**WanLink Queue Discipline**

**Goal:** Setup a WanLink with an alternate queue discipline.

In this test scenario, the default WanLink queue discipline of FiFO (First In First Out) is replaced with WRR (Weighted Round Robin) to demonstrate how to setup queuing that will prioritize traffic flows based on IP ToS.

**Note:** WRR can only be used with User Mode WanLinks.

1. Setup a WanLink connection.
   A. Go to the **WanLinks** tab and select **Create**.
B. Enter the WanLink name, physical ports, base transfer rate, delay, jitter etc...
   These impairments will be applied to all traffic on the WanLink.

C. Select **Apply** to create the base WanLink.

For more information see **LANforge-GUI User Guide: Creating & Modifying WanLinks**
2. Setup WanLink for **User Mode**.
   
   **A.** Select **All** to un-hide the other WanLink config panels.

   ![WanLink configuration interface](image)

   **B.** In panel 2, un-check the **Kernel-Mode** box.

   ![WanLink configuration interface](image)

   **C.** Select **Apply** to change the WanLink.

For more information see [LANforge-GUI User Guide: Creating & Modifying WanLinks](#)
3. Demonstrate the FIFO Queue Discipline.
   A. Start the WanLink, then run traffic through LANforge-ICE ports eth2 and eth3.
   Here we are using LANforge-FIRE on a secondary resource to over-subscribe the 100Mbps WanLink with five 30Mbps traffic flows each with a different IP ToS value set to show that the FIFO WanLink ignores the ToS bits by treating all packets equally and processing them in the order they enter the queue.

   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
   udp-001-ToS-0            LFAUDP     Stopped   0         0         0          0          0            0            0
   udp-002-ToS-64           LFAUDP     Stopped   0         0         0          0          0            0            0
   udp-003-ToS-96           LFAUDP     Stopped   0         0         0          0          0            0            0
   udp-004-ToS-128          LFAUDP     Stopped   0         0         0          0          0            0            0
   udp-005-ToS-192          LFAUDP     Stopped   0         0         0          0          0            0            0

   B. The dropped packet percentages show that even with a high value ToS, no priority is observed.

   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
   udp-001-ToS-0            LFAUDP     Run       30,986    29,035    24,731,675 23,640,798 15,753       15,513       5,793
   udp-002-ToS-64           LFAUDP     Run       31,203    32,229    25,341,190 26,170,783 4,697        12,647       1,733
   udp-003-ToS-96           LFAUDP     Run       25,690    26,259    20,052,720 21,505,667 22,227       20,551       8,237
   udp-004-ToS-128          LFAUDP     Run       18,211    18,988    14,707,804 15,256,343 39,087      49,074       14,713
   udp-005-ToS-192          LFAUDP     Run       16,050    14,245    12,948,194 11,490,452 49,169       61,644       18,261

For more information see LANforge-GUI User Guide: Layer-3 Cross-Connects
4. Change the WanLink queue discipline to WRR.
   A. Select the Stop All button to stop all connections, then Modify the WanLink.
   
   ![LANforge Manager screenshot]

   B. In panel 4, change the QDisc field to the following string: 
   **WRR,2000-0-255,4000-64-255,8000-96-255,16000-128-255,32000-192-255** 
   for both Endpoint-A and Endpoint-B. 
   The WRR string format is weight-ToS-mask where higher weights are given higher priority to packets matching the ToS and bit mask. 
   **Note:** Minimum weighting should be equal to or greater than your MTU.

   ![WanLink endpoint configuration screenshot]

   C. Select OK to apply changes to the WanLink and close the modify window.
5. Demonstrate the WRR Queue Discipline.

A. Run the WanLink and the same five UDP traffic flows through LANforge-ICE ports eth2 and eth3.

B. This time, the higher valued ToS UDP flows are experiencing less drops due to the WRR priorities setup in the WanLink.

For more information see LANforge-GUI User Guide: Layer-3 Cross-Connects
Candela Technologies, Inc., 2417 Main Street, Suite 201, Ferndale, WA 98248, USA
www.candelaitech.com | sales@candelaitech.com | +1.360.380.1618