

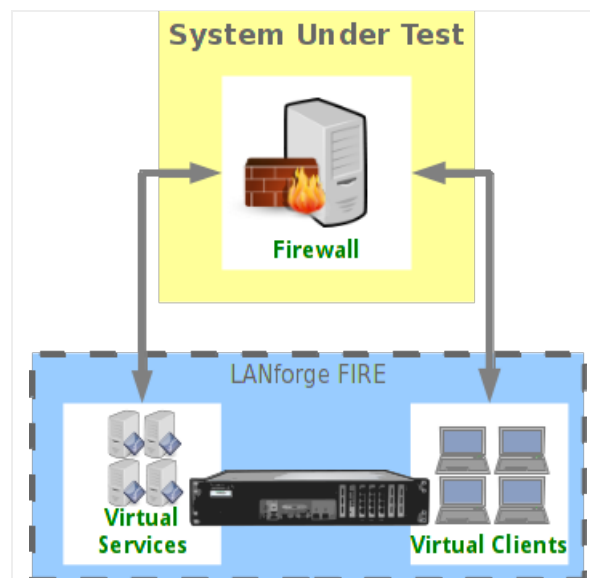
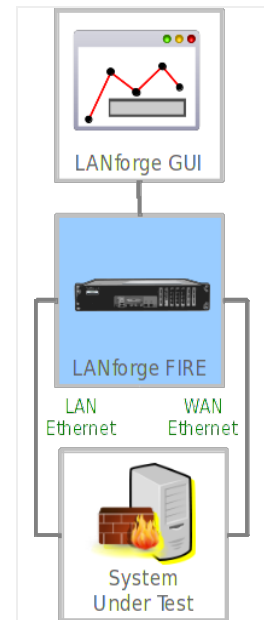
Multiple Thousands of UDP Connections

Goal: Set up and run traffic on multiple thousands of UDP connections.

LANforge-FIRE has the capability to create multiple thousands of UDP connections using only two ports. This example creates 1000 Layer-3 connections between two sets of 1000 MAC-VLANs that can all run simultaneously. This feature can be used to test stateless connection services such as DNS, DHCP, and file streaming systems.

The upper limit of the total number of concurrent connections is determined by the processor speed and total memory available on the system running the LANforge server software. In addition, the packet rate and payload size of each connection will also affect performance. Larger packet sizes take less CPU time to process.

NOTE: If you are attempting to run this test scenario, you will need a LANforge license key that enables the correct number of ports. Please contact us at support@candelatech.com for assistance.



1. For this example, we are using a CT503-MIX 1Gx4 with multiple 10 Gigabit fiber NICs. We have cabled two physical ports on this single LANforge system together. Our plan of action will be to create 1000 MAC-VLANs on each port as endpoints for 1000 Layer-3 UDP cross connections.

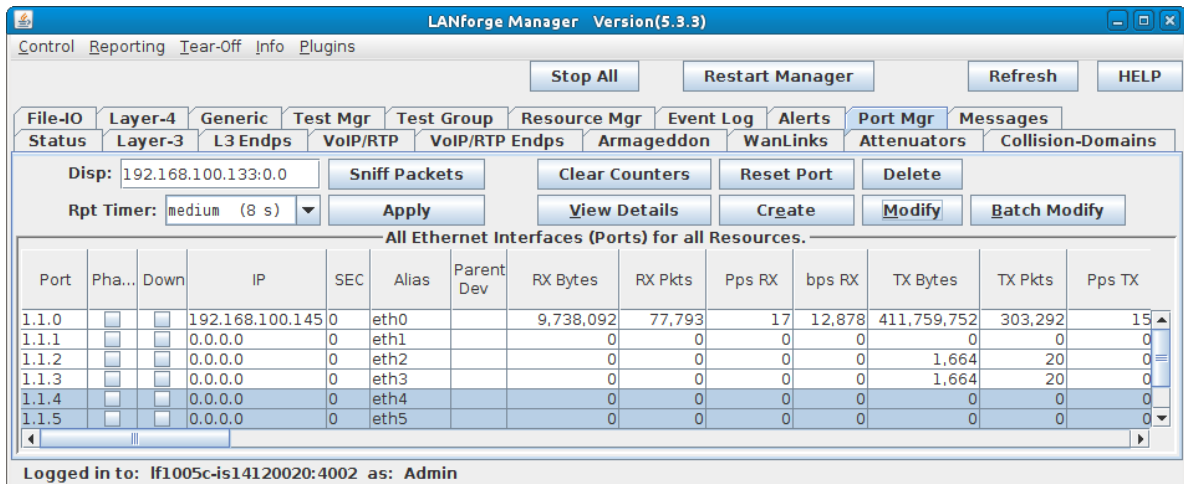


A. **Connection Suggestion:** If you are using the LANforge GUI Client remotely connected to your LANforge Server (like using a VPN), this process will appear rather sluggish. This sluggishness is caused by the volume of reporting traffic flowing to the GUI. We suggest you connect to the LANforge Server desktop using Remote Desktop or VNC.

