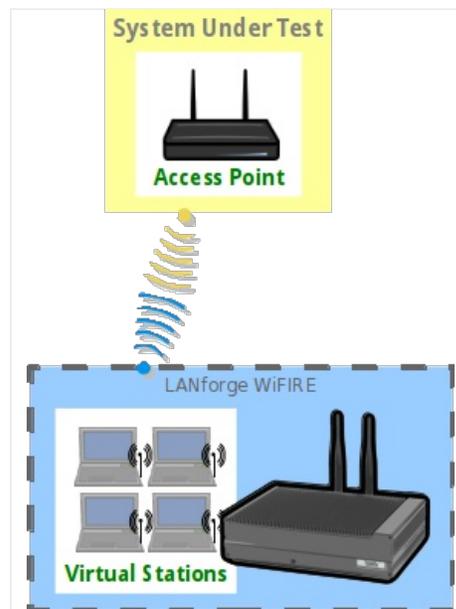


## LANforge WiFi Station Reset Testing

**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.



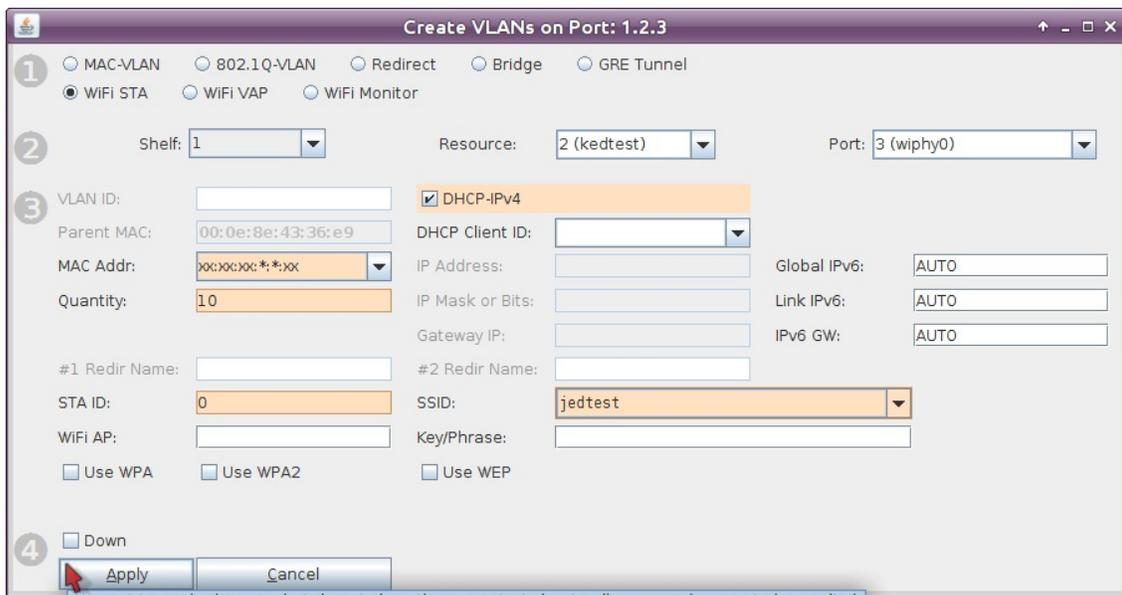
### 1. Create WiFi stations

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

The screenshot shows the LANforge Manager interface. The 'Port Mgr' tab is active, displaying a table of network interfaces. A red arrow points to the 'Create' button in the interface controls.

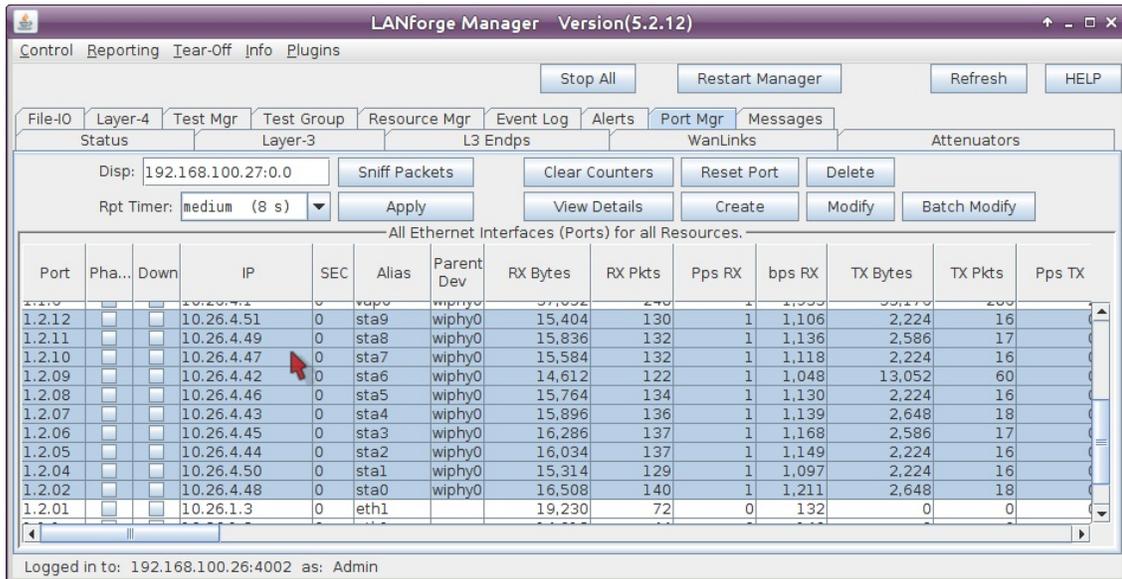
Port	Pha...	Down	IP	SEC	Alias	Parent Dev	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps TX
1.2.3			0.0.0.0	0	wiphy0		69,725	450	4	5,152	1,039	10	
1.2.2			10.26.4.12	0	sta0	wiphy0	1,110	5	0	76	1,244	6	
1.2.17		<input checked="" type="checkbox"/>	0.0.0.0	0	wlan2	wiphy2	0	0	0	0	0	0	0
1.2.16		<input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

