Lab Cisco Switch - QOS testing (April 13, 2022)

Setup:

Two (2) Cisco switches isolated and connected via Trunk Port.
MW Link setup between the 2 Cisco switches to be able to reduce network bandwidth and test QOS.
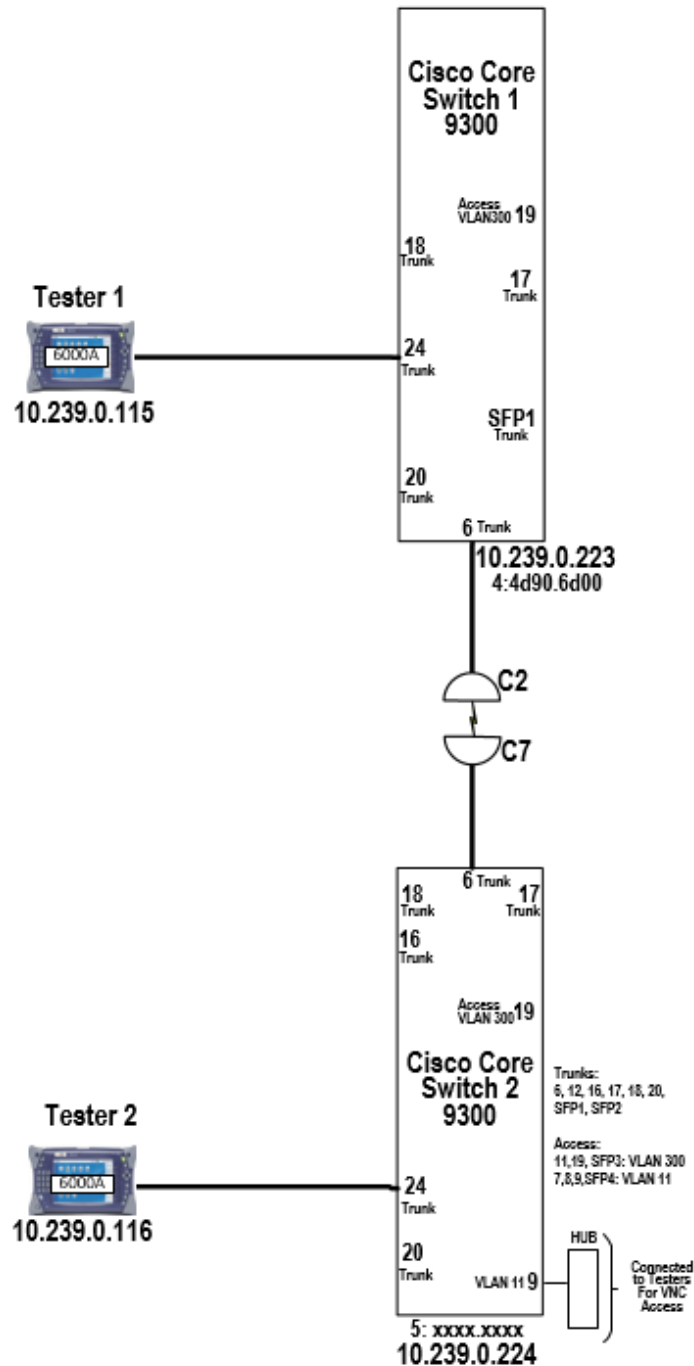MW Link has a max bandwidth of 169 Mbps.
All Cisco ports operating on 1Gbps.