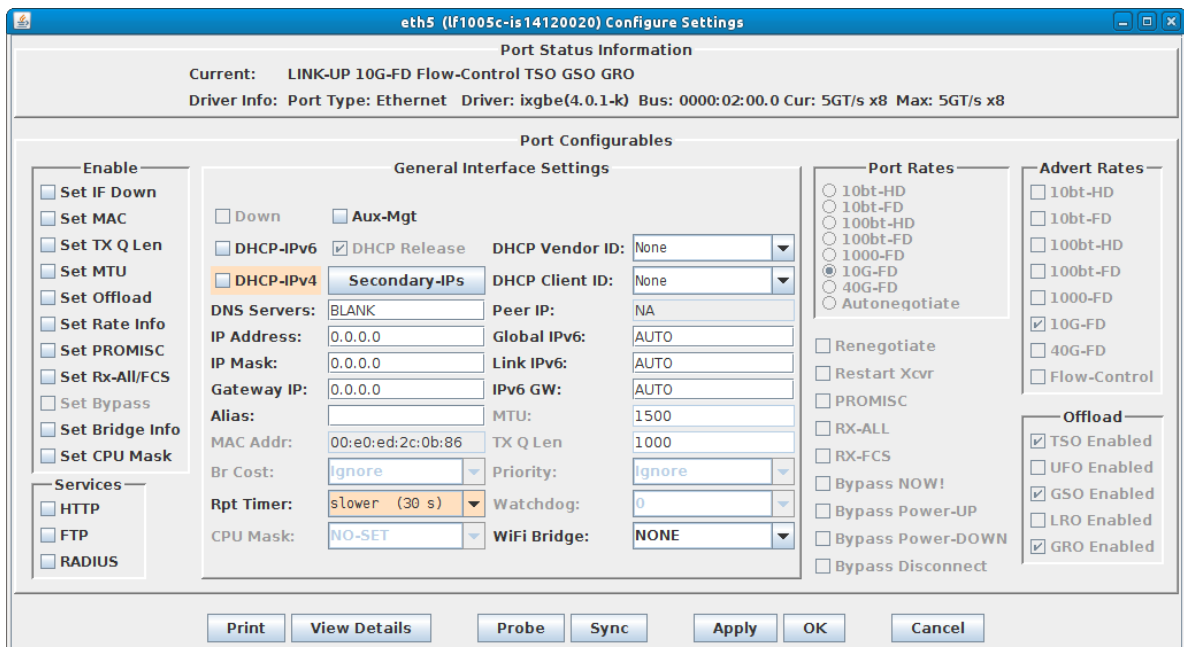
B. **Reporting Suggestion:** When creating 2000 MAC-VLANs and 1000 Layer-3 connections, we are actually creating $2000 + (3 \times 1000) = 5000$ reportable entities that could generate up to $5000 \times 4\text{kB} = 20,000\text{kB}$ of traffic per reporting interval. We intentionally set our reporting intervals low (10 or more seconds) to keep the GUI client responsive.

2. Set up two physical ports so that they have 0.0.0.0 IP addresses and IP masks. We will choose **eth4** and **eth5** for this example. We will base our MAC-VLANs off these two physical ports. Set the reporting level for these two ports to a low frequency: **30 sec**.