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

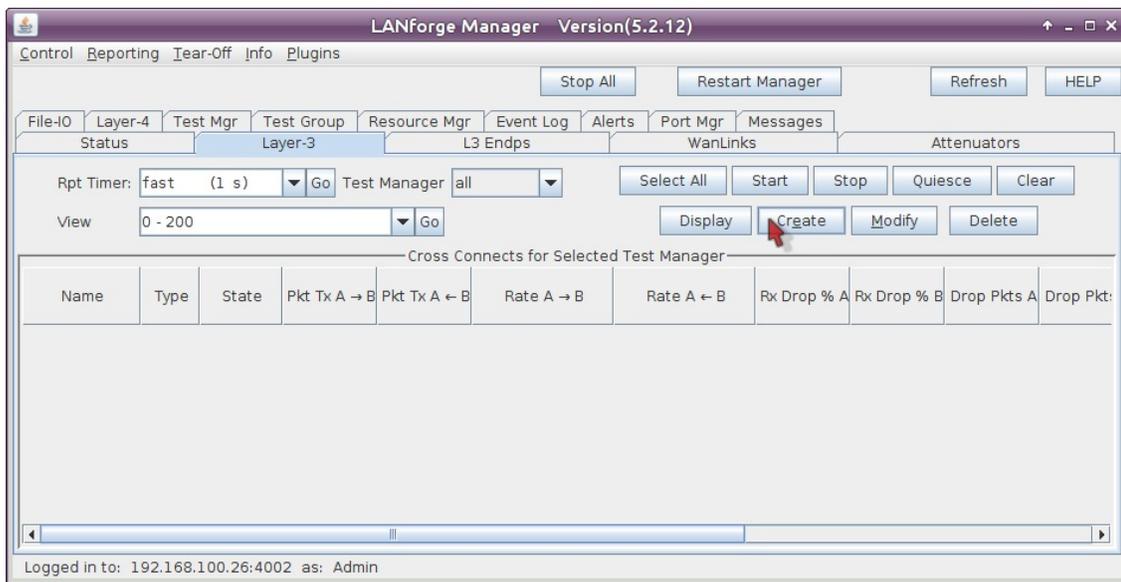


- A. Select WiFi STA
- B. For MAC address, choose `xx:xx:xx:*:*:xx`
- C. Select DHCP-IPv4
- D. Enter Quantity **10**
- E. Specify **0** for STA ID
- F. The example SSID for this cookbook is `jedtest`
- G. ...and then click **Apply**

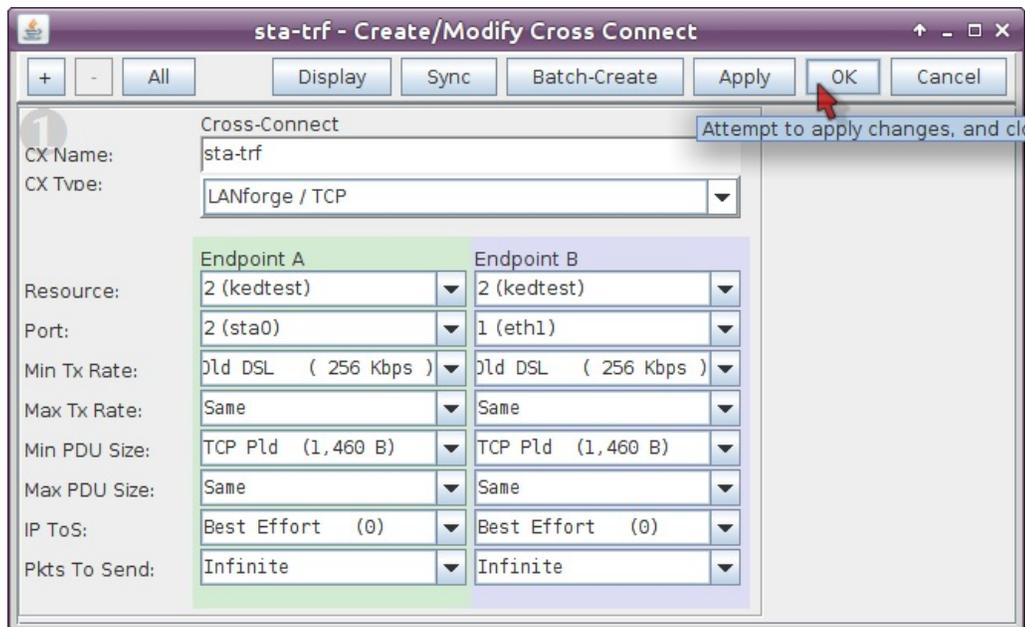
C. You will see ten stations created:



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

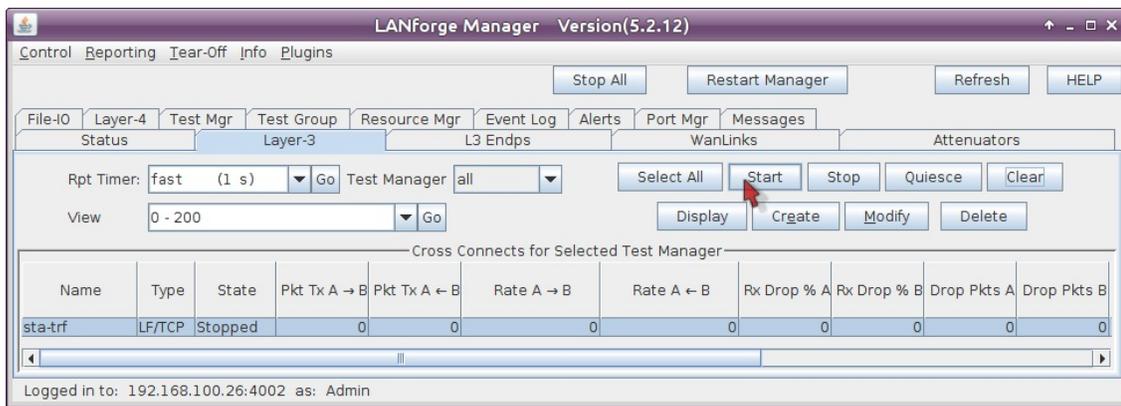


B. Create station download traffic

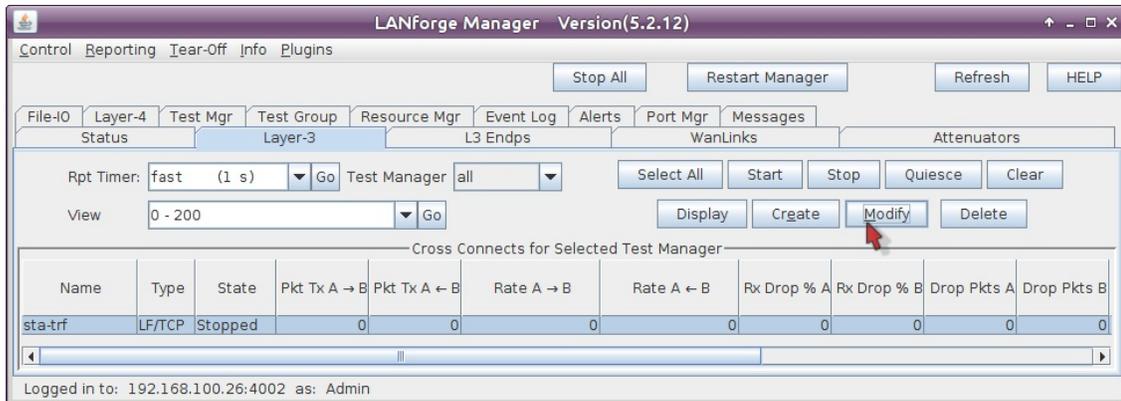


- This example connection is named **sta-trf**
- Connection Type is **LANforge / TCP**
- This example resource is **kedtest**, where our stations live
- The Endpoint A Port will be the station **sta0**,
- and the Endpoint B Port will be upstream of the ap, **eth1**.
- We'll set the Min Tx Rate for both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

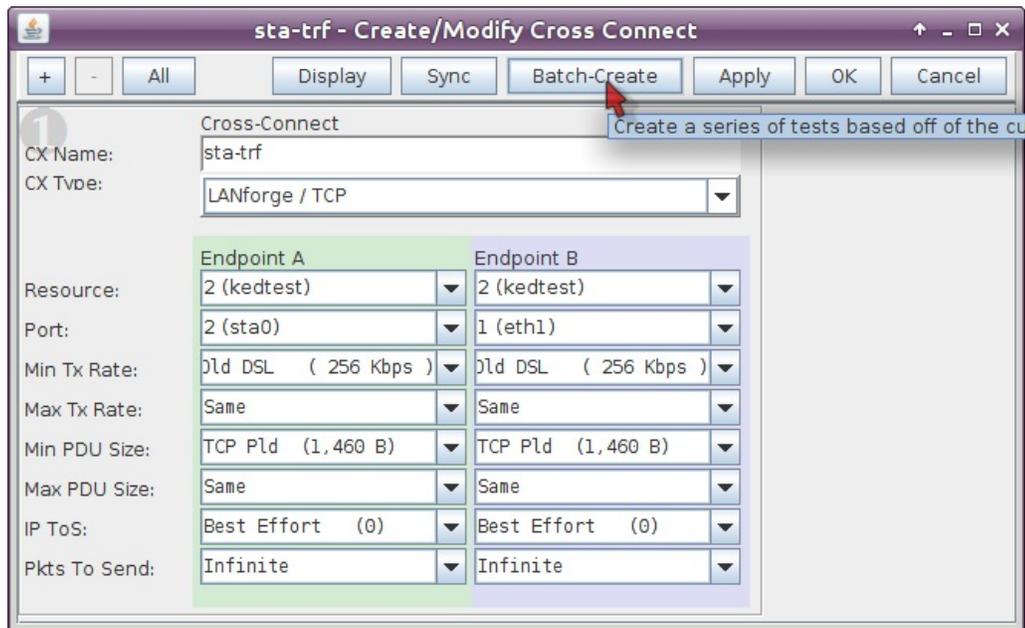
C. Test this station by selecting it and clicking **Start**



