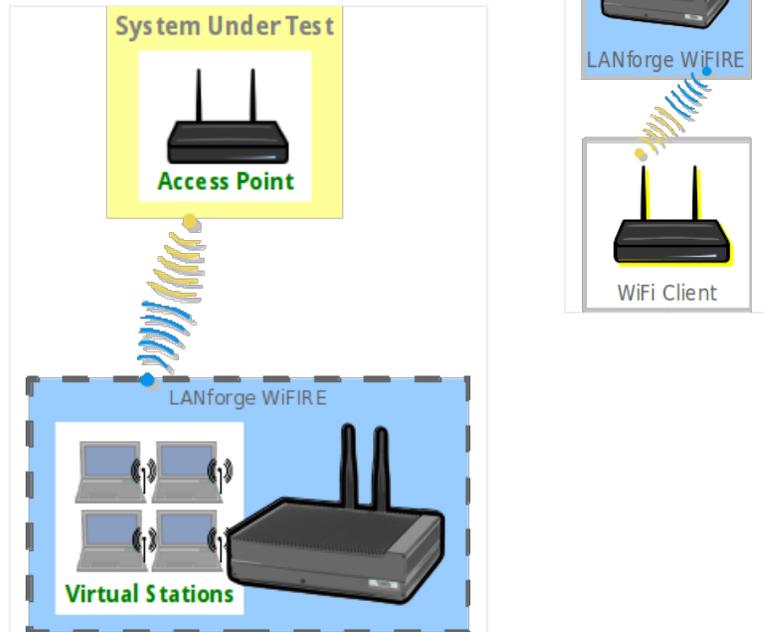


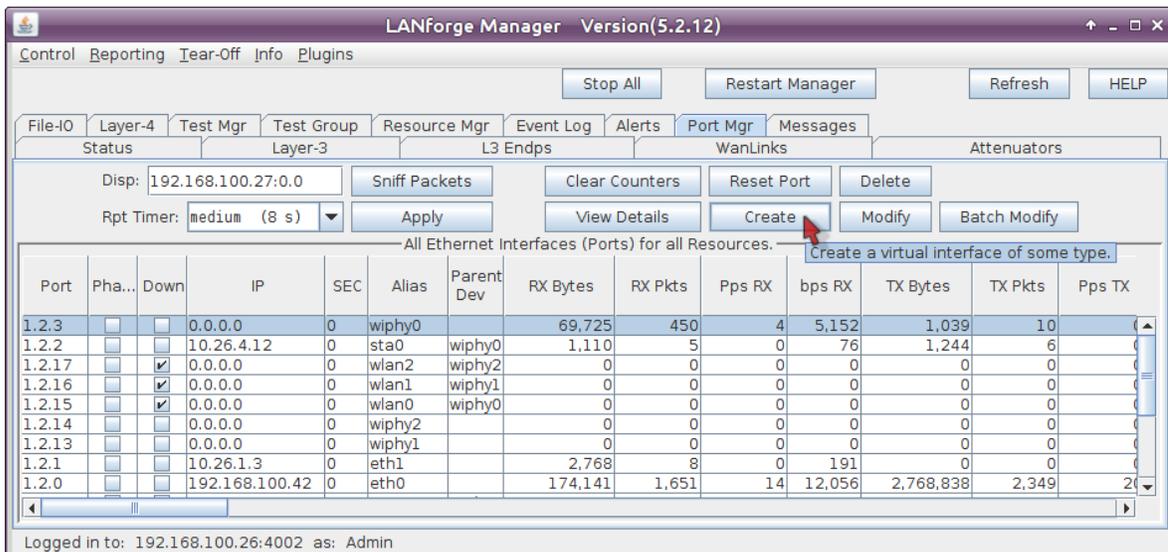
LANforge WiFi Station Reset Testing

Goal: Use the WiFi Port Reset plugin to emulate restarting of stations associated to your WiFi network. Requires LANforge 5.2.12 or later. Restarting a WiFi station exercises the whole network stack because it forces negotiation across the wired network: your AP, your DHCP server, your AP controller, and possibly your RADIUS server. Performing this test at an unusually high frequency is a challenging robustness test for your wireless topology and can expose possible race conditions when large numbers of stations reset simultaneously while passing traffic. This cookbook assumes the System Under Test is your AP and that a CT520 (or better) is emulating stations to be reset on the network.



1. Create WiFi stations

A. In the **Ports** tab, select *wiphy0* and click **Create**



Port	Pha...	Down	IP	SEC	Alias	Parent Dev	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps TX
1.2.3		<input type="checkbox"/>	0.0.0.0	0	wiphy0		69,725	450	4	5,152	1,039	10	
1.2.2		<input type="checkbox"/>	10.26.4.12	0	sta0	wiphy0	1,110	5	0	76	1,244	6	
1.2.17		<input checked="" type="checkbox"/>	0.0.0.0	0	wlan2	wiphy2	0	0	0	0	0	0	
1.2.16		<input checked="" type="checkbox"/>	0.0.0.0	0	wlan1	wiphy1	0	0	0	0	0	0	
1.2.15		<input checked="" type="checkbox"/>	0.0.0.0	0	wlan0	wiphy0	0	0	0	0	0	0	
1.2.14		<input type="checkbox"/>	0.0.0.0	0	wiphy2		0	0	0	0	0	0	
1.2.13		<input type="checkbox"/>	0.0.0.0	0	wiphy1		0	0	0	0	0	0	
1.2.1		<input type="checkbox"/>	10.26.1.3	0	eth1		2,768	8	0	191	0	0	
1.2.0		<input type="checkbox"/>	192.168.100.42	0	eth0		174,141	1,651	14	12,056	2,768,838	2,349	24

B. In the **Create VLANs** window, craft ten wifi stations:

Create VLANs on Port: 1.2.3

1 MAC-VLAN 802.1Q-VLAN Redirect Bridge GRE Tunnel
 WiFi STA WiFi VAP WiFi Monitor

2 Shelf: 1 Resource: 2 (kedtest) Port: 3 (wiphy0)

3 VLAN ID: **DHCP-IPv4**
 Parent MAC: 00:0e:8e:43:36:e9 DHCP Client ID:
 MAC Addr: xx:xx:xx:*:*:xx IP Address: Global IPv6: AUTO
 Quantity: 10 IP Mask or Bits: Link IPv6: AUTO
 Gateway IP: IPv6 GW: AUTO
 #1 Redir Name: #2 Redir Name:
 STA ID: 0 SSID: jedtest
 WiFi AP: Key/Phrase:
 Use WPA Use WPA2 Use WEP

4 Down

- A. Select *WiFi STA*
- B. For MAC address, choose `xx:xx:xx:*:*:xx`
- C. Select *DHCP-IPv4*
- D. Enter *Quantity 10*
- E. Specify *0* for *STA ID*
- F. The example *SSID* for this cookbook is `jedtest`
- G. ...and then click **Apply**

C. You will see ten stations created:

LANforge Manager Version(5.2.12)