A. In the LANforge GUI, go to the Port Manager tab.



B. Assign IP addresses and masks to the two ports.

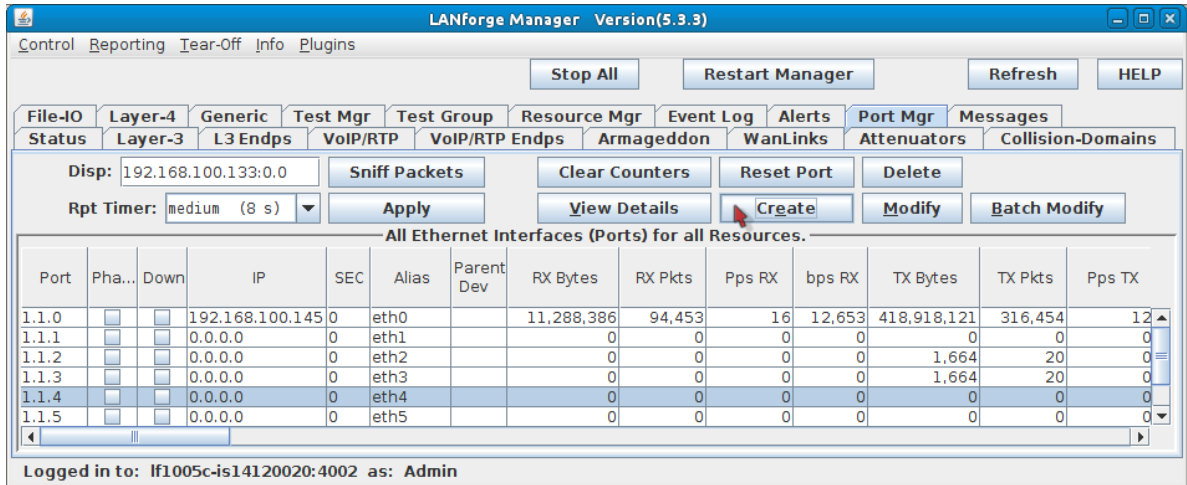


C. Verify the port configuration.

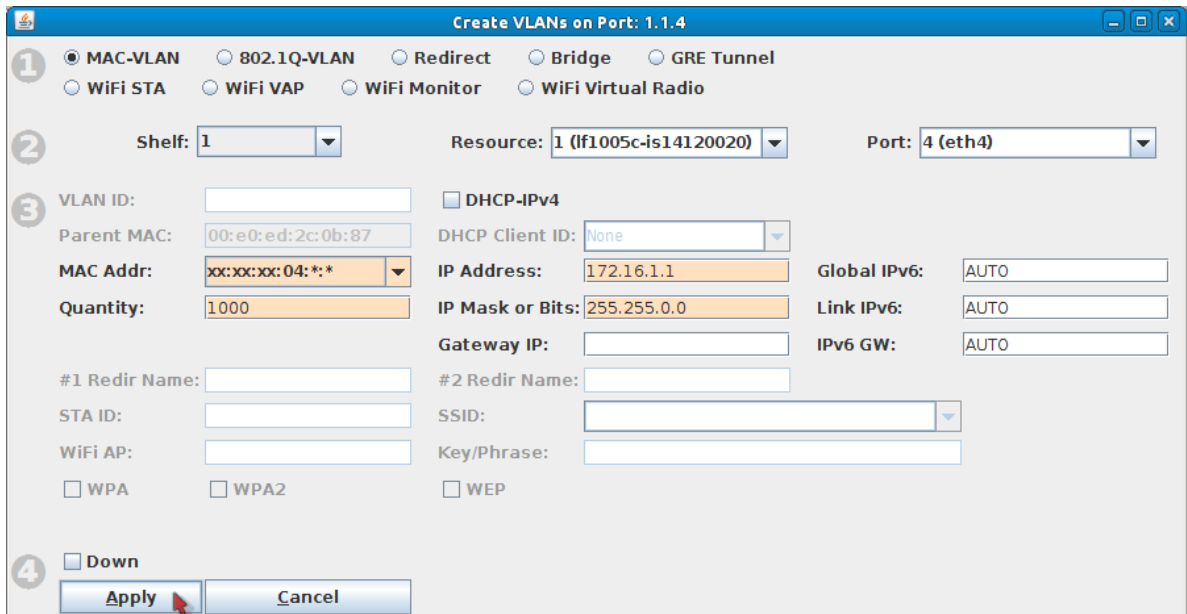
For more information see [LANforge User's Guide: Ports \(Interfaces\)](#)

3. We will use the Port Batch Create tool to create 1000 MAC-VLANs on each of the two ports. These MAC-VLAN ports should report more frequently than the parent ports: set them to report every 15 seconds. We also want to create MAC addresses that are distinct for these two groups: the first three octets will match the parent port, but we will set their fourth octets to 04 and 05 to remind us of their parent ports. The following two octets will be random (specified with '*').

A. In the **Ports** tab, highlight port **eth4** and click the **Create** button.



B. Follow the these steps to create 1000 MAC-VLANs on the port.



- A. Create a **MAC Address** pattern similar to the parent MAC address pattern: 00:e0:ed:30:*:*
- B. Set **Quantity** to 1000
- C. Set an initial **IP Address**: 172.16.1.1
- D. Set the **IP Mask**: 255.255.0.0
- E. Click **Apply**, this takes a second to start.
- F. You do not need to close the **Create** window.

- C. Repeat the previous step with these changes to create the next 1000 MAC-VLANs on port **eth5**.

- Create a **MAC Address** pattern similar to the parent MAC address pattern:00:e0:ed:05:*:*
- Set **Quantity** to 1000
- Set an initial **IP Address**: 172.16.10.1
- Set the **IP Mask**: 255.255.0.0
- Click **Apply**, this takes a second to start.
- When the progress bar switches to *Ready* you can click **Cancel** to close the Create window.

- D. Check the **Ports** tab to watch the IP addresses get assigned to the MAC-VLANs. This will take 5 or more minutes.

