

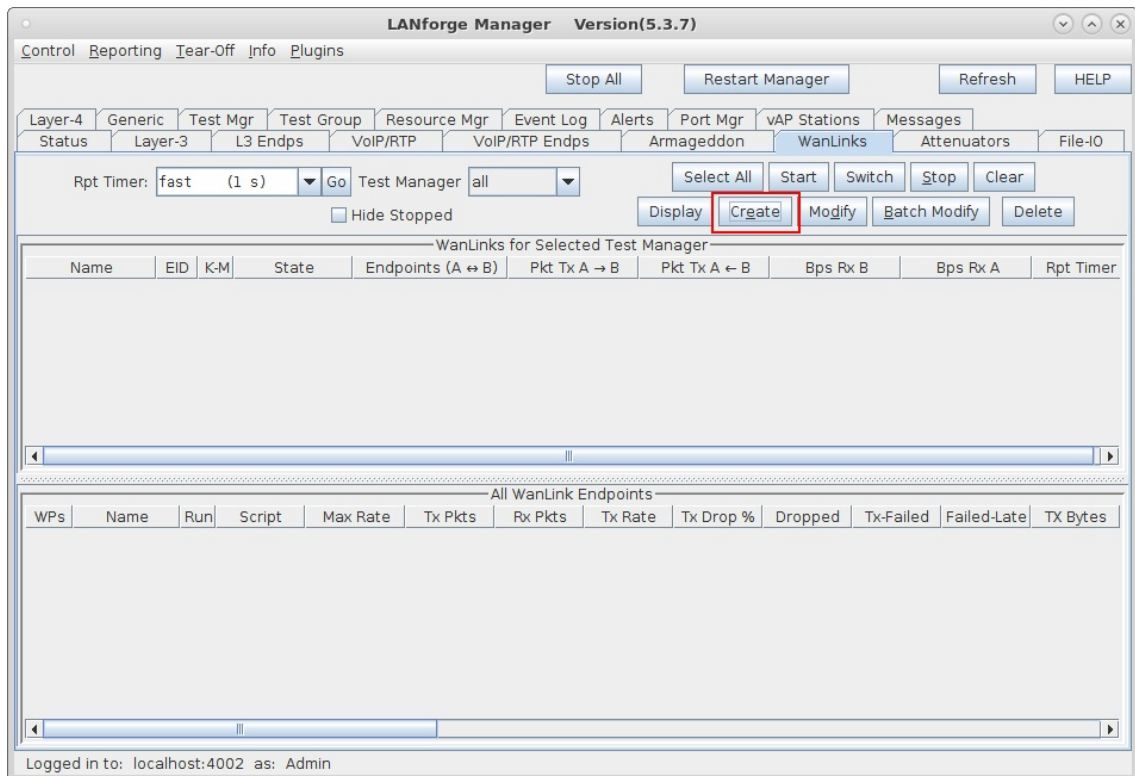
WanLink Queue Discipline

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.

The screenshot shows a dialog box titled "100Mbps-wan - Create/Modify WanLink". At the top, there are buttons for "+", "-", "All", "Apply", "OK", "Display WanLink & WanPaths", and "Cancel". Below these buttons is a section titled "WanLink Information".

WanLink Information

Name: 100Mbps-wan

Presets: CUSTOM

	Endpoint A	Endpoint B
Port:	2 (eth2)	3 (eth3)
Transfer Rate:	100M (100 Mbps)	100M (100 Mbps)
Delay:	tiny (10 ms)	tiny (10 ms)
Drop-Freq:	zero (0%)	zero (0%)
Jitter:	zero (0 us)	zero (0 us)
Jitter-Freq:	zero (0%)	zero (0%)

- 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.

The screenshot shows the '100Mbps-wan - Create/Modify WanLink' dialog box. The 'All' button is highlighted with a red box. The dialog is divided into several panels. Panel 1 (left) shows 'WanLink Information' with fields for Name, Presets, Port, Transfer Rate, Delay, Drop-Freq, Jitter, and Jitter-Freq. Panel 2 (right) shows 'WanLink Information' with checkboxes for Pass-Through, HW Pass-Through, Coupled-Mode, and Kernel-Mode (checked), and fields for Resource, Rpt Timer, Reorder-Freq, Dup-Freq, Drop Burst, and Reorder Amt. Panel 3 (middle) shows 'Endpoint A WAN Paths' and 'Endpoint B WAN Paths' tables. Panel 4 (bottom) shows 'CPU-ID', 'Test Manager', 'Replay File', and 'Dump File' sections.