Control Reporting Tear-Off Info Plugins

Stop All Restart Manager Refresh HELP

File-I/O Layer-4 Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr Messages

Status Layer-3 L3 Endps WanLinks Attenuators

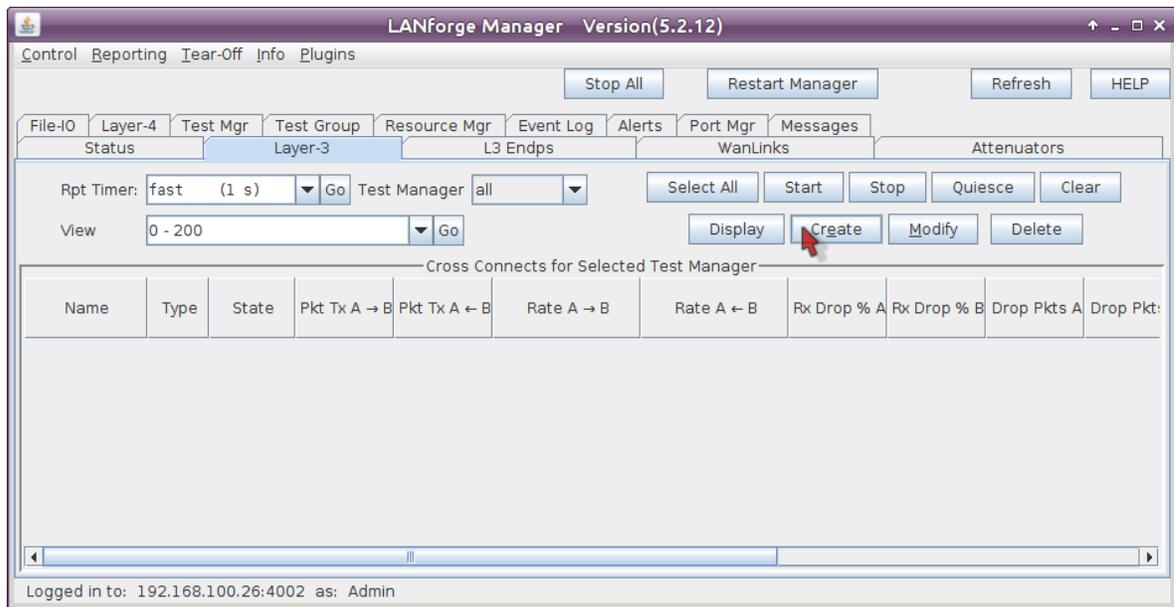
Disp: 192.168.100.27:0:0 Sniff Packets Clear Counters Reset Port Delete
 Rpt Timer: medium (8 s) Apply View Details Create Modify Batch Modify

All Ethernet Interfaces (Ports) for all Resources.

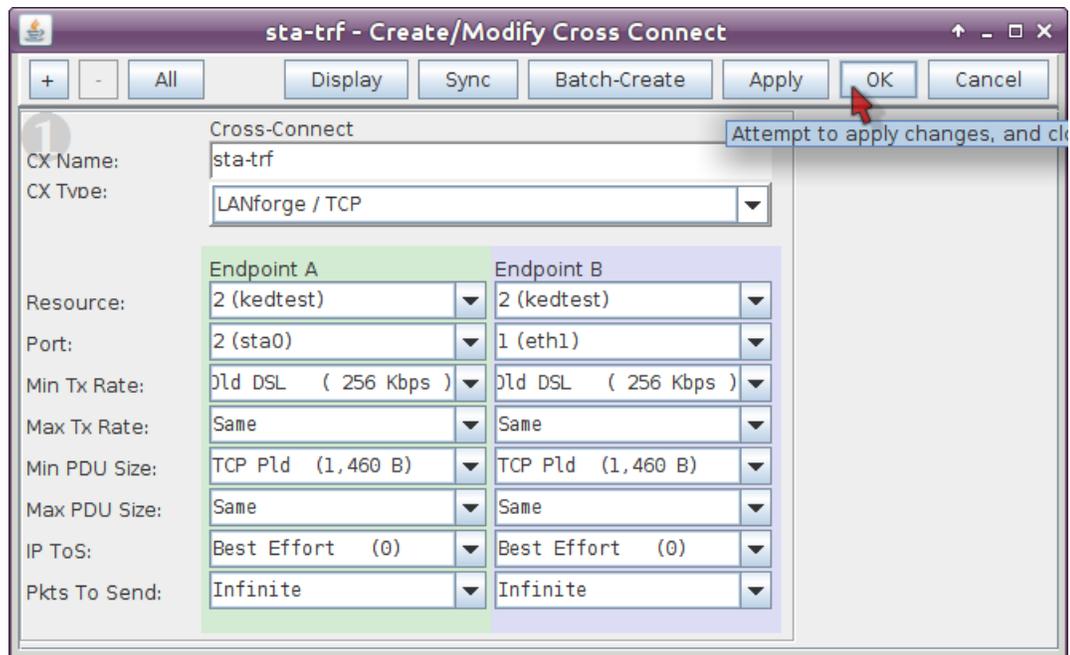
Port	Pha...	Down	IP	SEC	Alias	Parent Dev	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps TX
1.2.12			10.26.4.51	0	sta9	wiphy0	15,404	130	1	1,106	2,224	16	
1.2.11			10.26.4.49	0	sta8	wiphy0	15,836	132	1	1,136	2,586	17	
1.2.10			10.26.4.47	0	sta7	wiphy0	15,584	132	1	1,118	2,224	16	
1.2.09			10.26.4.42	0	sta6	wiphy0	14,612	122	1	1,048	13,052	60	
1.2.08			10.26.4.46	0	sta5	wiphy0	15,764	134	1	1,130	2,224	16	
1.2.07			10.26.4.43	0	sta4	wiphy0	15,896	136	1	1,139	2,648	18	
1.2.06			10.26.4.45	0	sta3	wiphy0	16,286	137	1	1,168	2,586	17	
1.2.05			10.26.4.44	0	sta2	wiphy0	16,034	137	1	1,149	2,224	16	
1.2.04			10.26.4.50	0	sta1	wiphy0	15,314	129	1	1,097	2,224	16	
1.2.02			10.26.4.48	0	sta0	wiphy0	16,508	140	1	1,211	2,648	18	
1.2.01			10.26.1.3	0	eth1		19,230	72	0	132	0	0	