Port	Pha...	Down	IP	SEC	Alias	Parent Dev	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps
1.1.1...			172.16.10.106	0	eth5#105	eth5	0	0	0	0	1,296	16	
1.1.1...			172.16.10.105	0	eth5#104	eth5	0	0	0	0	1,296	16	
1.1.1...			172.16.10.104	0	eth5#103	eth5	0	0	0	0	1,296	16	
1.1.1...			172.16.10.103	0	eth5#102	eth5	0	0	0	0	1,296	16	
1.1.1...			172.16.10.102	0	eth5#101	eth5	0	0	0	0	1,296	16	
1.1.1...			172.16.10.101	0	eth5#100	eth5	0	0	0	0	1,296	16	
1.1.1...			172.16.10.11	0	eth5#10	eth5	0	0	0	0	1,476	18	
1.1.1...			172.16.10.2	0	eth5#1	eth5	0	0	0	0	1,554	19	
1.1.1...			172.16.10.1	0	eth5#0	eth5	0	0	0	0	1,386	17	
1.1.0...			0.0.0.0	0	eth5		164	2	0	0	1,385,728	16,286	
1.1.1...			172.16.4.232	0	eth4#999	eth4	468	6	0	0	1,296	16	
1.1.1...			172.16.4.231	0	eth4#998	eth4	1,248	16	0	0	1,296	16	
1.1.1...			172.16.4.230	0	eth4#997	eth4	0	0	0	0	1,296	16	
1.1.1...			172.16.4.229	0	eth4#996	eth4	468	6	0	0	1,296	16	
1.1.1...			172.16.4.228	0	eth4#995	eth4	780	10	0	0	1,296	16	
1.1.1...			172.16.4.227	0	eth4#994	eth4	468	6	0	0	1,296	16	

E. Adjust the Report Timer.

LANforge Manager Version(5.3.3)

Control Reporting Tear-Off Info Plugins

Stop All Restart Manager Refresh HELP

File-IO Layer-4 Generic Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr Messages

Status Layer-3 L3 Endps VoIP/RTP VoIP/RTP Endps Armageddon WanLinks Attenuators Collision-Domains

Disp: 192.168.100.133:0.0 Sniff Packets Clear Counters Reset Port Delete

Rpt Timer: slow (15 s) Apply View Details Create Modify Batch Modify

All Ethernet Interfaces (Ports) for all Resources.