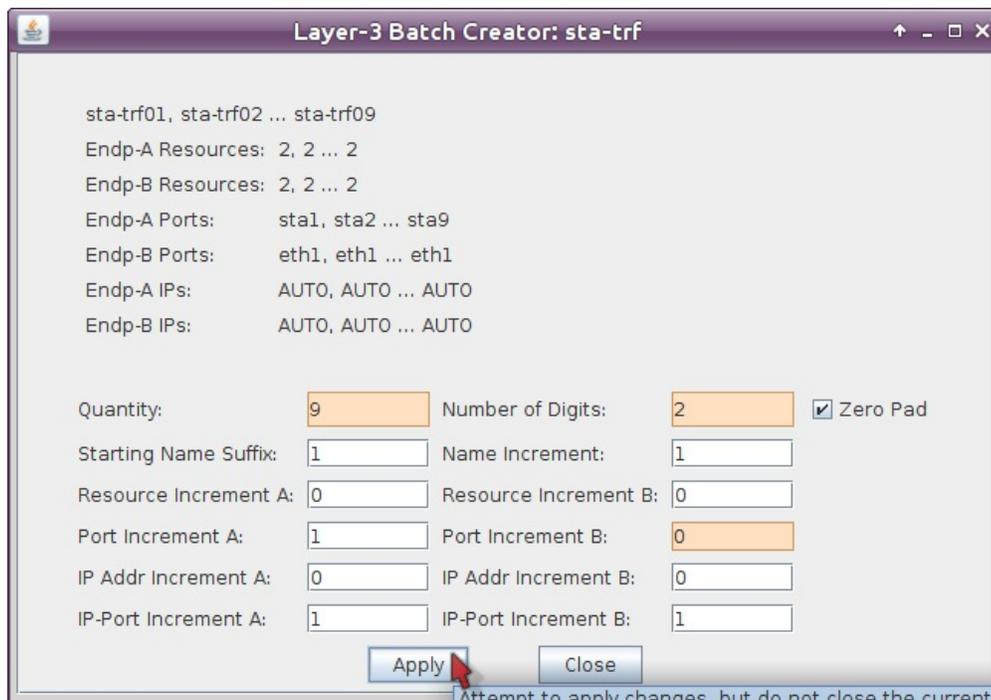
- D. Click **Stop** when you are done testing the connection
- E. Click **Modify** for **sta-trf** and we will batch create nine more:



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

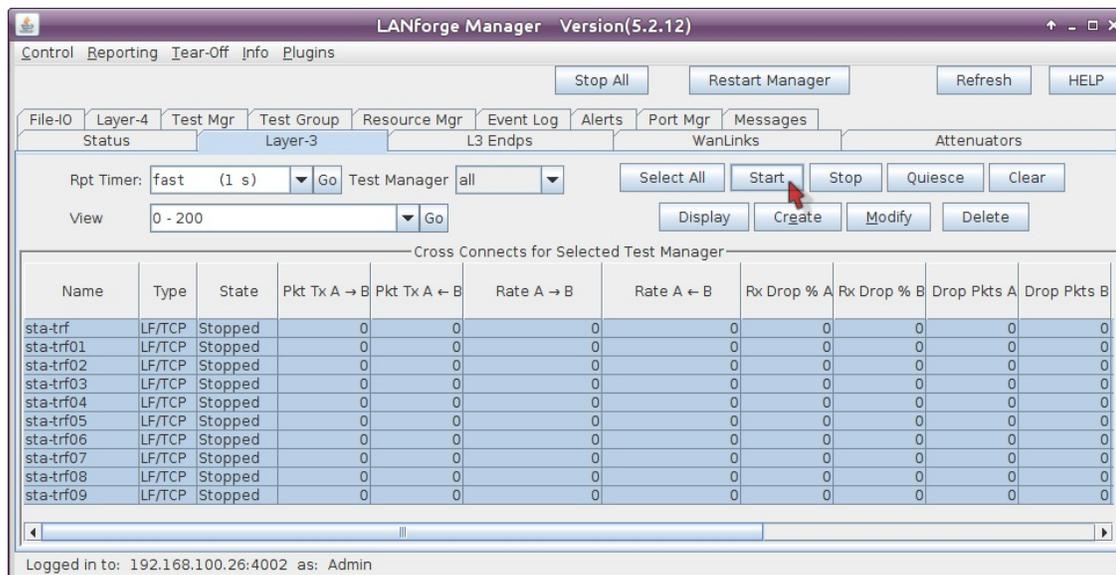


- G. Create nine more cross connects like this one:



Attempt to apply changes, but do not close the current v

- 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

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 Crgate 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-trf	LF/TCP	Run	3,404	3,403	255,911	255,835	0	0	0	0
sta-trf08	LF/TCP	Run	3,422	3,422	255,935	255,935	0	0	0	0
sta-trf09	LF/TCP	Run	3,422	3,422	255,937	255,935	0	0	0	0
sta-trf05	LF/TCP	Run	3,418	3,422	255,962	255,934	0	0	0	0
sta-trf07	LF/TCP	Run	3,422	3,422	255,934	255,934	0	0	0	0
sta-trf03	LF/TCP	Run	3,424	3,424	255,916	255,914	0	0	0	0
sta-trf01	LF/TCP	Run	3,411	3,409	255,942	255,956	0	0	0	0
sta-trf02	LF/TCP	Run	3,413	3,416	255,929	255,975	0	0	0	0
sta-trf04	LF/TCP	Run	3,407	3,418	255,975	255,961	0	0	0	0
sta-trf06	LF/TCP	Run	3,422	3,422	255,935	255,935	0	0	0	0