Logged in to: 192.168.100.26:4002 as: Admin

2. Create Connections to Stations
 - A. In the **Layer-3** tab, click **Create**

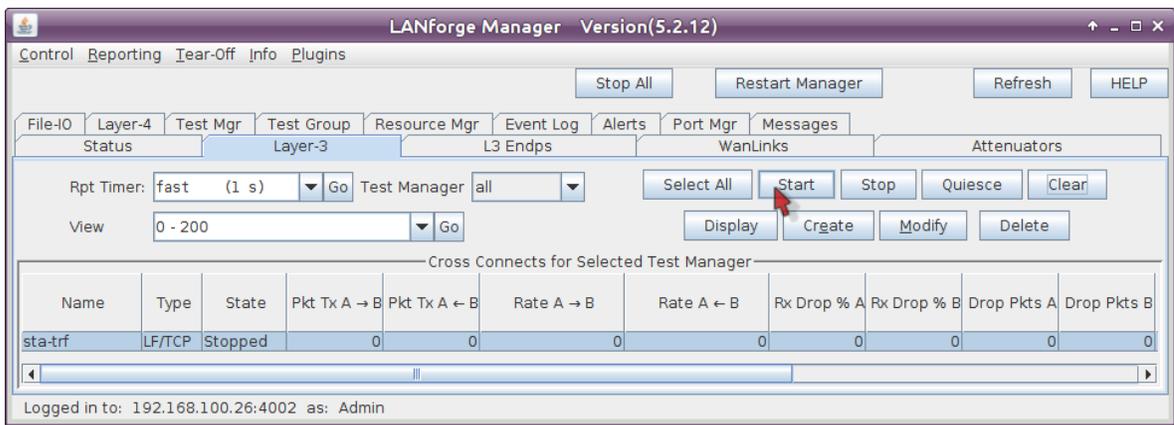


B. Create station download traffic



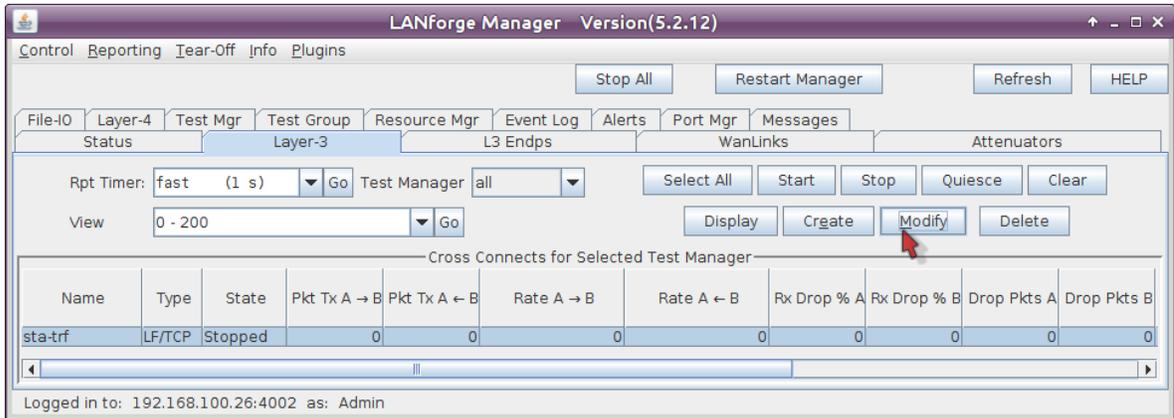
- A. This example connection is named *sta-trf*
- B. *Connection Type* is **LANforge / TCP**
- C. This example *resource* is **kedtest**, where our stations live
- D. The Endpoint A *Port* will be the station **sta0**.
- E. and the Endpoint B *Port* will be upstream of the ap, **eth1**.
- F. We'll set the *Min Tx Rate* for both sides to **265 Kbps**
- G. and set the *PDU Size* to **TCP Pld (1,460 B)**.
- H. ...then click **OK**

C. Test this station by selecting it and clicking **Start**

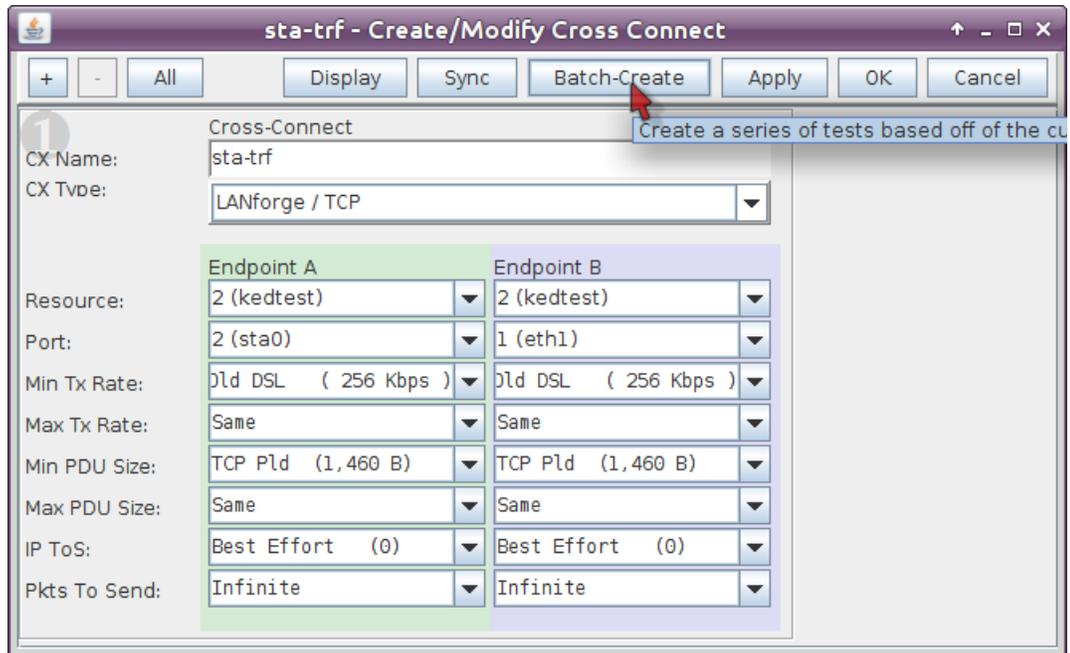


D. Click **Stop** when you are done testing the connection

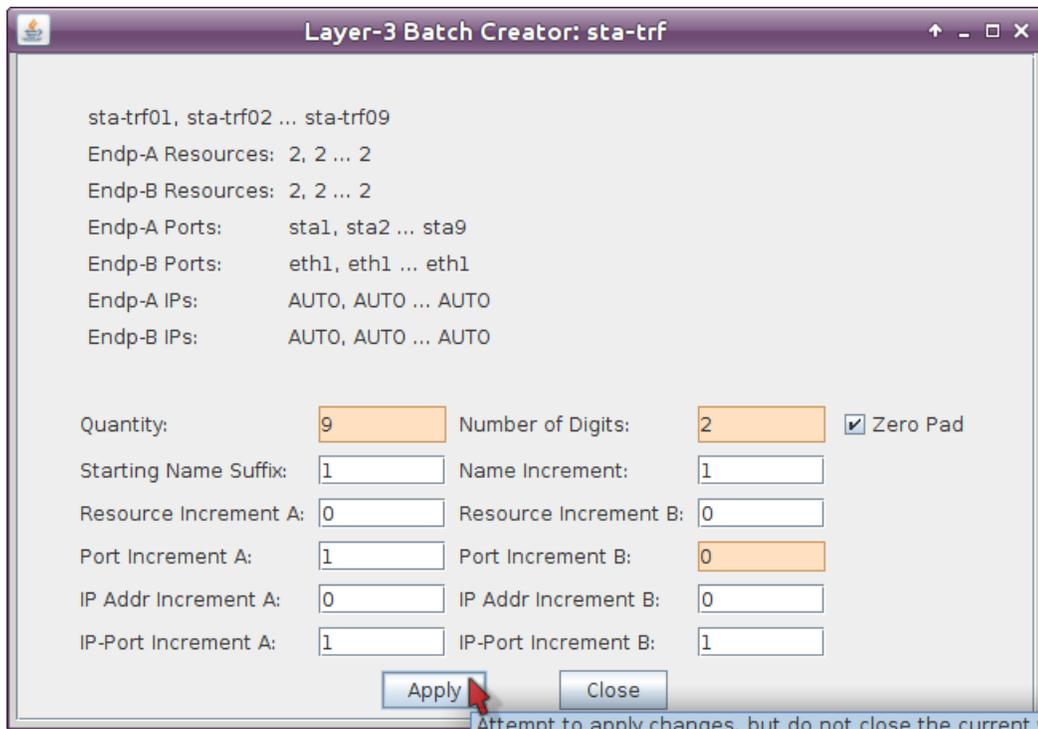
E. Click **Modify** for `sta-trf` and we will batch create nine more:



F. Click **Batch Create** in the *Create-Modify Cross Connect* window

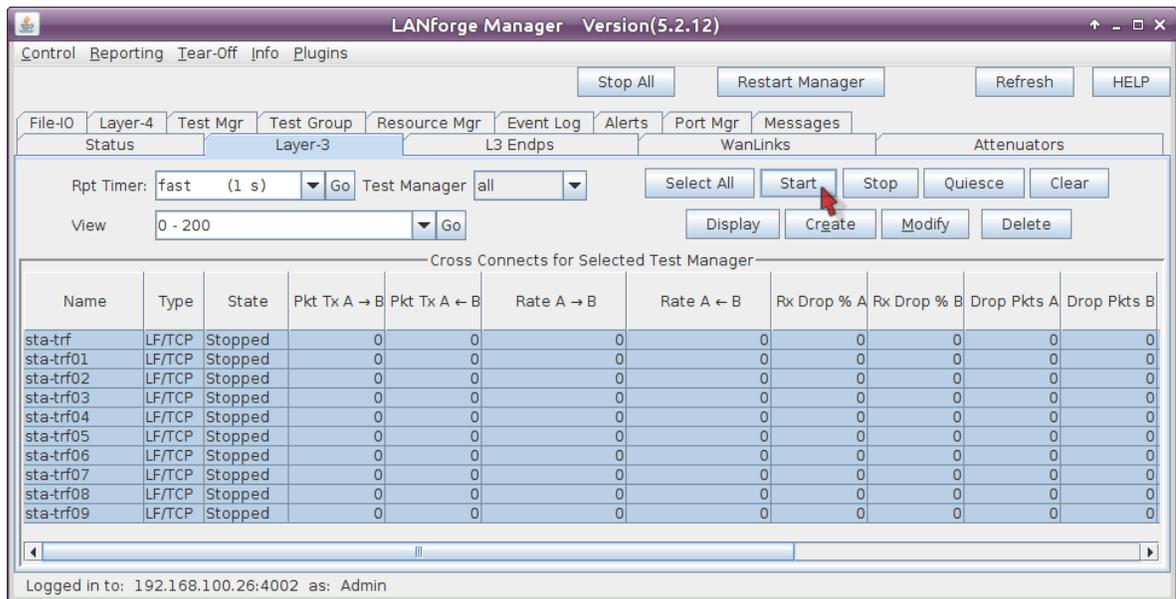


G. Create nine more cross connects like this one:

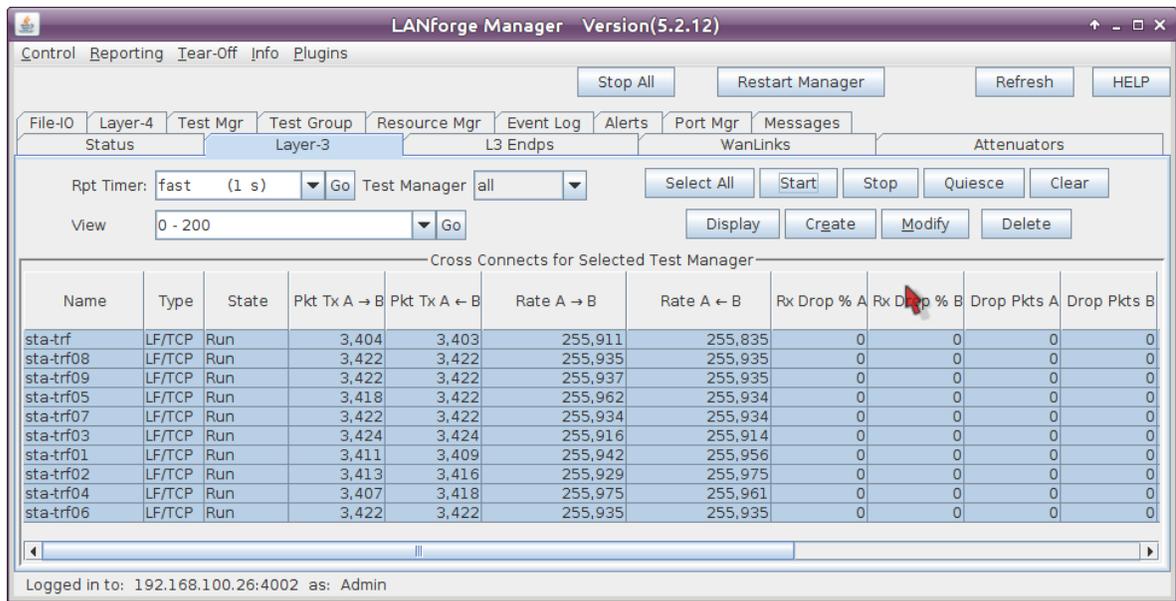


- A. Set *Quantity* to 9
- B. Set *Number of Digits* to 2
- C. We are not changing the B-side port, so we do not need to increment it. Set the *Port Increment B* to 0