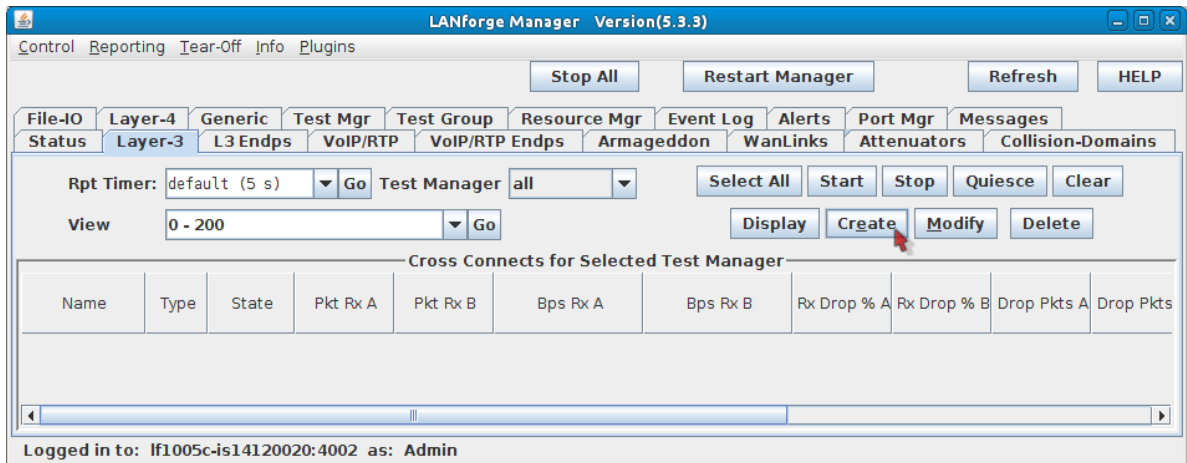
Port	Pha...	Down	IP	SEC	Alias	Parent Dev	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps
1.1.0...			172.16.1.35	0	eth4#34	eth4	1,092	14	0	0	1,554	19	
1.1.0...			172.16.1.34	0	eth4#33	eth4	1,170	15	0	0	1,484	18	
1.1.0...			172.16.1.33	0	eth4#32	eth4	546	7	0	0	1,484	18	
1.1.0...			172.16.1.32	0	eth4#31	eth4	312	4	0	0	1,734	21	
1.1.0...			172.16.1.31	0	eth4#30	eth4	858	11	0	0	1,414	17	
1.1.0...			172.16.1.30	0	eth4#29	eth4	468	6	0	0	1,664	20	
1.1.0...			172.16.1.29	0	eth4#28	eth4	624	8	0	0	1,644	20	
1.1.0...			172.16.1.28	0	eth4#27	eth4	624	8	0	0	1,734	21	
1.1.0...			172.16.1.27	0	eth4#26	eth4	156	2	0	0	1,734	21	
1.1.0...			172.16.1.26	0	eth4#25	eth4	936	12	0	0	1,734	21	
1.1.0...			172.16.1.25	0	eth4#24	eth4	312	4	0	0	1,484	18	
1.1.0...			172.16.1.24	0	eth4#23	eth4	624	8	0	0	1,414	17	
1.1.0...			172.16.1.23	0	eth4#22	eth4	936	12	0	0	1,734	21	
1.1.0...			172.16.1.22	0	eth4#21	eth4	156	2	0	0	1,664	20	
1.1.0...			172.16.1.21	0	eth4#20	eth4	1,326	17	0	0	1,664	20	
1.1.0...			172.16.1.20	0	eth4#19	eth4	624	8	0	0	1,734	21	
1.1.0...			172.16.1.19	0	eth4#18	eth4	624	8	0	0	1,734	21	
1.1.0...			172.16.1.18	0	eth4#17	eth4	468	6	0	0	1,734	21	
1.1.0...			172.16.1.17	0	eth4#16	eth4	1,170	15	0	0	1,484	18	
1.1.0...			172.16.1.16	0	eth4#15	eth4	702	9	0	0	1,406	17	
1.1.0...			172.16.1.15	0	eth4#14	eth4	156	2	0	0	1,476	18	
1.1.0...			172.16.1.14	0	eth4#13	eth4	936	12	0	0	1,714	21	
1.1.0...			172.16.1.13	0	eth4#12	eth4	0	0	0	0	1,484	18	
1.1.0...			172.16.1.12	0	eth4#11	eth4	156	2	0	0	1,484	18	
1.1.0...			172.16.1.11	0	eth4#10	eth4	468	6	0	0	1,476	18	
1.1.0...			172.16.1.10	0	eth4#9	eth4	468	6	0	0	1,734	21	
1.1.0...			172.16.1.9	0	eth4#8	eth4	624	8	0	0	1,484	18	
1.1.0...			172.16.1.8	0	eth4#7	eth4	858	11	0	0	1,484	18	
1.1.0...			172.16.1.7	0	eth4#6	eth4	390	5	0	0	1,554	19	
1.1.0...			172.16.1.6	0	eth4#5	eth4	156	2	0	0	1,484	18	
1.1.0...			172.16.1.5	0	eth4#4	eth4	0	0	0	0	1,554	19	
1.1.0...			172.16.1.4	0	eth4#3	eth4	1,638	21	0	0	1,484	18	
1.1.0...			172.16.1.3	0	eth4#2	eth4	546	7	0	0	1,476	18	
1.1.0...			172.16.1.2	0	eth4#1	eth4	156	2	0	0	1,554	19	
1.1.0...			172.16.1.1	0	eth4#0	eth4	468	6	0	0	1,386	17	
1.1.0...			0.0.0.0	0	fcoe1		0	0	0	0	0	0	
1.1.0...			0.0.0.0	0	fcoe0		0	0	0	0	0	0	
1.1.0...			0.0.0.0	0	eth5		164	2	0	0	1,385,728	16,286	
1.1.0...			0.0.0.0	0	eth4		34,276	418	0	0	1,369,546	16,095	
1.1.0...			0.0.0.0	0	eth3		0	0	0	0	1,664	20	
1.1.0...			0.0.0.0	0	eth2		0	0	0	0	1,664	20	
1.1.0...			0.0.0.0	0	eth1		0	0	0	0	0	0	
1.1.0...			192.168.100.145	0	eth0		43,279,207	224,696	112	264,500	904,063,970	694,811	

