

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.

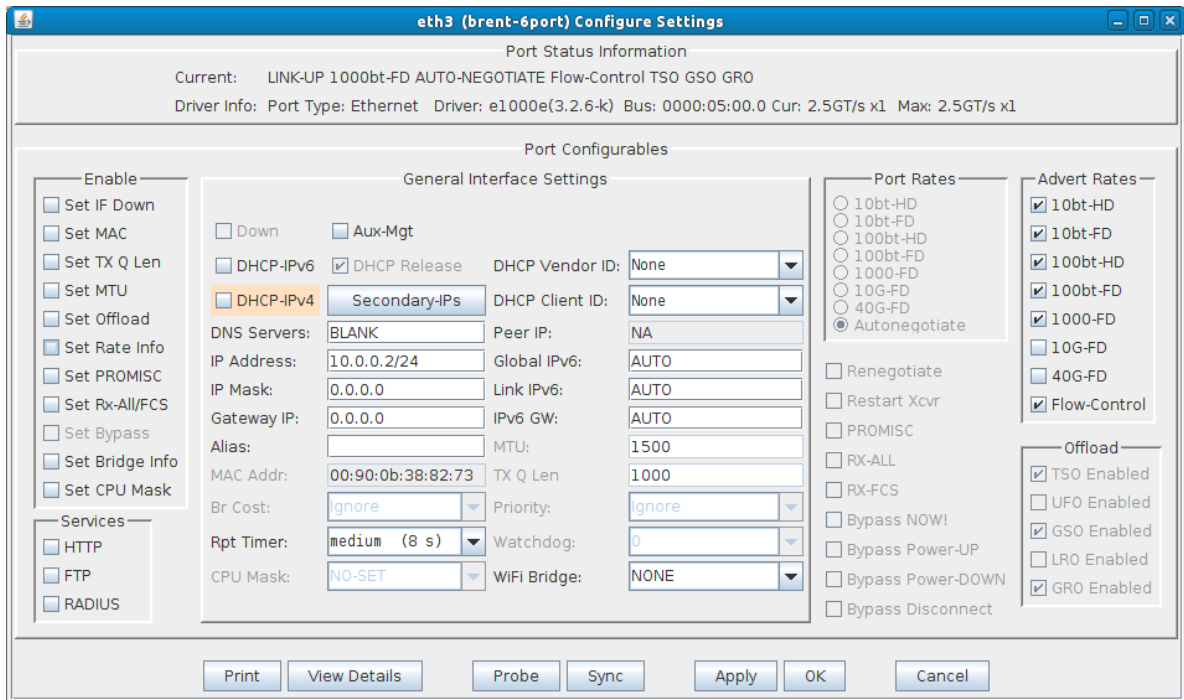
LANforge will be generating UDP traffic at 1 Mbps through a WanLink that is scripted to apply one second of latency every ten seconds. The one second latency should create a one second sequence gap. The packet size will be smaller to increase the rate of traffic and thus decreasing sequence gaps, this 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 configuration window for the 'eth0' interface. The 'General Interface Settings' section is expanded, showing various configuration options. The 'IP Address' field is highlighted in orange and contains the value '10.0.0.1/24'. Other visible fields include 'IP Mask' (0.0.0.0), 'Gateway IP' (0.0.0.0), 'MAC Addr' (00:90:0b:38:82:70), and 'CPU Mask' (NO-SET). The 'Port Rates' section shows 'Autonegotiate' selected. The 'Advert Rates' section has several options checked, including '1000-FD' and 'Flow-Control'. The 'Services' section on the left has 'HTTP', 'FTP', and 'RADIUS' options.

