

Displaying Sequence Gaps

Goal: Generate and show sequence gaps (time between packets) by running traffic through a WanLink with an intermittent latency spike.

Tracking sequence gaps can be useful in the following scenarios:

- Roaming with and without 802.11r.
- OSPF failovers.
- Cellular to WiFi handoff.

In this test scenario, LANforge will be set up to generate sequence gaps. Then the sequence gaps will be shown via the layer-3 display window.

Four physical ports will be used, two to generate traffic and two for the WanLink endpoints. This test uses a LANforge CT922 system.

LANforge will be generating UDP traffic at 1 Mbps through a WanLink that is scripted to apply one second of latency every ten seconds. The one second latency should create a one second sequence gap. The packet size will be smaller to increase the rate of traffic and thus decreasing sequence gaps, this will make any larger sequence gaps more apparent.

1. Set IPs on traffic generating ports, **eth0** and **eth3** in this case.
 - A. In the **Port Manager** tab modify **eth0**.

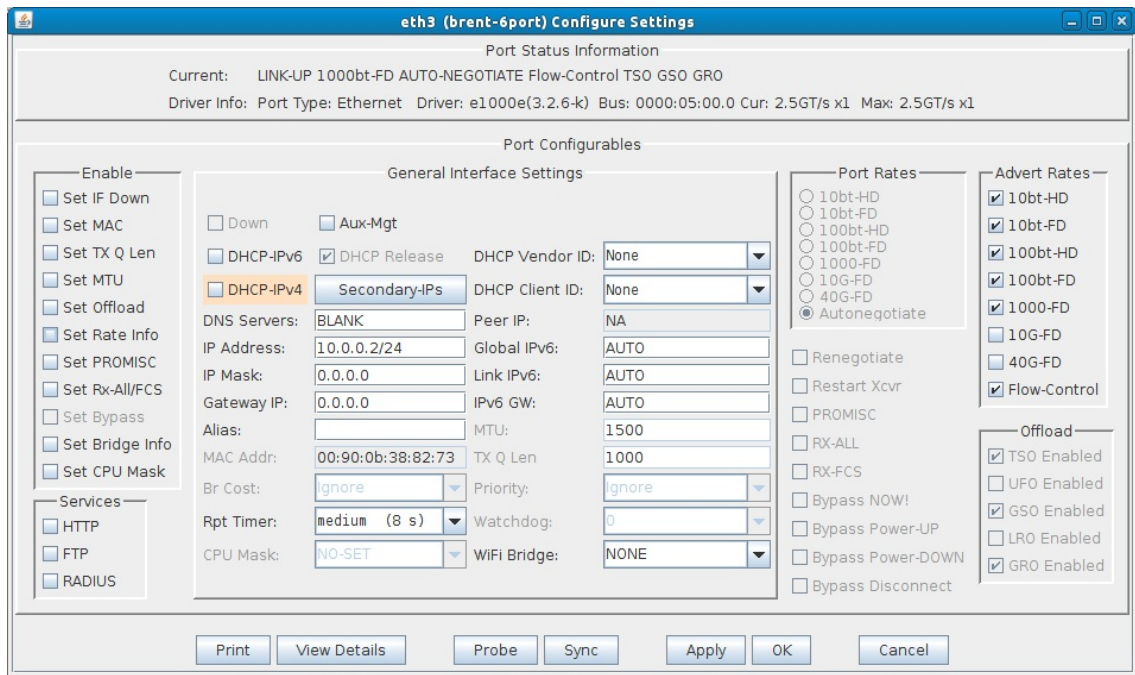
The screenshot shows the 'eth0 (brent-6port) Configure Settings' dialog box. The 'Port Status Information' section shows 'Current: LINK-UP 1000bt-FD AUTO-NEGOTIATE Flow-Control TSO GSO GRO' and 'Driver Info: Port Type: Ethernet Driver: e1000e(3.2.6-k) Bus: 0000:02:00.0 Cur: 2.5GT/s x1 Max: 2.5GT/s x1'. The 'Port Configurables' section is divided into several panels:

- Enable:** Includes checkboxes for 'Set IF Down', 'Set MAC', 'Set TX Q Len', 'Set MTU', 'Set Offload', 'Set Rate Info', 'Set PROMISC', 'Set Rx-All/FCS', 'Set Bypass', 'Set Bridge Info', and 'Set CPU Mask'.
- Services:** Includes checkboxes for 'HTTP', 'FTP', and 'RADIUS'.
- General Interface Settings:** Includes checkboxes for 'Down' and 'Aux-Mgt', 'DHCP-IPv6', 'DHCP Release', 'DHCP Vendor ID: None', 'DHCP-IPv4', 'Secondary-IPs', 'DHCP Client ID: None', 'DNS Servers: BLANK', 'Peer IP: NA', 'IP Address: 10.0.0.1/24', 'Global IPv6: AUTO', 'IP Mask: 0.0.0.0', 'Link IPv6: AUTO', 'Gateway IP: 0.0.0.0', 'IPv6 GW: AUTO', 'Alias:', 'MTU: 1500', 'MAC Addr: 00:90:0b:38:82:70', 'TX Q Len: 1000', 'Br Cost: ignore', 'Priority: ignore', 'Rpt Timer: medium (8 s)', 'Watchdog: 0', and 'CPU Mask: NO-SET', 'WiFi Bridge: NONE'.
- Port Rates:** Includes radio buttons for '10bt-HD', '10bt-FD', '100bt-HD', '100bt-FD', '1000-FD', '10G-FD', '40G-FD', and 'Autonegotiate' (selected). It also has checkboxes for 'Renegotiate', 'Restart Xcvr', 'PROMISC', 'RX-ALL', 'RX-FCS', 'Bypass NOW!', 'Bypass Power-UP', 'Bypass Power-DOWN', and 'Bypass Disconnect'.
- Advert Rates:** Includes checkboxes for '10bt-HD', '10bt-FD', '100bt-HD', '100bt-FD', '1000-FD', '10G-FD', '40G-FD', and 'Flow-Control'.
- Offload:** Includes checkboxes for 'TSO Enabled', 'UFO Enabled', 'GSO Enabled', 'LRO Enabled', and 'GRO Enabled'.

At the bottom of the dialog are buttons for 'Print', 'View Details', 'Probe', 'Sync', 'Apply', 'OK', and 'Cancel'.

- A. Set the **IP Address**.

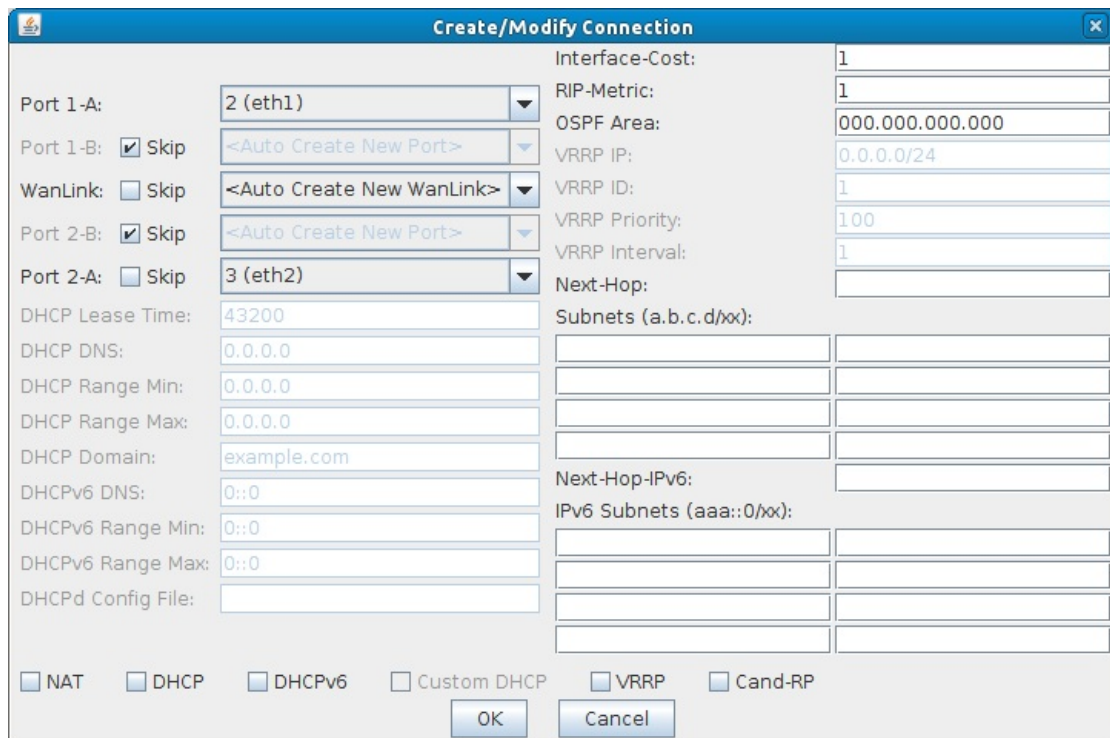
B. In the **Port Manager** tab modify **eth3**.