Logged in to: 192.168.100.26:4002 as: Admin

### 3. Configure Port Reset Script

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

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

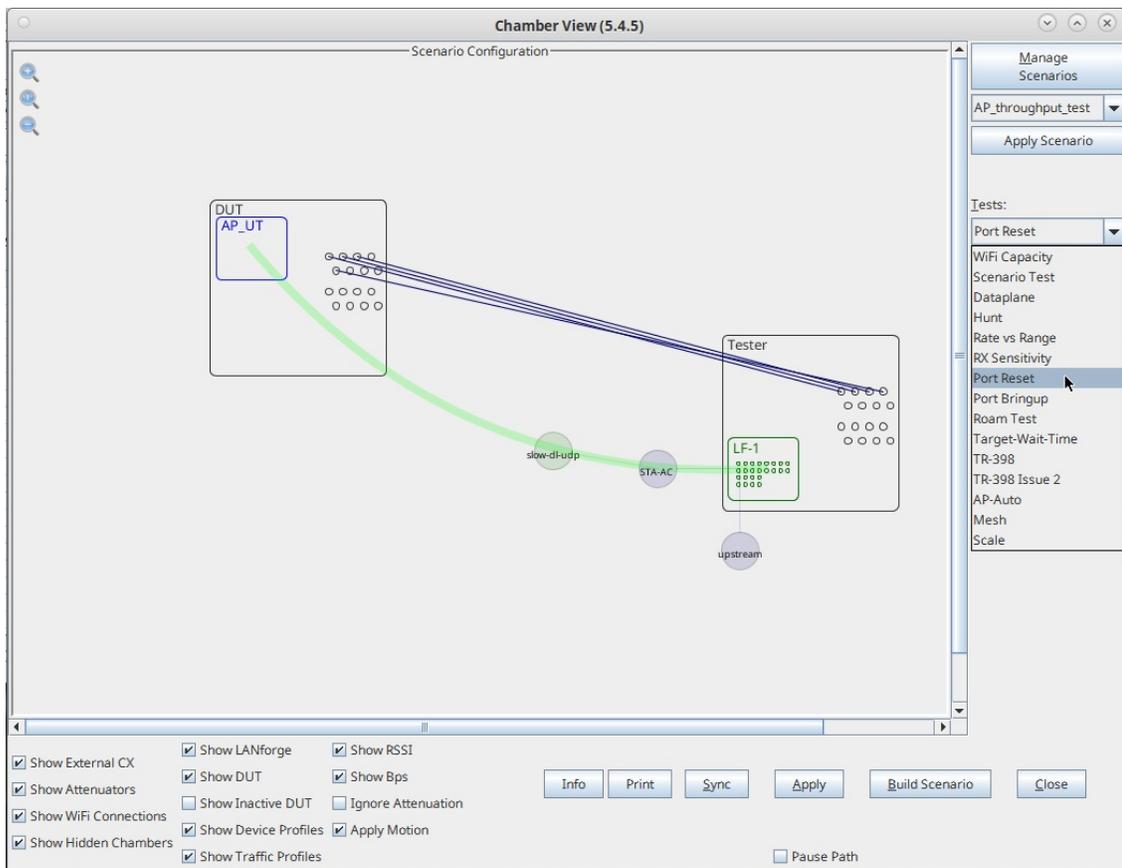
Rpt Timer: medium (8 s) Apply View Details Create Modify Batch Modify

All Ethernet Interfaces (Ports) for all Resources.

