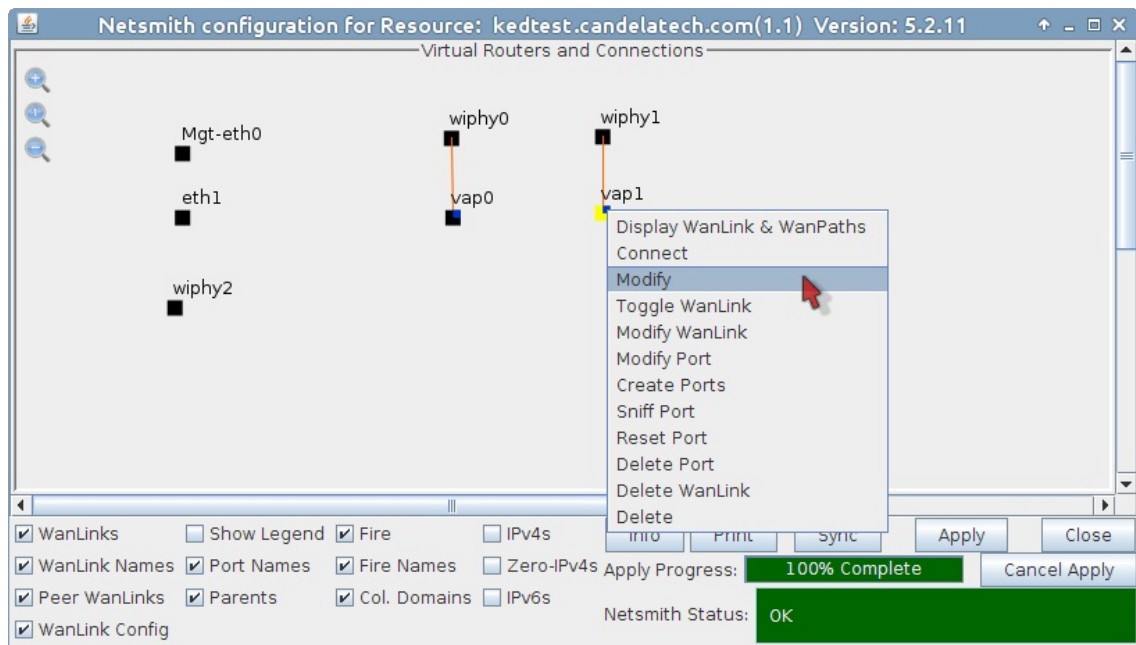
- C. Enable the DHCP pool and the Next-hop for the port



- Select **DHCP**
- Set **DHCP Lease Time** to 120
- Set **DHCP Range Min** to 10.26.2.10
- Set **DHCP Range Max** to 10.26.2.250
- Set **Next-Hop** to 10.26.1.3
- Add **Subnet** 0.0.0.0/0
- Click **OK**

D. Click **Apply** in the Netsmith window to commit the changes to LANforge. If you do not, these changes will disappear.