H. Select all connections and click **Start**

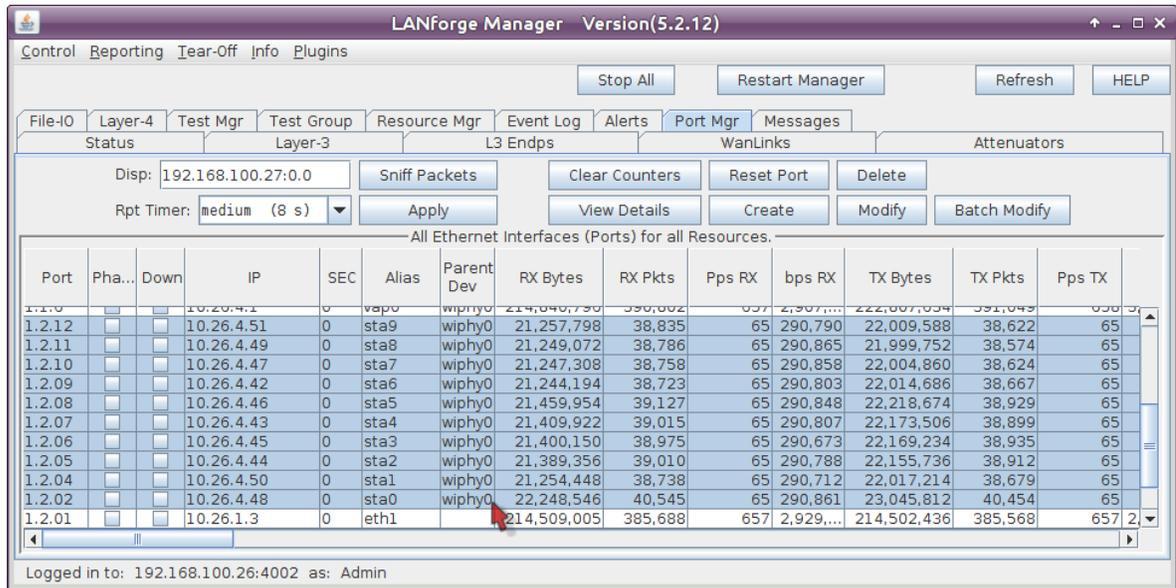


- I. Connections should not show dropped packets in the Rx Drop % A or Rx Drop % B columns

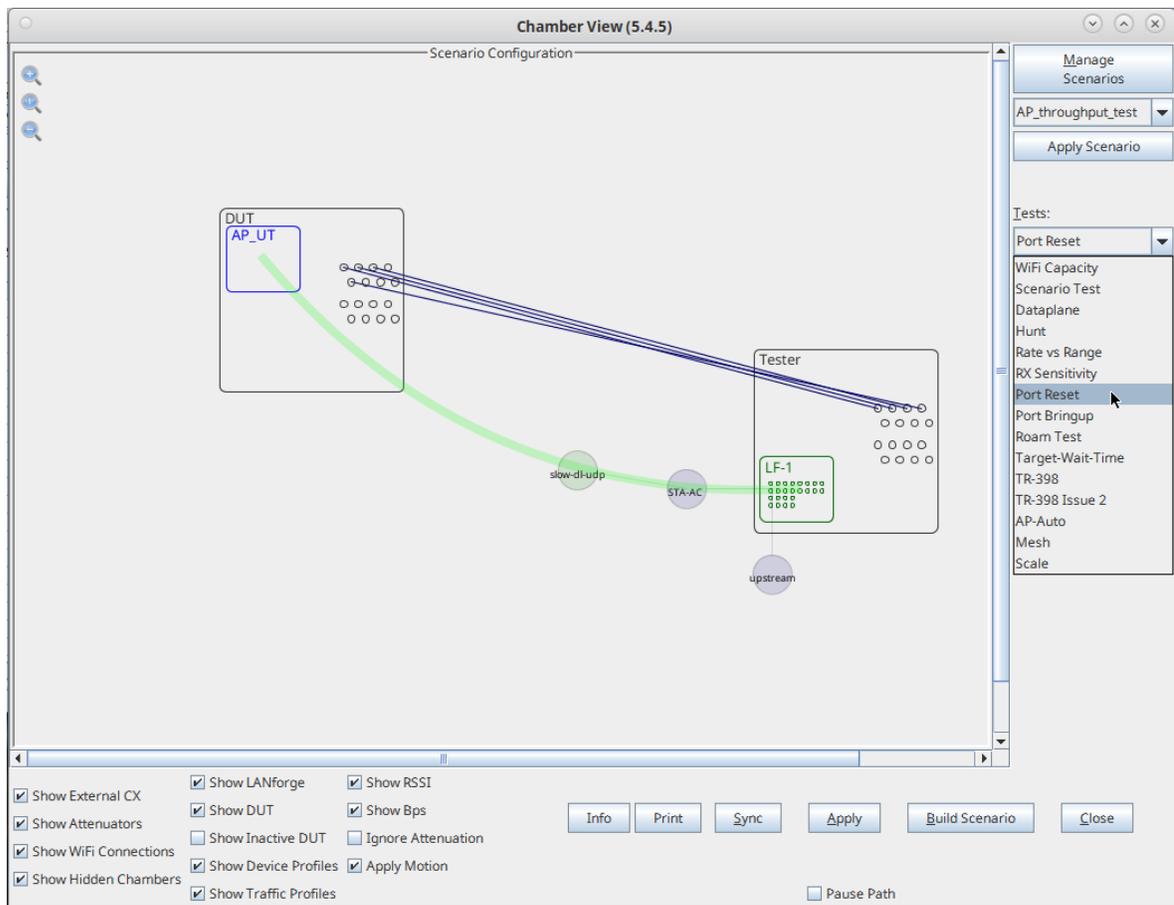


3. Configure Port Reset Script

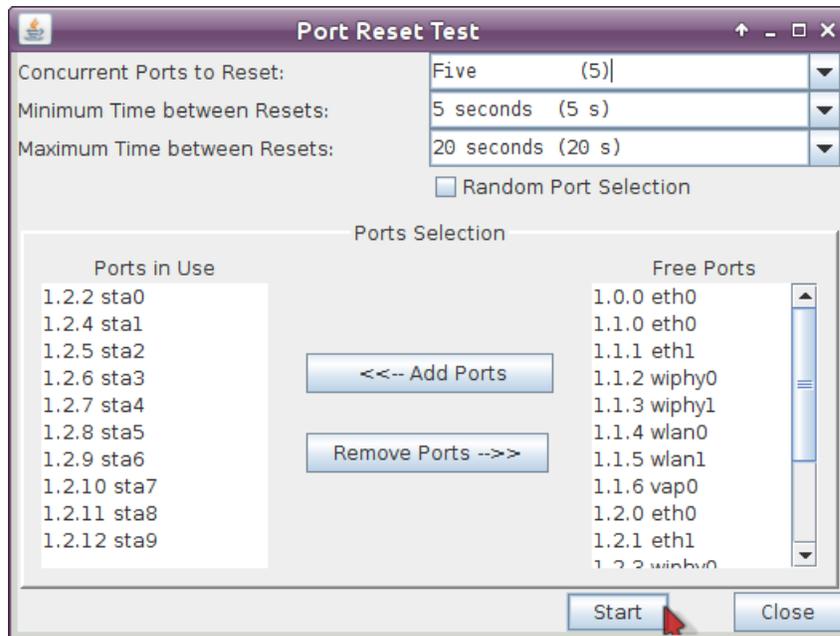
A. In the **Port Manager** tab, select stations **sta0 - sta9**



B. In the **LANforge Manager** windows, select the *Chamber View*→*Tests*→*Port Reset* option→*Run Test*



C. In the *Port Reset Test* window, you will see the ten ports already selected. We will configure quick resets for this test:



- A. Set *Concurrent Ports to Reset* to **5**
- B. Set *Minimum Time between Resets* to **5 seconds**
- C. and *Maximum Time between Resets* to **20 seconds**
- D. ...and click **Start**

4. Observe Results

- A. The *Port Reset Test Results* window will show the list of ports getting reset.