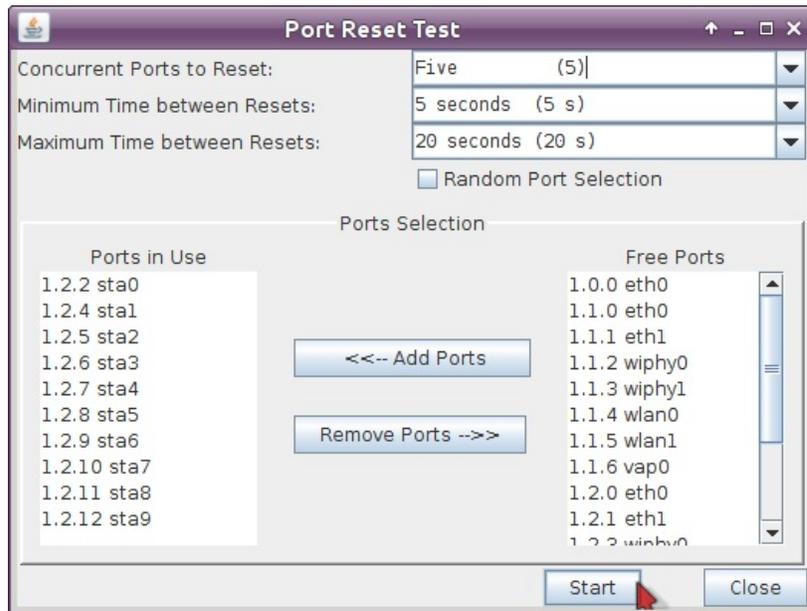
Port	Pha...	Down	IP	SEC	Alias	Parent Dev	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps TX
1.2.12			10.26.4.51	0	sta9	wiphy0	21,257,798	38,835	65	290,790	22,009,588	38,622	65
1.2.11			10.26.4.49	0	sta8	wiphy0	21,249,072	38,786	65	290,865	21,999,752	38,574	65
1.2.10			10.26.4.47	0	sta7	wiphy0	21,247,308	38,758	65	290,858	22,004,860	38,624	65
1.2.09			10.26.4.42	0	sta6	wiphy0	21,244,194	38,723	65	290,803	22,014,686	38,667	65
1.2.08			10.26.4.46	0	sta5	wiphy0	21,459,954	39,127	65	290,848	22,218,674	38,929	65
1.2.07			10.26.4.43	0	sta4	wiphy0	21,409,922	39,015	65	290,807	22,173,506	38,899	65
1.2.06			10.26.4.45	0	sta3	wiphy0	21,400,150	38,975	65	290,673	22,169,234	38,935	65
1.2.05			10.26.4.44	0	sta2	wiphy0	21,389,356	39,010	65	290,788	22,155,736	38,912	65
1.2.04			10.26.4.50	0	sta1	wiphy0	21,254,448	38,738	65	290,712	22,017,214	38,679	65
1.2.02			10.26.4.48	0	sta0	wiphy0	22,248,546	40,545	65	290,861	23,045,812	40,454	65
1.2.01			10.26.1.3	0	eth1		214,509,005	385,688	657	2,929,...	214,502,436	385,568	657

Logged in to: 192.168.100.26:4002 as: Admin

- 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.

Graphical Script Report for: Port Reset Test

Port Reset script requested values:  
Concurrent Ports to Reset: Five (5)  
Minimum Time between Resets: 5 seconds (5 s)  
Maximum Time between Resets: 20 seconds (20 s)  
Random Port Selection: false  
Date: Thu May 29 13:35:50 PDT 2014  
Build Date: Tue May 20 10:57:47 PDT 2014  
Build Version: 5.2.12

Add Your Notes Below:

1401395999.969 reset\_port 1 2 sta6  
1401395999.969 reset\_port 1 2 sta7  
1401395999.970 reset\_port 1 2 sta8  
1401395999.971 reset\_port 1 2 sta9  
1401396012.250 reset\_port 1 2 sta0  
1401396012.250 reset\_port 1 2 sta1  
1401396012.250 reset\_port 1 2 sta2  
1401396012.251 reset\_port 1 2 sta3  
1401396012.251 reset\_port 1 2 sta4  
1401396030.832 reset\_port 1 2 sta5  
1401396030.832 reset\_port 1 2 sta6  
1401396030.832 reset\_port 1 2 sta7  
1401396030.832 reset\_port 1 2 sta8  
1401396030.832 reset\_port 1 2 sta9  
1401396035.948 reset\_port 1 2 sta0  
1401396035.948 reset\_port 1 2 sta1  
1401396035.948 reset\_port 1 2 sta2  
1401396035.948 reset\_port 1 2 sta3  
1401396035.948 reset\_port 1 2 sta4  
1401396045.998 reset\_port 1 2 sta5  
1401396045.998 reset\_port 1 2 sta6  
1401396045.999 reset\_port 1 2 sta7  
1401396045.999 reset\_port 1 2 sta8  
1401396045.999 reset\_port 1 2 sta9  
1401396052.644 reset\_port 1 2 sta0  
1401396052.645 reset\_port 1 2 sta1  
1401396052.645 reset\_port 1 2 sta2  
1401396052.645 reset\_port 1 2 sta3  
1401396052.645 reset\_port 1 2 sta4  
1401396066.772 reset\_port 1 2 sta5  
1401396066.773 reset\_port 1 2 sta6  
1401396066.773 reset\_port 1 2 sta7  
1401396066.773 reset\_port 1 2 sta8  
1401396066.773 reset\_port 1 2 sta9  
1401396085.062 reset\_port 1 2 sta0  
1401396085.062 reset\_port 1 2 sta1  
1401396085.062 reset\_port 1 2 sta2  
1401396085.062 reset\_port 1 2 sta3  
1401396085.062 reset\_port 1 2 sta4  
1401396100.676 reset\_port 1 2 sta5

Close Save File

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-IO 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 Crgate 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-IO 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 Crgate Modify Delete