A. Set the **IP Address**.

2. Create a WanLink.

A. In **Netsmith**, right click an open area and click **New Connection**.



A. Select the Skip checkboxes on **Port 1-B** and **Port 2-B**.

B. Set **Port 1-A** to **eth1**.

C. Set **Port 2-A** to **eth2**.

D. Click **OK**.

E. Click **Apply** in Netsmith.

3. Configure the WanLink.

A. In the **WanLinks** tab, modify the WanLink.

The screenshot shows the 'VRWL-1.1.000 - Create/Modify WanLink' dialog box. It is divided into several sections:

- Section 1:** WanLink Information. Name: VRWL-1.1.000, Presets: CUSTOM. Endpoint A: Port 3 (eth2), Transfer Rate 10M (10 Mbps), Delay zero (0 us), Drop-Freq zero (0%), Jitter zero (0 us), Jitter-Freq zero (0%). Endpoint B: Port 2 (eth1), Transfer Rate 10M (10 Mbps), Delay zero (0 us), Drop-Freq zero (0%), Jitter zero (0 us), Jitter-Freq zero (0%).
- Section 2:** WanLink Information. Pass-Through, Coupled-Mode, HW Pass-Through, Kernel-Mode (checked). Resource: 1 (brent-6port), Rpt Timer: default (5 s). Reorder-Freq, Dup-Freq, Drop Burst, and Reorder Amt are also configured.
- Section 3:** Endpoint A WAN Paths and Endpoint B WAN Paths. Both tables are empty.
- Section 4:** WanLink Information. CPU-ID: 0, Test Manager: default_tm. Loop Replay is checked for both Endpoint A and Endpoint B.

A. Set the Transfer Rate to **10Mbps** for **both** endpoints.

B. Click the **Script** button on **Endpoint A**.

Add/Modify Script

Endpoint Name: VRWL-1.1.000-A Script Type: ScriptWL

Script Name: my-script Group Action: All

Enable Script Show Reports Symmetric Loop Hide Iteration Details Hide Legend Hide CSV

Loop Count: Forever Script Iterations: 10 (0) Estimated Duration: 10 s (0 ms)

Script Configuration

Run Duration: 1 s (1 s)