B. The *Layer-3* tab will show the amount of lost and dropped packets.

LANforge Manager Version(5.2.12)

Control Reporting Tear-Off Info Plugins

Stop All Restart Manager Refresh HELP

File-I/O Layer-4 Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr Messages

Status Layer-3 L3 Endps WanLinks Attenuators

Rpt Timer: fast (1 s) Go Test Manager all

Select All Start Stop Quiesce Clear

View 0 - 200 Display Create Modify Delete

Cross Connects for Selected Test Manager

Name	Type	State	Pkt Tx A → B	Pkt Tx A ← B	Rate A → B	Rate A ← B	Rx Drop % A	Rx Drop % B	Drop Pkts A	Drop Pkts B
sta-trf06	LF/TCP	Run	37,168	37,167	244,535	244,529	0.296	0.517	110	192
sta-trf01	LF/TCP	Run	36,584	36,589	240,615	240,604	0.344	0.541	126	198
sta-trf07	LF/TCP	Run	36,944	36,943	243,062	243,055	0.3	0.536	111	198
sta-trf09	LF/TCP	Run	36,666	36,665	241,233	241,226	0.475	0.54	174	198
sta-trf04	LF/TCP	Run	36,613	36,613	240,884	240,884	0.497	0.56	182	205
sta-trf08	LF/TCP	Run	36,666	36,665	241,233	241,226	0.305	0.537	112	197
sta-trf05	LF/TCP	Run	36,779	36,779	241,976	241,976	0.517	0.579	190	213
sta-trf02	LF/TCP	Run	36,498	36,498	240,127	240,127	0.299	0.556	109	203
sta-trf03	LF/TCP	Run	36,670	36,670	241,259	241,259	0.303	0.559	111	205
sta-trf	LF/TCP	Run	36,737	36,739	241,651	241,634	0.544	0.593	200	218

Logged in to: 192.168.100.26:4002 as: Admin

C. We can graph the throughput of the connections with the *Dynamic Report* menu option

LANforge Manager Version(5.2.12)

Control Reporting Tear-Off Info Plugins

Stop All Restart Manager Refresh HELP

File-I/O Layer-4 Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr Messages

Status Layer-3 L3 Endps WanLinks Attenuators

Rpt Timer: fast (1 s) Go Test Manager all

Select All Start Stop Quiesce Clear

View 0 - 200 Display Create Modify Delete

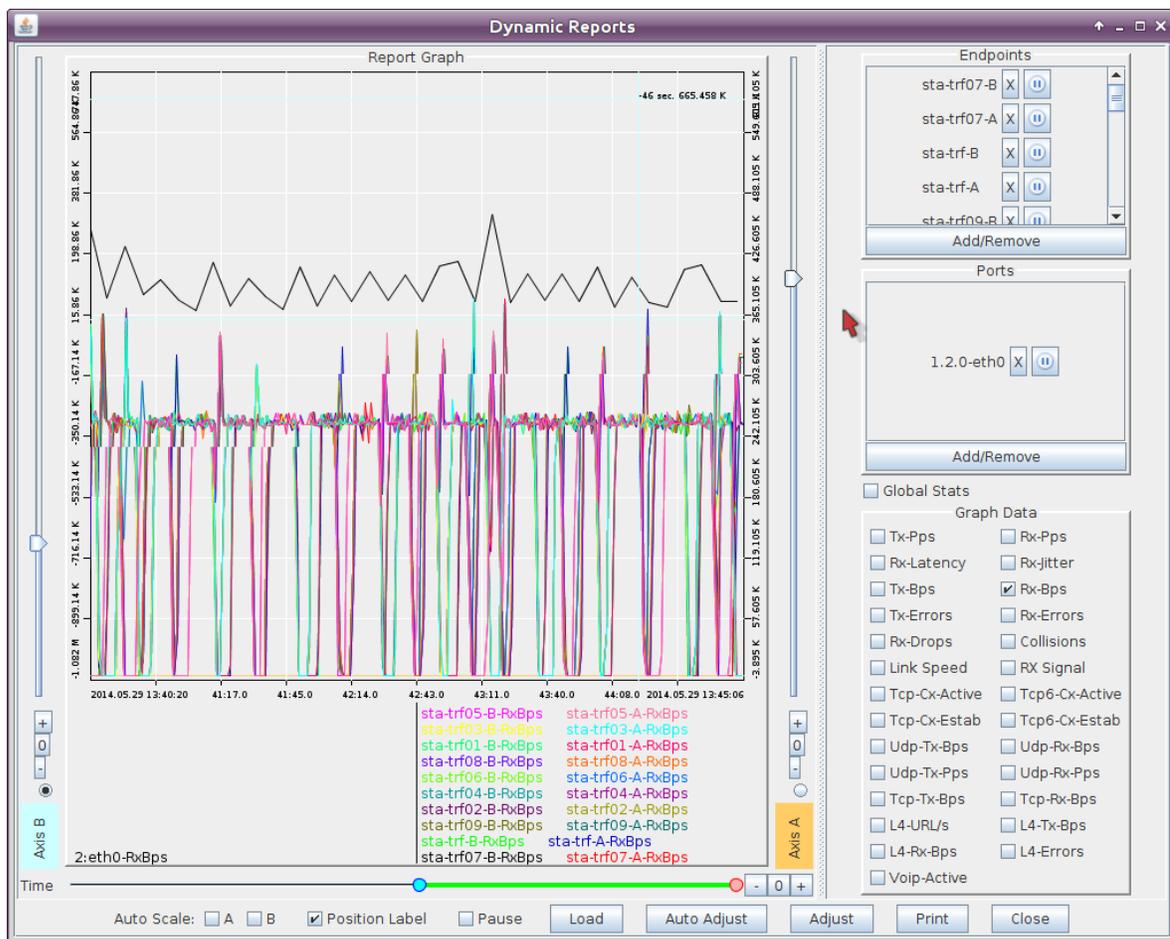
Cross Connects for Selected Test Manager

Name	Type	State	Pkt Tx A → B	Pkt Tx A ← B	Rate A → B	Rate A ← B	Rx Drop % A	Rx Drop % B	Drop Pkts A	Drop Pkts B
sta-trf05	LF/TCP	Run	37,223	37,223	241,038	241,038	0.537	0.602	200	224
sta-trf	LF/TCP	WAITING	37,295	37,294	241,849	241,843	0.617	0.627	230	234
sta-trf09	LF/TCP	Run	37,227		40,987	40,987	0.484	0.559	180	208
sta-trf08	LF/TCP	Run	37,218		40,987	40,987	0.317	0.556	118	207
sta-trf07	LF/TCP	Run	37,524		42,968	42,968	0.309	0.552	116	207
sta-trf04	LF/TCP	WAITING	37,181		41,110	41,110	0.584	0.584	217	217
sta-trf03	LF/TCP	WAITING	37,238		41,480	41,480	0.379	0.583	141	217
sta-trf02	LF/TCP	WAITING	37,066		40,364	40,364	0.391	0.58	145	215
sta-trf06	LF/TCP	Run	37,746		44,425	44,425	0.315	0.527	119	199
sta-trf01	LF/TCP	WAITING	37,139		40,825	40,825	0.399	0.584	148	217