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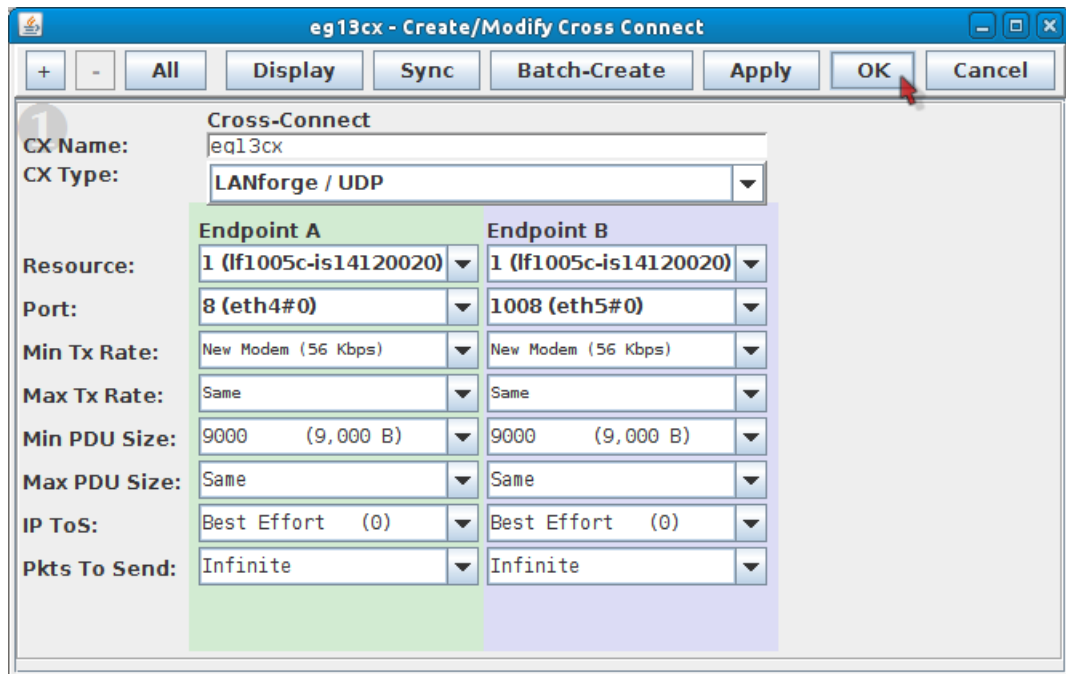
- Click the Column header labeled **Port** to sort all the newly created MAC-VLANs to the top.
- Select all the MAC-VLANs.
- Change the **Rpt Timer** setting to **slow (15 s)**
- Click **Apply**.

4. Create Cross Connects between the MAC-VLANs. We can create all these cross connections in two steps. First we will create the first cross-connect. Next, we will batch-create the remaining 999 cross connections using the first as a template.

A. Switch to the **Layer-3** tab and click the **Create** button to see the **Create/Modify Cross Connect** window.



B. Set up the cross connection between the first two MAC-VLANs.



A. Connection name: **eg13cx**

B. Port, TX Endpoint: **eth4#0**

C. Port, RX Endpoint: **eth5#0**

D. Min PDU Size: **9,000 B**

E. Click the **OK** button to save.

C. In the **Layer-3** tab...

LANforge Manager Version(5.3.3)

Control Reporting Tear-Off Info Plugins

Stop All Restart Manager Refresh HELP

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

Status Layer-3 L3 Endps VoIP/RTP VoIP/RTP Endps Armageddon WanLinks Attenuators Collision-Domains

Rpt Timer: default (5 s) Go Test Manager all Select All Start Stop Quiesce Clear

View 0 - 200 Go Display Create **Modify** Delete

Cross Connects for Selected Test Manager

Name	Type	State	Pkt Rx A	Pkt Rx B	Bps Rx A	Bps Rx B	Rx Drop % A	Rx Drop % B	Drop Pkts A	Drop Pkts B
eg13cx	LF/UDP	Stopped	0	0	0	0	0	0	0	0

Logged in to: lf1005c-is14120020:4002 as: Admin

A. Select the cross-connect **eg13cx**

B. Click **Modify** in the **Layer-3** tab.

D. Click **Batch Create** in the **Create/Modify Cross Connect** window.

eg13cx - Create/Modify Cross Connect

+ - All Display Sync **Batch Create** Apply OK Cancel

1

Cross-Connect

CX Name: eg13cx

CX Type: LANforge / UDP

Endpoint A		Endpoint B	
Resource:	1 (lf1005c-is14120020)	Resource:	1 (lf1005c-is14120020)
Port:	8 (eth4#0)	Port:	1008 (eth5#0)
Min Tx Rate:	New Modem (56 Kbps)	Min Tx Rate:	New Modem (56 Kbps)
Max Tx Rate:	Same	Max Tx Rate:	Same
Min PDU Size:	9000 (9,000 B)	Min PDU Size:	9000 (9,000 B)
Max PDU Size:	Same	Max PDU Size:	Same
IP ToS:	Best Effort (0)	IP ToS:	Best Effort (0)
Pkts To Send:	Infinite	Pkts To Send:	Infinite

E. We can create cross connects in one batch. Using the **Layer-3 Batch Creator** window:

The screenshot shows the 'Layer-3 Batch Creator: eg13cx' window. It displays a list of generated cross connect names: 'eg13cx0001, eg13cx0002 ... eg13cx0999'. Below this, it shows the configuration for Endp-A and Endp-B resources, ports, and IPs. The 'Quantity' is set to 999, and the 'Number of Digits' is set to 4. The 'Starting Name Suffix' is 1, and the 'Name Increment' is 1. The 'Resource Increment A' is 0, and the 'Resource Increment B' is 0. The 'Port Increment A' is 1, and the 'Port Increment B' is 1. The 'IP Addr Increment A' is 0, and the 'IP Addr Increment B' is 0. The 'IP-Port Increment A' is 1, and the 'IP-Port Increment B' is 1. The 'Zero Pad' checkbox is checked. The 'Apply' button is highlighted with a red mouse cursor.