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

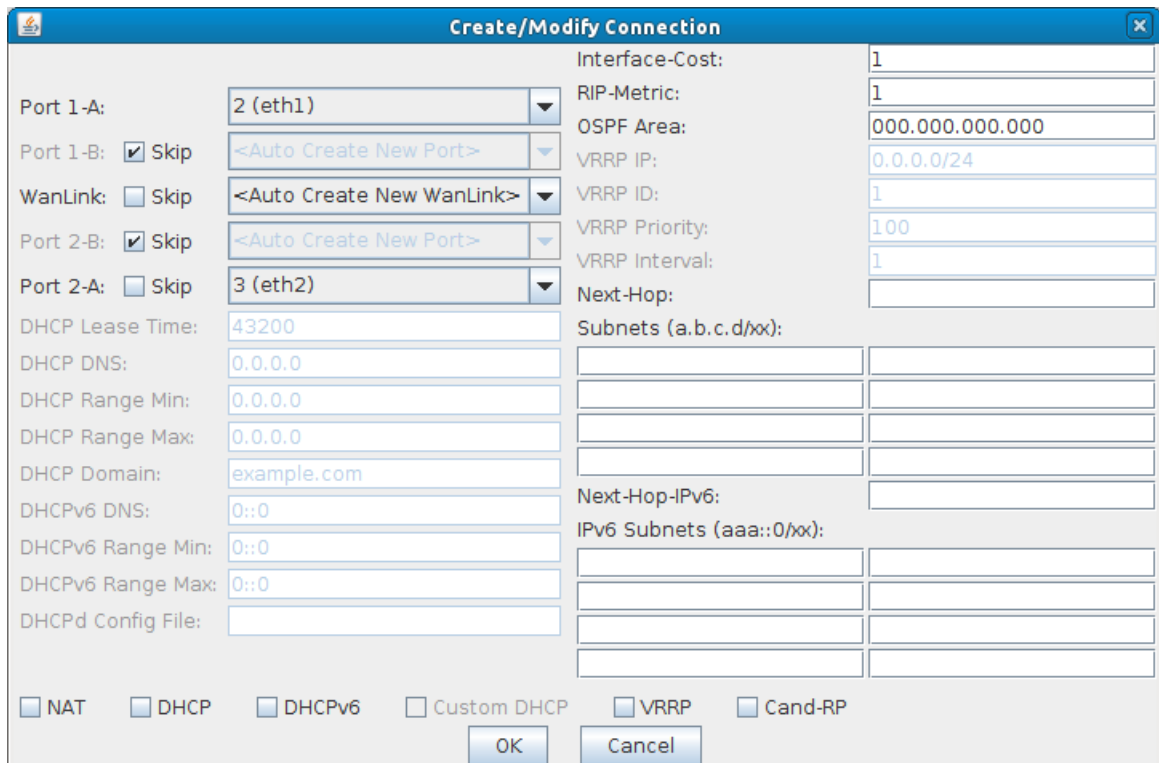
B. In the **Port Manager** tab modify **eth3**.



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 (Left):** WanLink Information. Name: VRWL-1.1.000. Presets: CUSTOM. Port: Endpoint A: 3 (eth2), Endpoint B: 2 (eth1). Transfer Rate: 10M (10 Mbps) for both. Delay, Drop-Freq, Jitter, and Jitter-Freq are all set to zero (0 us or 0%).
- Section 2 (Right):** WanLink Information. Pass-Through, Coupled-Mode, and HW Pass-Through are unchecked. Kernel-Mode is checked. Resource: 1 (brent-6port). Rpt Timer: default (5 s). Reorder-Freq, Dup-Freq, and Drop Burst are set to zero (0%). Reorder Amt: min 1, max 20. Script buttons are present for both endpoints.
- Section 3 (Middle):** Endpoint A WAN Paths and Endpoint B WAN Paths. Both tables are empty.
- Section 4 (Bottom):** WanLink Information. CPU-ID: 0. Test Manager: default_tm. Replay File: Dir. Dump File: Dir. Loop Replay is checked for both endpoints. Force Packet Gap, Drop-Xth, and Reorder-Xth are unchecked.

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

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 = 0,0,0,0,0,0,0,0,0,1000**
- 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**.

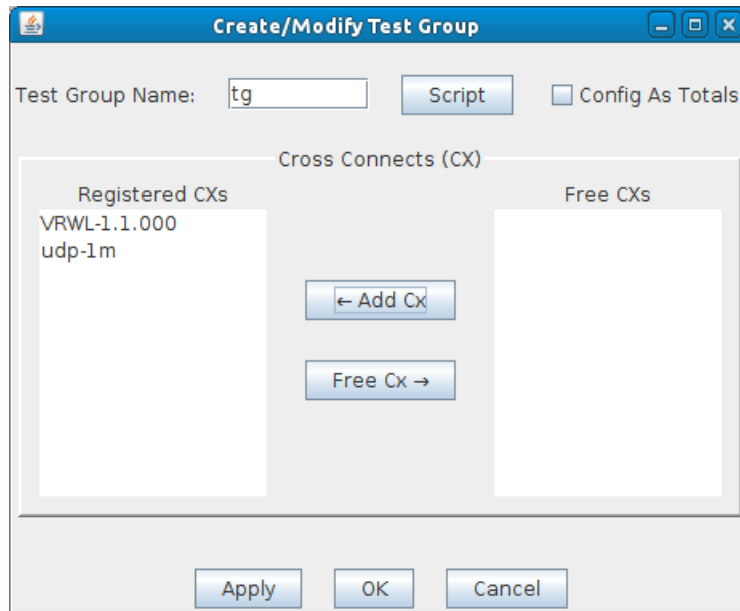
The screenshot shows the 'udp-1m - Create/Modify Cross Connect' dialog box with the following settings:

- Section 1: Cross-Connect**
 - CX Name: udp-1m
 - CX Type: LANforge / UDP
 - Endpoint A: Resource: 1 (brent-6port), Port: 1 (eth0), Min Tx Rate: 1m, Max Tx Rate: Same, Min PDU Size: Tiny (64 B), Max PDU Size: Same, IP ToS: Best Effort (0), Pkts To Send: Infinite
 - Endpoint B: Resource: 1 (brent-6port), Port: 4 (eth3), Min Tx Rate: 1m, Max Tx Rate: Same, Min PDU Size: Tiny (64 B), Max PDU Size: Same, IP ToS: Best Effort (0), Pkts To Send: Infinite
- Section 2: Report Timer**
 - Report Timer: fast (1 s)
 - Pld Pattern: increasing
 - Min IP Port: AUTO
 - Max IP Port: Same
 - Min Duration: Forever
 - Max Duration: Same
 - Min Recon: 0 (0 ms)
 - Max Recon: Same
 - Multi-Conn: Normal (0)
- Section 3: Test Manager**
 - Test Manager: default_tm
 - Quiesce: 3 (3 sec)
 - IP Addr: AUTO
 - Replay File:
 - Loop:
 - Dest Mac:
- Section 4: Endpoint A/B**
 - Snd Buff Size: OS Default
 - Rcv Buff Size: OS Default
 - Send Bad FCS: zero (0%)
 - Src MAC: 00:00:00:00:00:00
 - Use-Proxy:
 - Proxy Addr: 0.0.0.0
 - Proxy Port: 0
 - Socket Priority: 0

- 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.

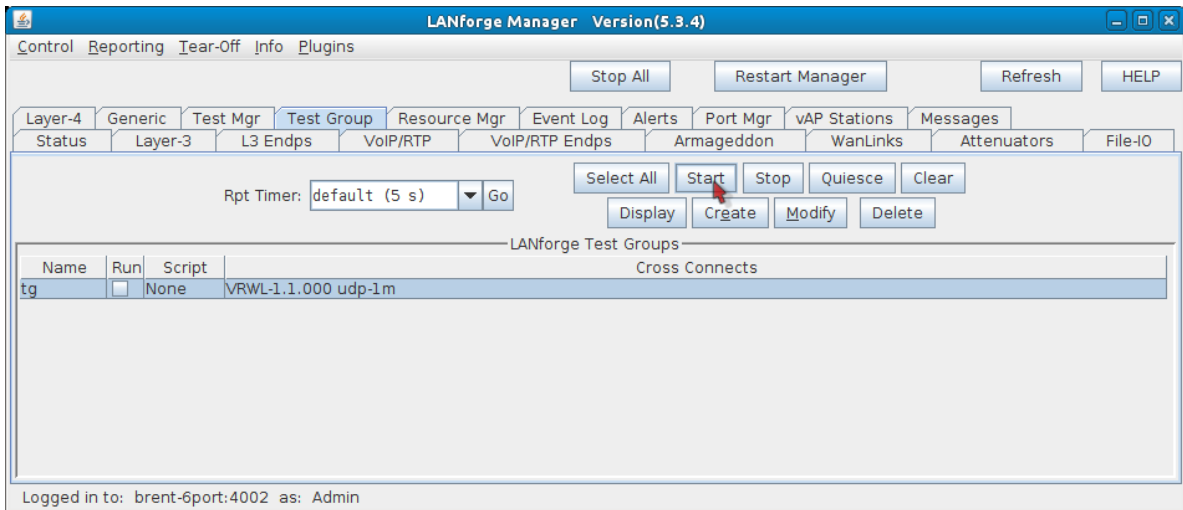
A. In the **Test Group** tab, click **Create**.



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

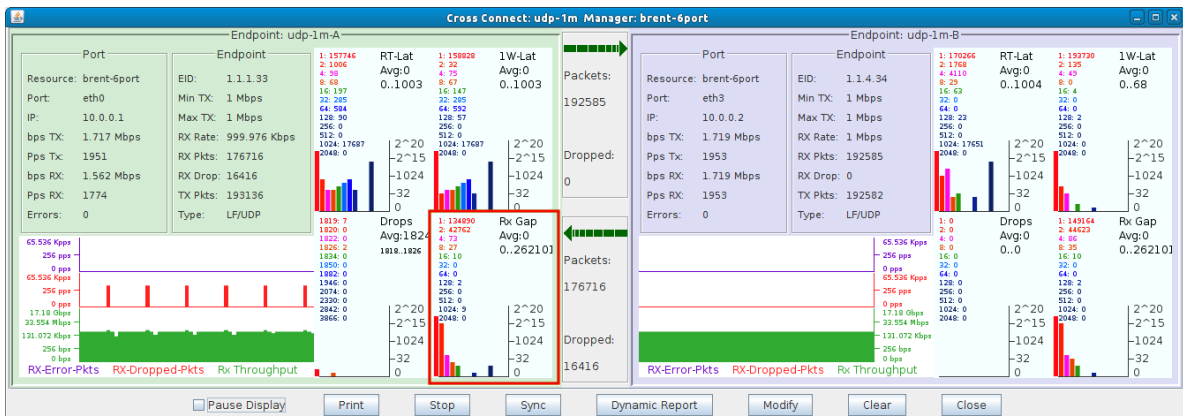
6. Start the test group. This will start both the layer 3 connection and the scripted WanLink.

A. In the **Test Group** tab, select **tg** and click **Start**. You will see the Script Report window appear.

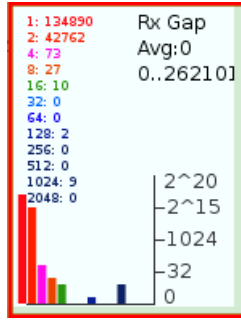


7. Display the Layer 3 connection and analyze the Rx Gap (sequence gap).

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.