Figure 1

TEST 1: Oversubscibe Queue 3 to 60 Mbps

Step 1: Test traffic - 4 streams of 42.25 Mbps each from each Tester = 169 Mbps (limit of the MW radio).
   See Figure 2.
   Streams:
   VLAN 300 / Pri 6 = 42.25 Mbps (Strict Priority-LLQ Low Latency Queue /10% of bandwidth)
   VLAN 44 / Pri 5= 42.25 Mbps (Queue 2/ 47% of bandwidth)
   VLAN 72 / Pri 4= 42.25 Mbps (Queue 1/ 29% of bandwidth)
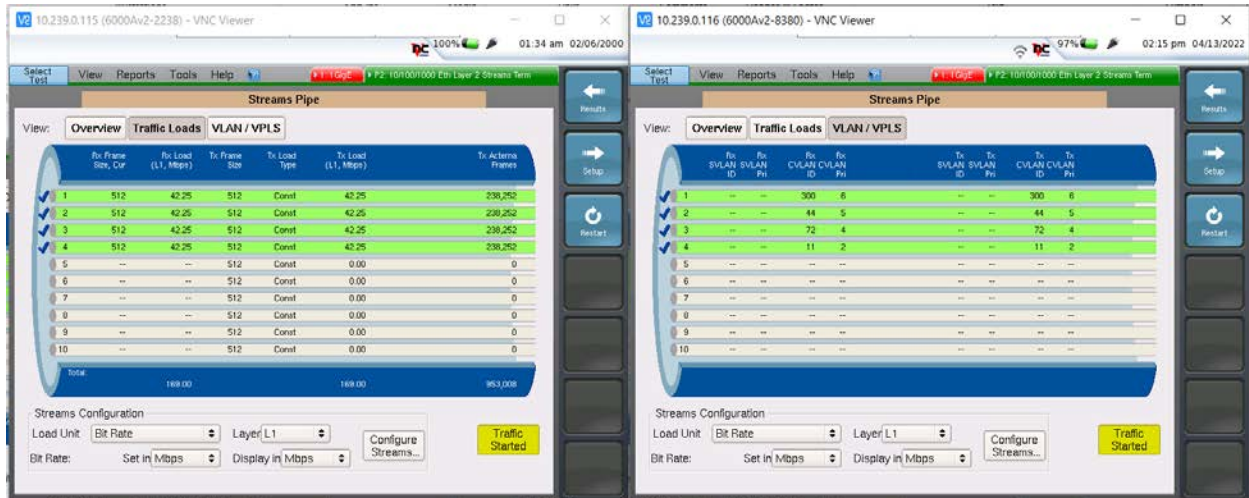   VLAN 11 / Pri 2=42.25 Mbps (Queue 0/ 14% of bandwidth)

Figure 2.

Step 2: QOS Test - Queue 3 (Stream 1 – VLAN 300) is oversubcribed to 60 Mbps.

Result: See Figure 3
Queue 3 correctly passes the 60 Mbps.
Tester 2 →Tester 1: Throughput reduced on Queues 1 and 0
Tester 1→Tester 2: Throughput reduced on Queues 1 only

Figure 3.

TEST 2: Oversubscibe Queue 3 to 150Mbps

Step 1: Setup: Same as Test 1
Step 2: QOS Test - Queue 3 (Stream 1 – VLAN 300) is oversubcribed to 150 Mbps.

Result: See Figure 4
Queue 3 does not receive the entire 150 Mbps in both directions.
Tester 2 →Tester 1: Throughput reduced on Queues 1 and 0
Tester 1→Tester 2: Throughput reduced on Queues 1 only

Figure 4.

TEST 3: Reduce network link throughput (MW link); Cisco ports at 1Gbps.

Step 1: Setup : Same as TEST 1 (Queue 3 is restored to 42.25 Mbps.)
Step 2: QOS Test - The MW Link is attenuated to reduce link bandwidth between the 2 Cisco switches to
141-144 Mbps.

Results: See Figure 5.
Queue 3 correctly retains 42.25 Mbps.
Tester 2 →Tester 1: Throughput reduced on Queues 1 and 0
Tester 1→Tester 2: Throughput reduced on Queues 1 only

Figure 5.

TEST 4: Reduce network link throughput (MW Link); Cisco ports at 100Mbps.