eg13cx0001, eg13cx0002 ... eg13cx0999
Endp-A Resources: 1, 1 ... 1
Endp-B Resources: 1, 1 ... 1
Endp-A Ports: eth4#1, eth4#2 ... eth4#999
Endp-B Ports: eth5#1, eth5#2 ... eth5#999
Endp-A IPs: AUTO, AUTO ... AUTO
Endp-B IPs: AUTO, AUTO ... AUTO

Quantity: 999 Number of Digits: 4 ☒ Zero Pad
Starting Name Suffix: 1 Name Increment: 1
Resource Increment A: 0 Resource Increment B: 0
Port Increment A: 1 Port Increment B: 1
IP Addr Increment A: 0 IP Addr Increment B: 0
IP-Port Increment A: 1 IP-Port Increment B: 1

Apply Close

A. Specify for **Quantity**: 999. This brings us to 1000 cross connects.

B. **Starting Name Suffix**: 1

C. Click the **Apply** button to create the cross connects.

F. Expect the system to work for a few minutes while it creates the cross connects.

The screenshot shows a warning dialog box with the text: 'When creating lots of entities at once, the system may be sluggish for a minute or two as it completes the request. Please be patient.' The 'Submit Batch Anyway' button is highlighted with a red mouse cursor.

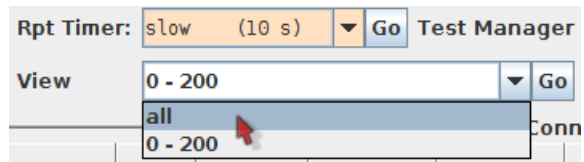
When creating lots of entities at once, the system may be sluggish for a minute or two as it completes the request. Please be patient.

Submit Batch Anyway Cancel

A. When the process completes, the Batch Warning will disappear.

B. Click the **Cancel** button on the **Create/Modify Cross Connects** window.

G. Update Report Timer for all cross connects.



The screenshot shows a section of the Test Manager interface. At the top, there is a label 'Rpt Timer:' followed by a dropdown menu currently set to 'slow (10 s)' and a 'Go' button. Below this is a 'View' label followed by a dropdown menu currently set to '0 - 200' and another 'Go' button. The dropdown menu for 'View' is open, showing three options: '0 - 200', 'all', and '0 - 200'. A mouse cursor is pointing at the 'all' option. To the right of the 'View' dropdown, the text 'Conn' is partially visible.

- A. The **Layer-3** tab now shows the first 200 Layer-3 cross connects.
- B. Use the **View** dropdown to display all the cross connects: select **All** and press **Go**.
- C. Click the **Select All** button to select all cross connects.
- D. Select **slow (10s)** in the **Rpt Timer** dropdown.
- E. Click the Report Timer **Go** button to apply. This will help keep the GUI responsive.

5. Start your cross connects.

- A. In the **Layer-3** tab, click the **Select All** button.
- B. Then click the **Start** button.

6. Monitoring your cross connects.

LANforge Manager Version(5.3.3)

Control Reporting Tear-Off Info Plugins

Stop All Restart Manager Refresh HELP

Collision-Domains File-IO Layer-4 Generic Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr Messages

Status Layer-3 L3 Endpts VoIP/RTP VoIP/RTP Endps Armageddon WanLinks Attenuators

Min PDU Size: AUTO Go Max PDU Size: Same Go

MIN Tx Rate: New Modem (56 Kbps) Go MAX Tx Rate: Same Go

View: 0 - 400 Go

Start Stop Quiesce Clear

Display Create Modify Batch Modify Delete

All Endpoints

Dropped	Jitter	Tx Bytes	Rx Bytes	Replays	TCP Rtx	Dup Pkts	Rx Dup %	000 Pkts	Rx 000 %	RX Wrong Dev	CRC Fail	RX BER	CX Active	CX Estab	CX Estab/s	1st RX	CX TO	Pattern
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	1,364	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	1,364	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	1,499	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	1,499	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	1,638	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	1,638	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	1,818	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	1,818	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	1,845	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	1,845	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	2,011	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	2,011	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	2,040	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	2,040	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	2,186	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	2,186	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	2,279	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	2,279	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	2,327	0	INCREASING
0	0	5,652,000	5,652,000	0	0	0	0	0	0	0	0	0	1	1	0	2,327	0	INCREASING

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A. As you scroll to the left in the **L3 Endpoints** table, you can monitor the connection qualities.