E. In the **Netsmith** window, select **vap1** and right click, choose **Modify**

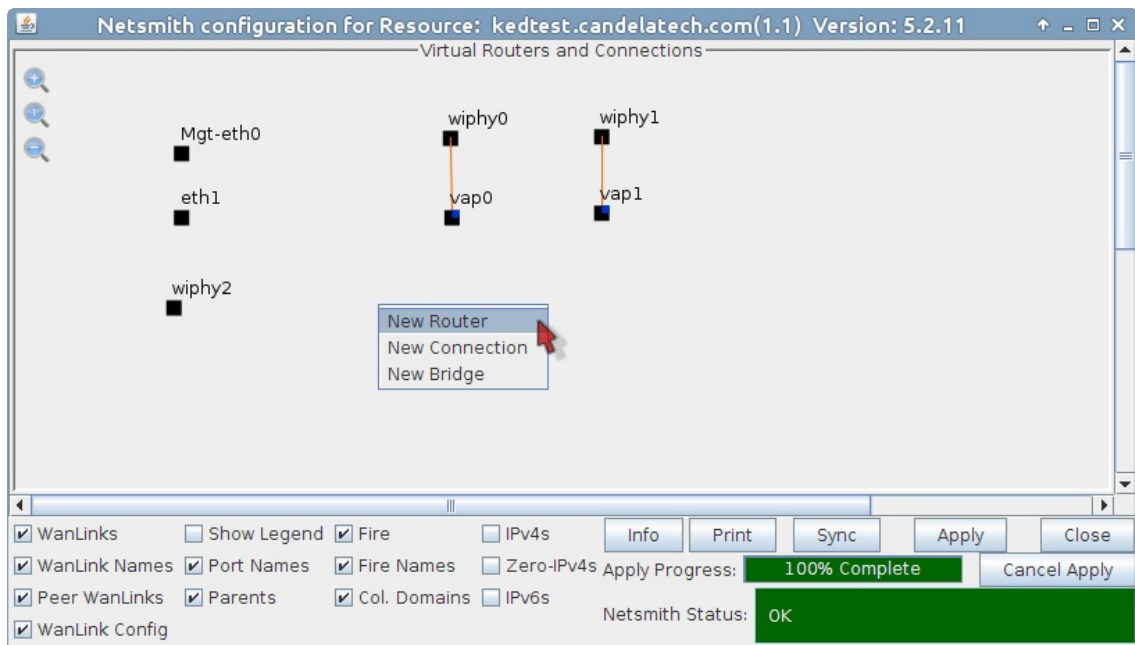


F. Configure the DHCP pool and the Next-hop for **vap1**

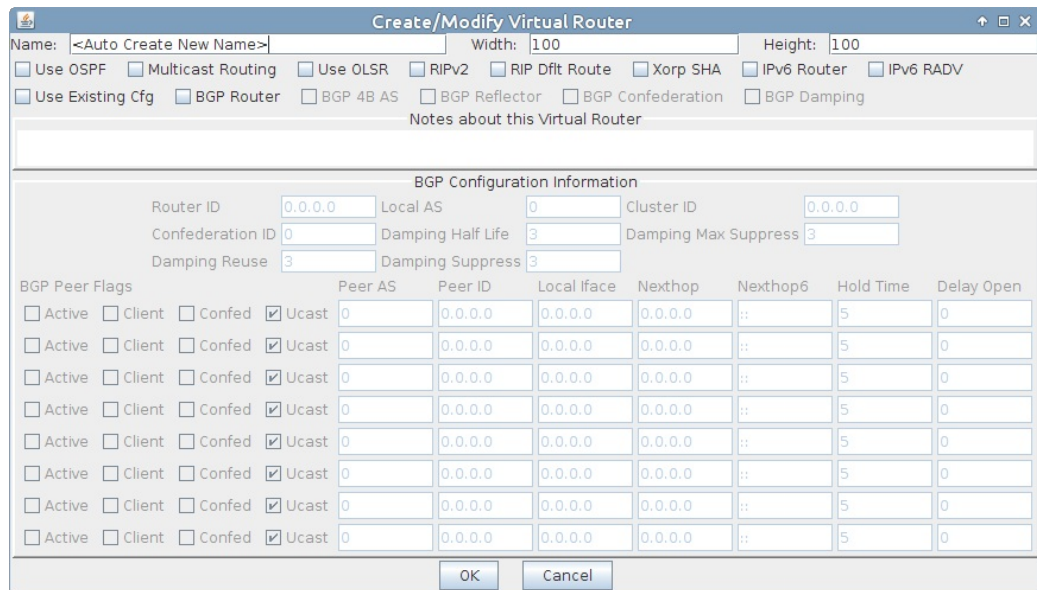
- A. Select **DHCP**
- B. Set **DHCP Lease Time** to 120
- C. Set **DHCP Range Min** to 10.26.3.10
- D. Set **DHCP Range Max** to 10.26.3.250
- E. Set **Next-Hop** to 10.26.1.3
- F. Add **Subnet** 0.0.0.0/0
- G. Click **OK**