Rates: 10Mbps

Latencies: 0,0,0,0,0,0,0,0,1000

Jitter: 0

Drops: 0

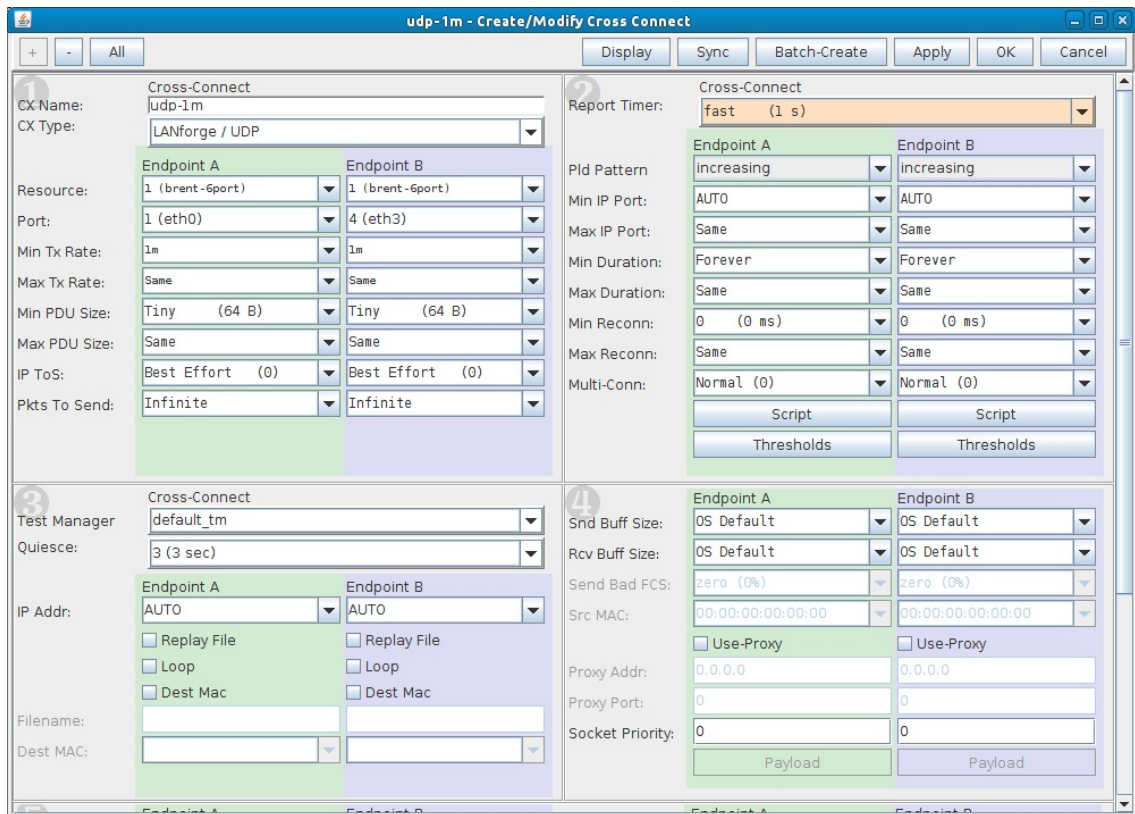
Show Previous Report Sync Apply OK Cancel

- A. Set the **Script Type** to **ScriptWL**.
- B. Click the **Loop** checkbox.
- C. **Run Duration = 1s**
- D. **Rates = 10Mbps**
- E. **Latencies = 0,0,0,0,0,0,0,0,1000**
- F. **Jitter = 0**
- G. **Drops = 0**
- H. Click **OK**.

C. Click **OK** to close the WanLink modify window.

4. Create a Layer 3 connection.

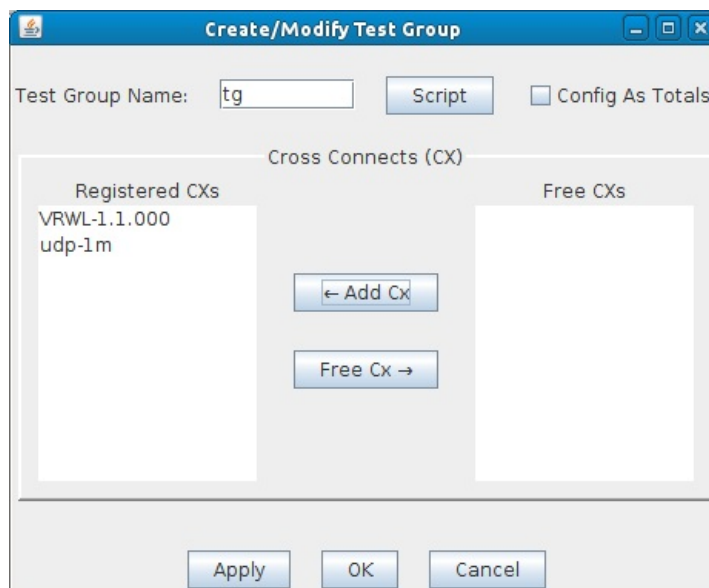
A. In the **Layer-3** tab, Click **Create**.



- A. **CX Name = udp-1m**
- B. **Report Timer = 1s**
- C. **Endpoint A Port = eth0**
- D. **Endpoint B Port = eth3**
- E. **Endpoint A and B = 1m**
- F. **Endpoint A and B Min PDU Size = 64 B**
- G. Click **OK**.