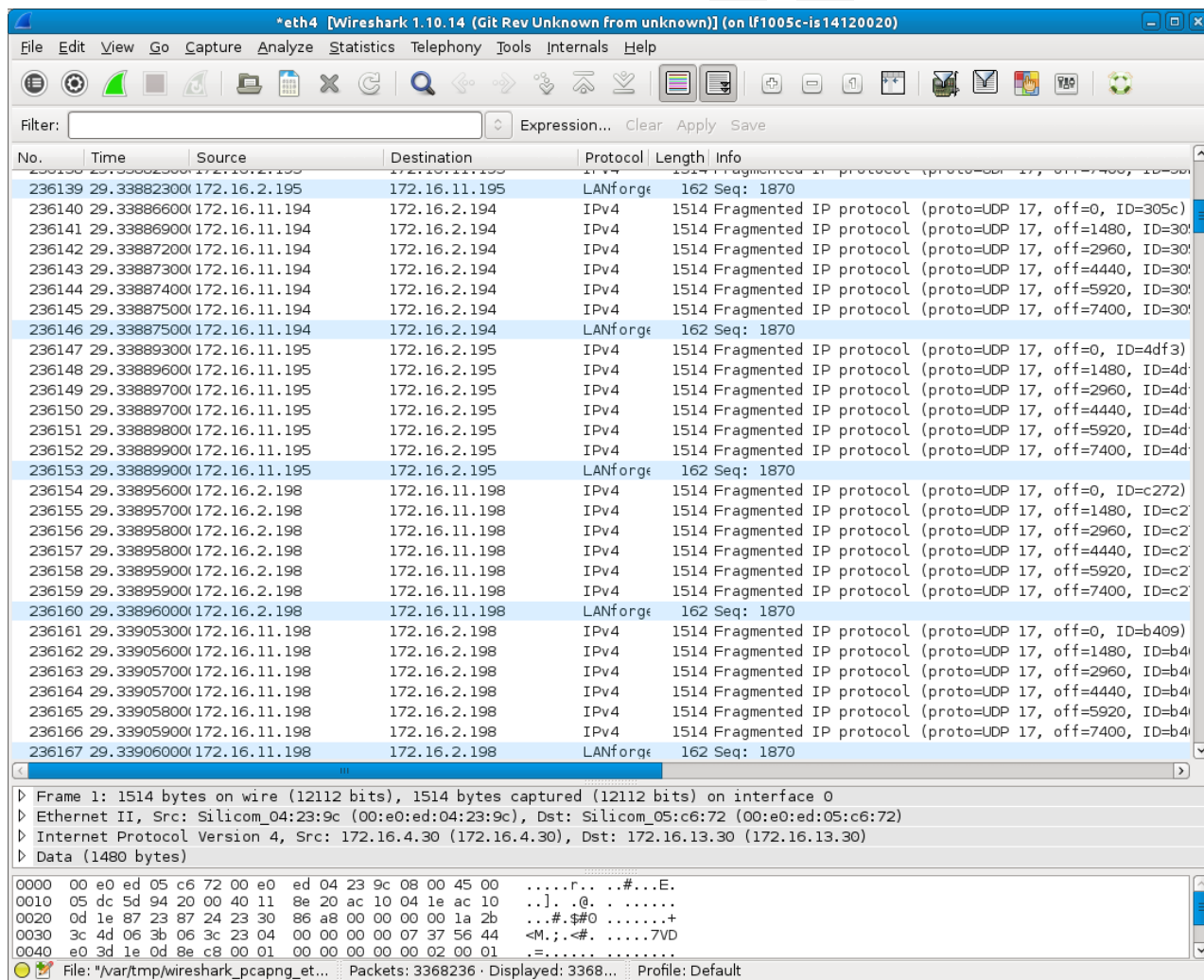
B. **Tx Bytes** and **Rx Bytes** columns show traffic amount.

Tx Bytes	Rx Bytes
5,652,000	5,652,000
5,652,000	5,652,000
5,652,000	5,652,000
5,652,000	5,652,000
5,652,000	5,652,000
5,652,000	5,652,000
5,652,000	5,652,000
5,652,000	5,652,000
5,652,000	5,652,000

C. The **Pattern** column shows traffic trend.

Pattern
INCREASING
INCREASING
INCREASING
INCREASING
INCREASING

7. Sniffing your cross connects with Wireshark from the parent ports **eth4** or **eth5**.



- To sniff the parent ports that the MAC-VLANs are associated with, you want to be connected to the LANforge server desktop using either Remote Desktop or VNC.
- Operating this many cross connects can be taxing on many machines. To minimize the sluggishness of Wireshark, start Wireshark when none of the Cross-Connects are active, and use the LANforge client to start and stop the traffic.
- In the **Layer-3** tab, click **Select All** and click **Stop**.
- In the **Port Mgr** tab, select interface **eth4** and click the **Sniff Packets** button.
- Wireshark will open and be capturing packets.
- In the **Layer-3** tab, click the **Start** button, and let your test run for one or two minutes.
- Then click the **Stop** or **Quiesce** buttons to end the test.
- Now you can save the Wireshark capture.