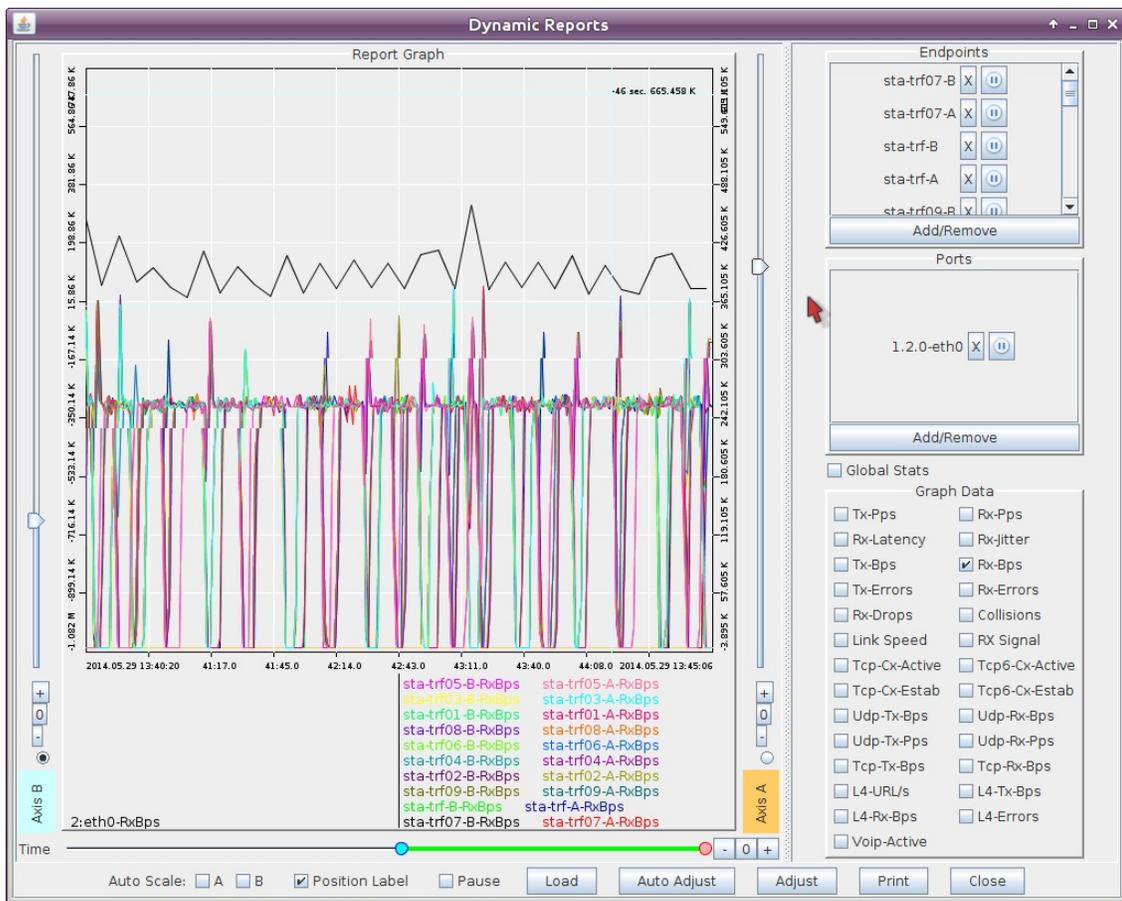
Cross Connects for Selected Test Manager

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	241,843	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)' Alerts tab. The table below contains the alert 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:

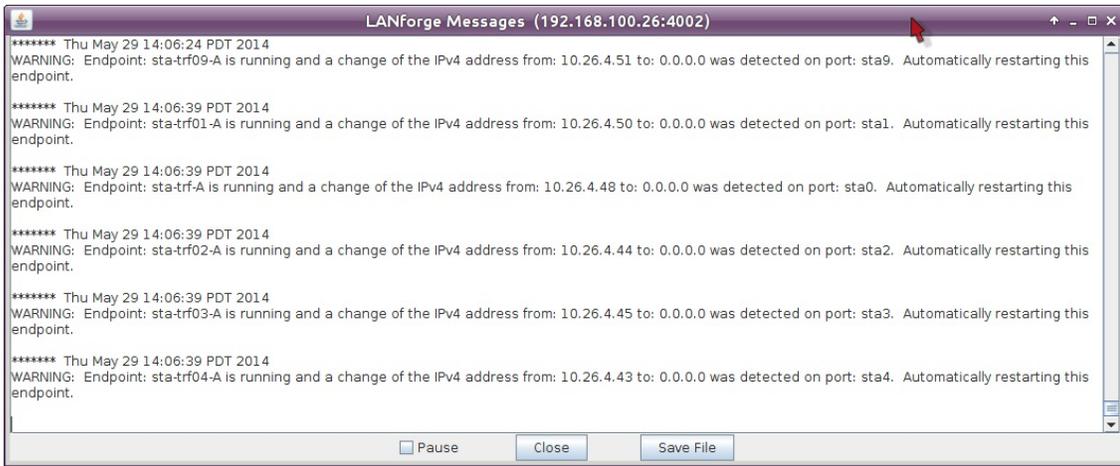
The screenshot shows the 'LANforge Wireless Events (192.168.100.26:4002)' window. The log contains the following entries:

```

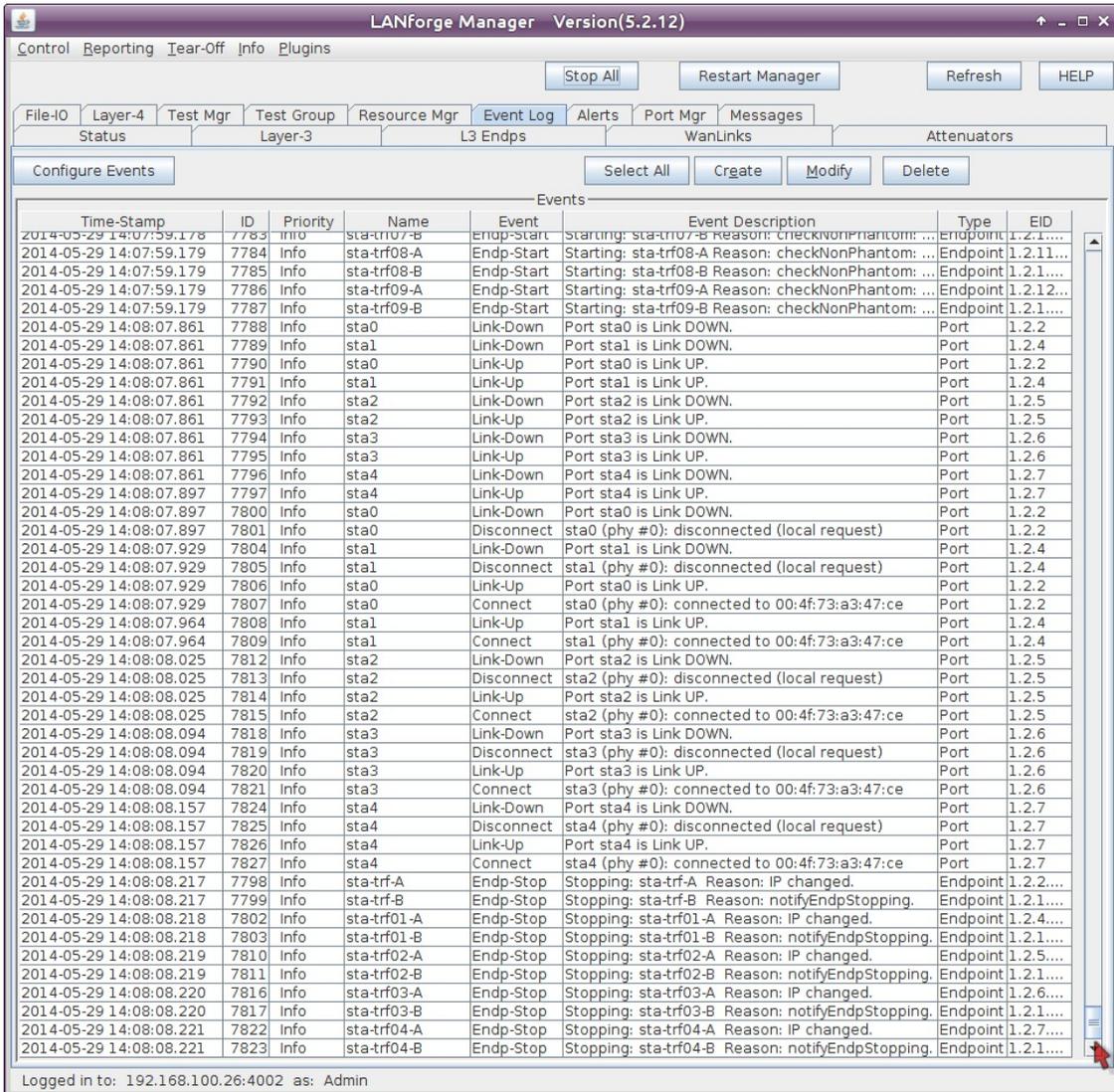
2014-05-29 14:03:57.201 1.2: sta6 (phy #0): disconnected (local request)
2014-05-29 14:03:57.201 1.2: sta6: new station 00:4f:73:a3:47:ce
2014-05-29 14:03:57.201 1.2: sta6 (phy #0): auth 00:4f:73:a3:47:ce -> 00:0e:8e:67:06:e9 status: 0: Successful
2014-05-29 14:03:57.201 1.2: sta6 (phy #0): assoc 00:4f:73:a3:47:ce -> 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): deauth 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): deauth 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): deauth 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

```

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:



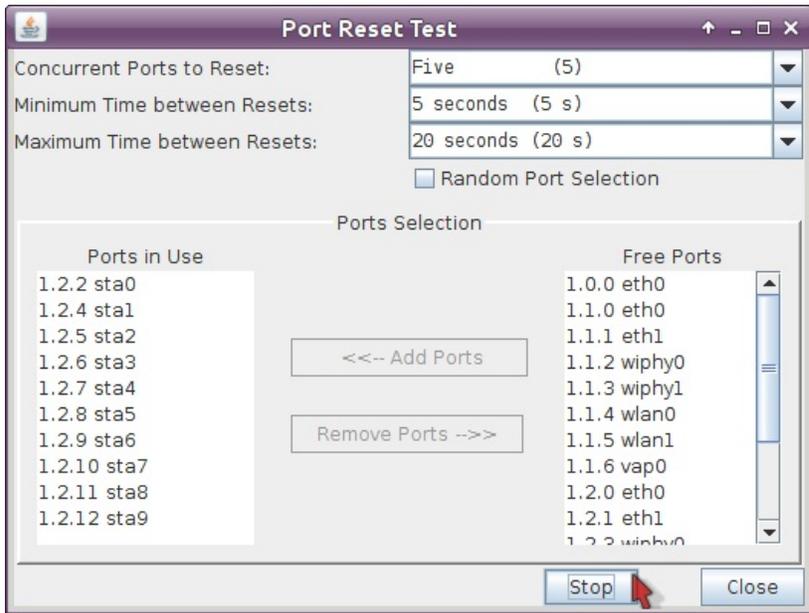
H. And in the Event Log tab, you can review more detailed link-up, link-down and connection events that occur with these station restarts:



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