G. Click **Apply** in the Netsmith window to commit the changes to LANforge.

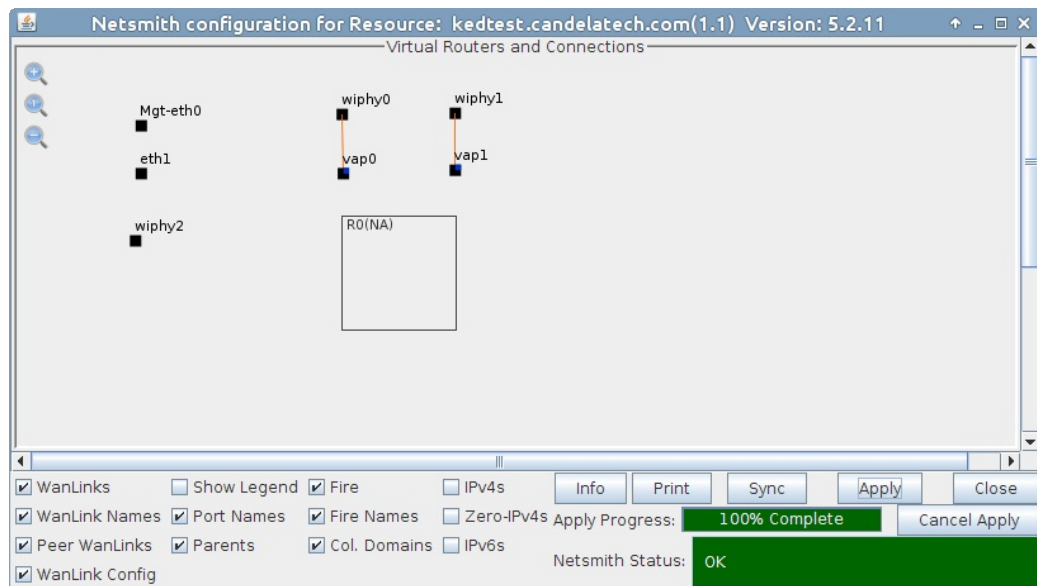
H. We will create a **virtual router** to allow upstream traffic to reach the virtual access points:



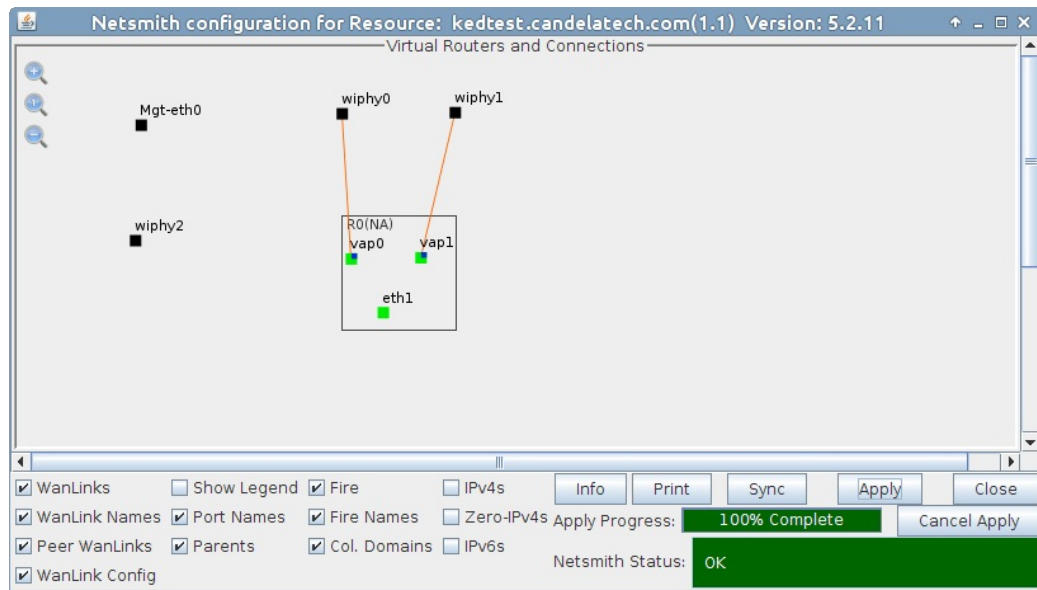
- Right click in the **NetSmith** window and select **New Router**
- You will see the **Create/Modify Virtual Router** window. We can use a default configuration.



- Click **OK** to save a default router



D. Drag the endpoints **vap0**, **vap1** and **eth1** into the virtual router, then click **Apply** in the Netsmith window.



E. We can verify outbound traffic using the following **ping** command. Open a terminal on the LANforge system and run **ping -I 10.26.3.1 10.26.1.2**

```
root@kedtest:/home/lanforge - Terminal
root@kedtest /home/lanforge
> ping -I 10.26.3.1 10.26.1.2
PING 10.26.1.2 (10.26.1.2) from 10.26.3.1 : 56(84) bytes of data.
64 bytes from 10.26.1.2: icmp_seq=1 ttl=64 time=0.242 ms
64 bytes from 10.26.1.2: icmp_seq=2 ttl=64 time=0.288 ms
64 bytes from 10.26.1.2: icmp_seq=3 ttl=64 time=0.281 ms
64 bytes from 10.26.1.2: icmp_seq=4 ttl=64 time=0.289 ms
^C
--- 10.26.1.2 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 2999ms
rtt min/avg/max/mdev = 0.242/0.275/0.289/0.019 ms

root@kedtest /home/lanforge
>
```