Logged in to: 192.168.100.26:4002 as: Admin

- Start Selected
- Stop Selected
- Clear Selected
- Modify Selected
- Display Selected
- Dynamic Report
- Table Report
- Count Selected
- Calculations
- Add/Remove Table Columns

D. In the *Dynamic Reports* window, we are graphing the **Rx-Bps** for each connection in axis-A, and in axis-B we are graphing the Rx-Bps for the upstream port, *eth1*



E. You will also want to watch for warnings and failures. In the *Alerts* tab, you will see persistent alerts. The alerts in this picture can be safely ignored:

The screenshot shows the 'LANforge Manager Version(5.2.12)' interface with the 'Alerts' tab selected. The 'Alerts' tab contains a table with the following data:

Time-Stamp	ID	Priority	Name	Event	Event Description	Type	EID
2014-05-29 10:10:35.208	781	Warning	wlan0	WiFi-Config	Port wlan0 has no WiFi SSID Configured.	Port	1.2.15
2014-05-29 10:10:35.245	787	Warning	wlan1	WiFi-Config	Port wlan1 has no WiFi SSID Configured.	Port	1.2.16
2014-05-29 10:10:35.283	793	Warning	wlan2	WiFi-Config	Port wlan2 has no WiFi SSID Configured.	Port	1.2.17

F. Check the *LANforge Wireless Events* window. You will see station connects and disconnects and failure notices. The messages shown in this picture are normal:

The screenshot shows the 'LANforge Wireless Events (192.168.100.26:4002)' window. It displays a log of wireless events. The log entries include:

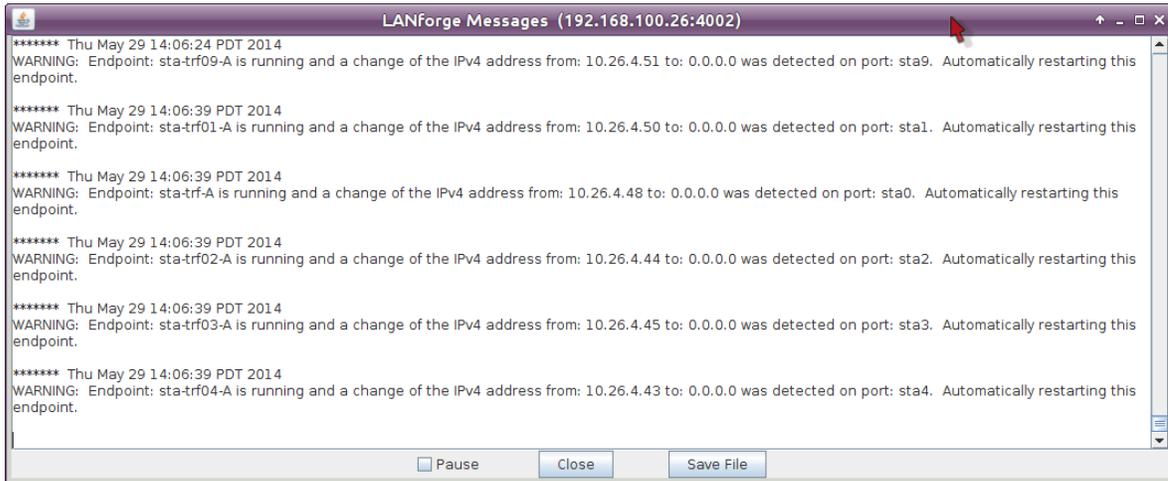
```

2014-05-29 14:03:57.201 1.2: sta6 (phy #0): disconnected (local request)
2014-05-29 14:03:57.201 1.2: sta6: new station 00:4f:73:a3:47:ce
2014-05-29 14:03:57.201 1.2: sta6 (phy #0): auth 00:4f:73:a3:47:ce -> 00:0e:8e:67:06:e9 status: 0: Successful
2014-05-29 14:03:57.201 1.2: sta6 (phy #0): assoc 00:4f:73:a3:47:ce -> 00:0e:8e:67:06:e9 status: 0: Successful
2014-05-29 14:03:57.201 1.2: sta6 (phy #0): connected to 00:4f:73:a3:47:ce
2014-05-29 14:03:57.201 1.2: sta7: del station 00:4f:73:a3:47:ce
2014-05-29 14:03:57.201 1.2: sta7 (phy #0): death 00:0e:8e:62:c1:e9 -> 00:4f:73:a3:47:ce reason 3: Deauthenticated because sending station is leaving (or has the IBSS or ESS)
2014-05-29 14:03:57.201 1.2: sta7 (phy #0): disconnected (local request)
2014-05-29 14:03:57.201 1.2: sta7: new station 00:4f:73:a3:47:ce
2014-05-29 14:03:57.201 1.2: sta7 (phy #0): auth 00:4f:73:a3:47:ce -> 00:0e:8e:62:c1:e9 status: 0: Successful
2014-05-29 14:03:57.201 1.2: sta7 (phy #0): assoc 00:4f:73:a3:47:ce -> 00:0e:8e:62:c1:e9 status: 0: Successful
2014-05-29 14:03:57.201 1.2: sta7 (phy #0): connected to 00:4f:73:a3:47:ce
2014-05-29 14:03:57.201 1.2: sta8: del station 00:4f:73:a3:47:ce
2014-05-29 14:03:57.201 1.2: sta8 (phy #0): death 00:0e:8e:cb:9e:e9 -> 00:4f:73:a3:47:ce reason 3: Deauthenticated because sending station is leaving (or has the IBSS or ESS)
2014-05-29 14:03:57.201 1.2: sta8 (phy #0): disconnected (local request)
2014-05-29 14:03:57.201 1.2: sta8: new station 00:4f:73:a3:47:ce
2014-05-29 14:03:57.201 1.2: sta8 (phy #0): auth 00:4f:73:a3:47:ce -> 00:0e:8e:cb:9e:e9 status: 0: Successful
2014-05-29 14:03:57.201 1.2: sta8 (phy #0): assoc 00:4f:73:a3:47:ce -> 00:0e:8e:cb:9e:e9 status: 0: Successful
2014-05-29 14:03:57.201 1.2: sta8 (phy #0): connected to 00:4f:73:a3:47:ce
2014-05-29 14:03:57.202 1.2: sta9: del station 00:4f:73:a3:47:ce
2014-05-29 14:03:57.202 1.2: sta9 (phy #0): death 00:0e:8e:d1:9b:e9 -> 00:4f:73:a3:47:ce reason 3: Deauthenticated because sending station is leaving (or has the IBSS or ESS)
2014-05-29 14:03:57.202 1.2: sta9 (phy #0): disconnected (local request)
2014-05-29 14:03:57.202 1.2: sta9: new station 00:4f:73:a3:47:ce
2014-05-29 14:03:57.202 1.2: sta9 (phy #0): auth 00:4f:73:a3:47:ce -> 00:0e:8e:d1:9b:e9 status: 0: Successful
2014-05-29 14:03:57.230 1.2: sta9 (phy #0): assoc 00:4f:73:a3:47:ce -> 00:0e:8e:d1:9b:e9 status: 0: Successful
2014-05-29 14:03:57.230 1.2: sta9 (phy #0): connected to 00:4f:73:a3:47:ce

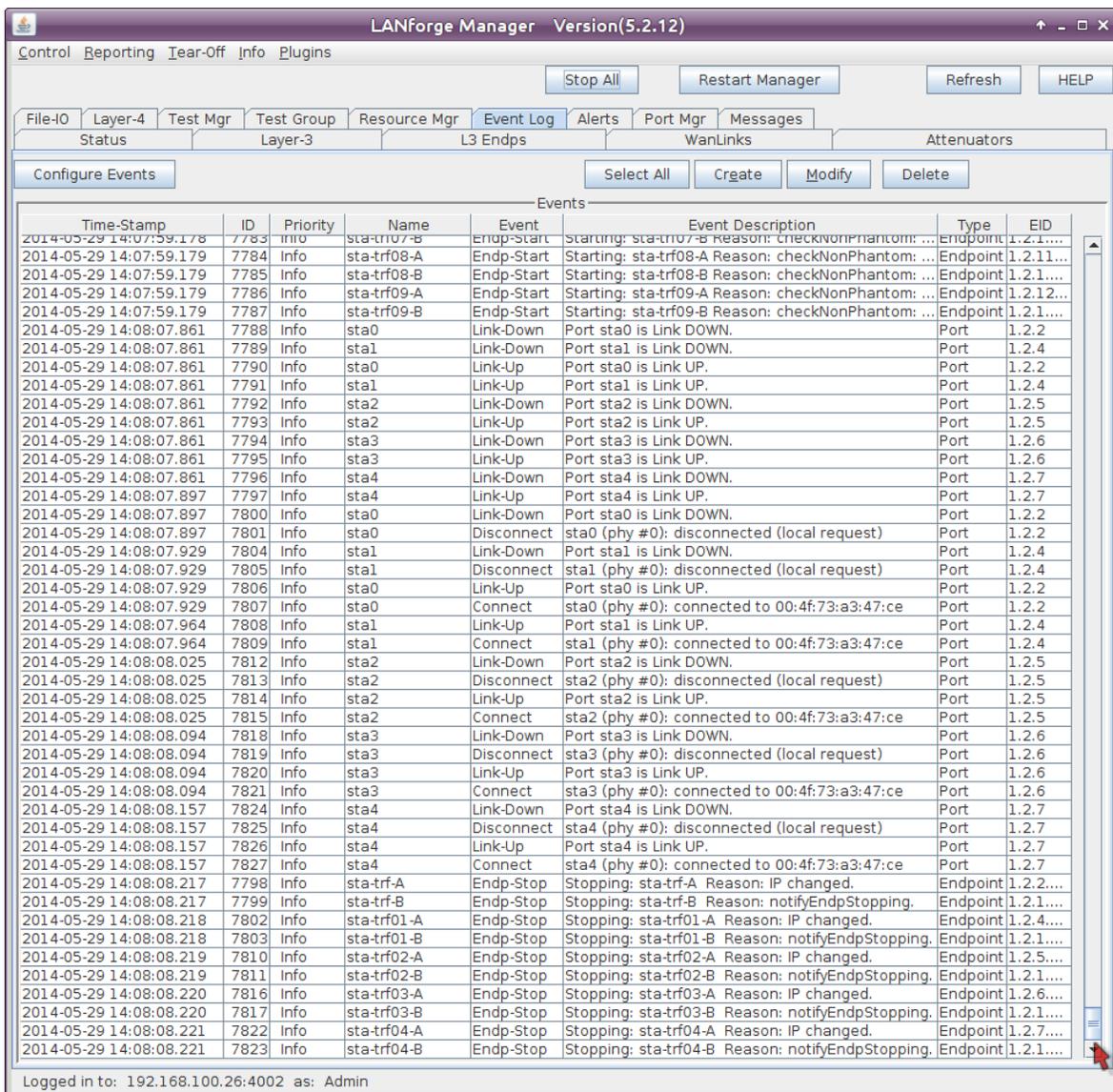
```