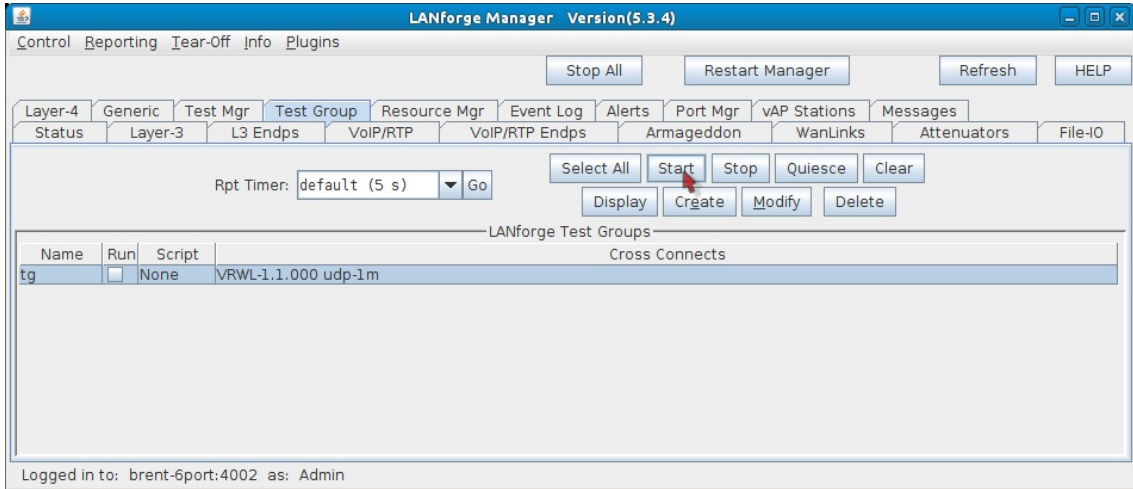
5. Create a test group to start the layer 3 connection and WanLink at the same time.

A. In the **Test Group** tab, click **Create**.

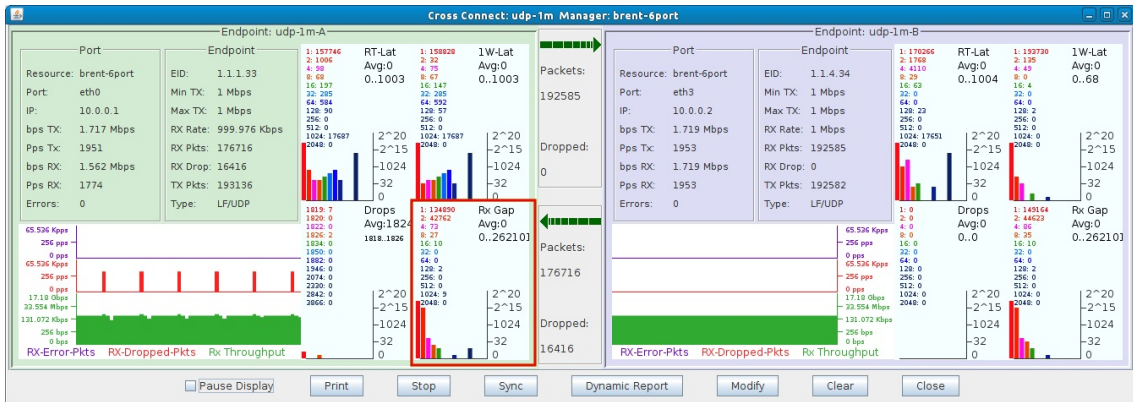


- A. **Test Group Name = tg**
- B. Select the WanLink and Layer 3 connection on the right and click **Add Cx**.
- C. Click **OK**.

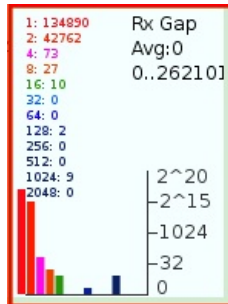
6. Start the test group. This will start both the layer 3 connection and the scripted WanLink.
 - A. In the **Test Group** tab, select **tg** and click **Start**. You will see the Script Report window appear.



7. Display the Layer 3 connection and analyze the Rx Gap (sequence gap).
 - A. In the Layer-3 tab, select **udp-1m** and click **Display**.



- B. The **Rx Gap** graph is highlighted in the below screenshot. The Rx Gap for Endpoint B doesn't show one second sequence gaps because that side of the WanLink was not scripted.



- A. The colored numbers on the left side of the colon represent time in milliseconds. The right colored numbers represent the number of times a sequence gap reached the particular time on the left side.

You'll notice that 9 sequence gaps hit 1024ms. These gaps were the result of the WanLink script occasionally sending one second latency.