Step 1: Setup: Cisco Ports set to 100 Mbps.
Step 2: Test traffic - 4 streams of 25 Mbps each = 100 Mbps (limit of the Cisco ports).
      Streams:
      VLAN 300 / Pri 6 = 25 Mbps (Strict Priority-LLQ Low Latency Queue /100% of bandwidth)
      VLAN 44 / Pri 5= 25 Mbps (Queue 2/ 0% of bandwidth)
      VLAN 72 / Pri 4= 25 Mbps (Queue 1/ 0% of bandwidth)
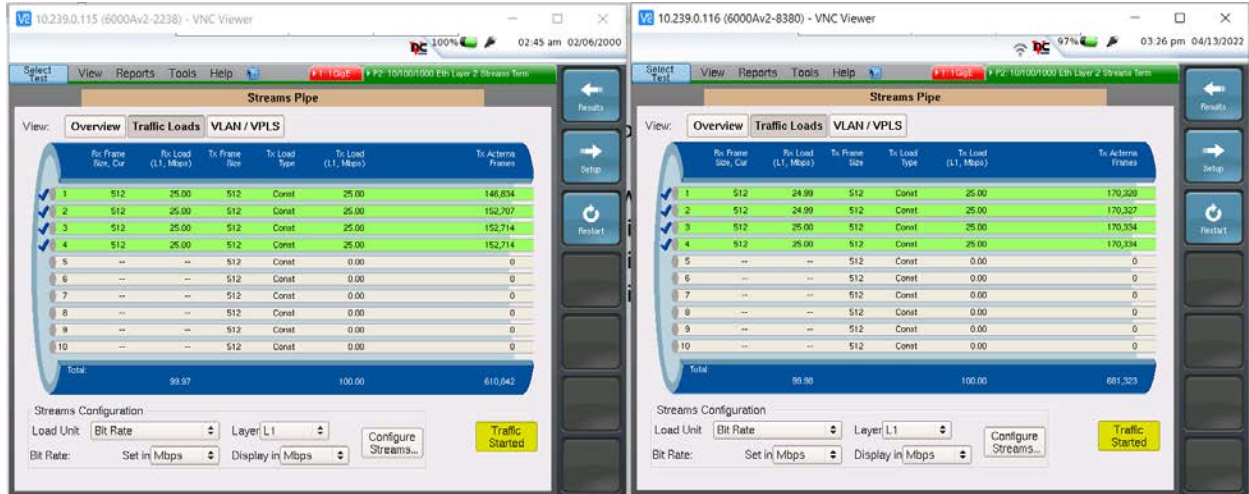   VLAN 11 / Pri 2= 25 Mbps (Queue 0/ 0% of bandwidth)
      See Figure 6

Figure 6

Step 3: QOS Test - MW Link attenuated to force a lower modulation with 43 Mbps throughput.

Results: See Figure 7.
Queue 3 correctly retains 42.25 Mbps.
Tester 2 →Tester 1: Throughput on Queues 1 and 0 reduced to 0.
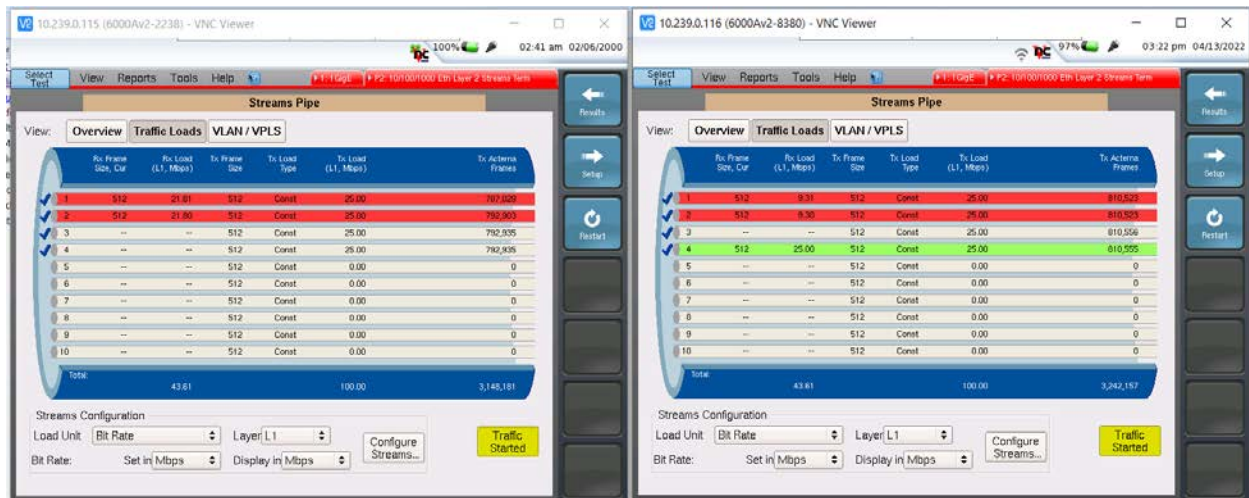Tester 1→Tester 2: Throughput on Queue 1 reduced to 0.

Figure 7