At the bottom of the window are buttons for 'Pause', 'Close', and 'Save File'.

G. In the *LANforge Messages* window, you will see connection warnings. Connections will warn when their IP changes, and this is normal, as shown in this picture:



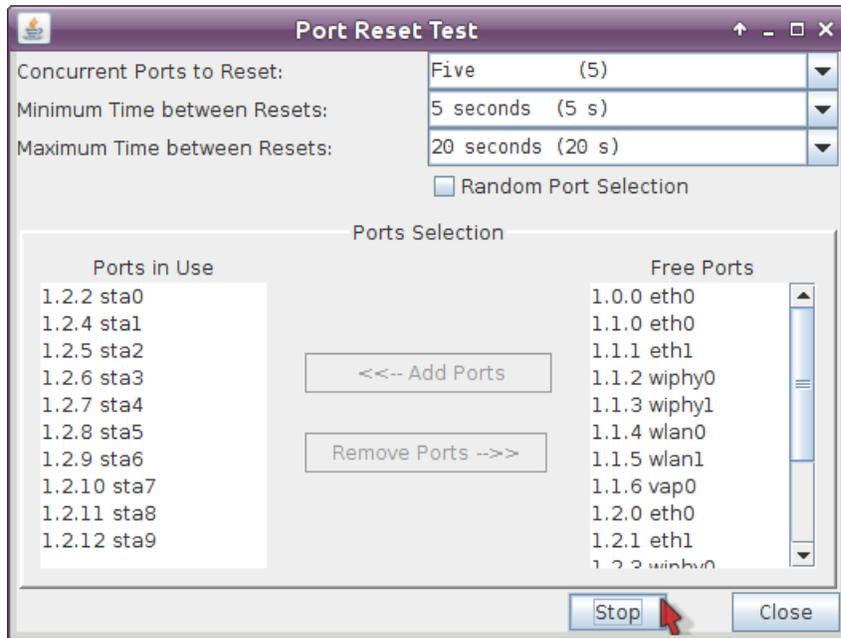
H. And in the *Event Log* tab, you can review more detailed link-up, link-down and connection events that occur with these station restarts:



I. Use these monitoring sources to check for undesirable trends:

- Undesirable slowing trend in traffic
- stations that do no return
- DHCP failures or pool exhaustion
- or uncommonly long station re-association events

5. Halt the test when you are finished.



Candela Technologies, Inc., 2417 Main Street, Suite 201, Ferndale, WA 98248, USA
www.candelatech.com | sales@candelatech.com | +1.360.380.1618