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

The screenshot shows the '100Mbps-wan - Create/Modify WanLink' dialog box. The 'Kernel-Mode' checkbox in panel 2 is highlighted with a red box and is now unchecked. The rest of the dialog is the same as in the previous screenshot.

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.

The screenshot shows the LANforge Manager interface. The 'Test Manager' tab is active, and the 'Layer-3' sub-tab is selected. The table below shows five UDP test flows, all of which are currently 'Stopped'.

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	LF/UDP	Stopped	0	0	0	0	0	0	0	0
udp-002-ToS-64	LF/UDP	Stopped	0	0	0	0	0	0	0	0
udp-003-ToS-96	LF/UDP	Stopped	0	0	0	0	0	0	0	0
udp-004-ToS-128	LF/UDP	Stopped	0	0	0	0	0	0	0	0
udp-005-ToS-192	LF/UDP	Stopped	0	0	0	0	0	0	0	0

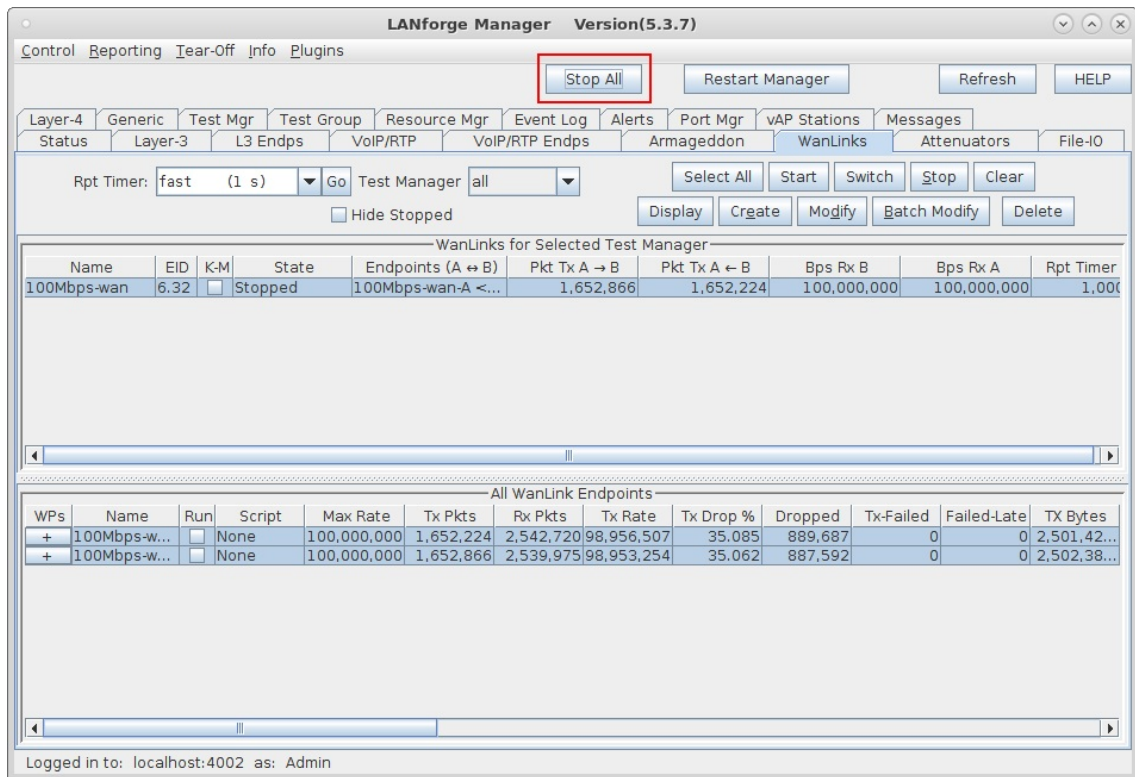
B. The dropped packet percentages show that even with a high value ToS, no priority is observed.

The screenshot shows the LANforge Manager interface with the same test flows now in a 'Run' state. The table displays traffic statistics and dropped packet percentages for each flow.

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	LF/UDP	Run	30,986	29,019	24,731,675	23,640,798	15.753	15.913	5,794	
udp-002-ToS-64	LF/UDP	Run	31,203	32,229	25,341,139	26,170,783	4.697	12.647	1,733	
udp-003-ToS-96	LF/UDP	Run	24,693	26,359	20,052,738	21,405,667	22.327	28.551	8,237	1
udp-004-ToS-128	LF/UDP	Run	18,211	18,788	14,787,804	15,256,343	39.887	49.07	14,714	1
udp-005-ToS-192	LF/UDP	Run	16,050	14,245	12,948,194	11,490,452	49.169	61.644	18,261	2

4. Change the WanLink queue discipline to WRR.

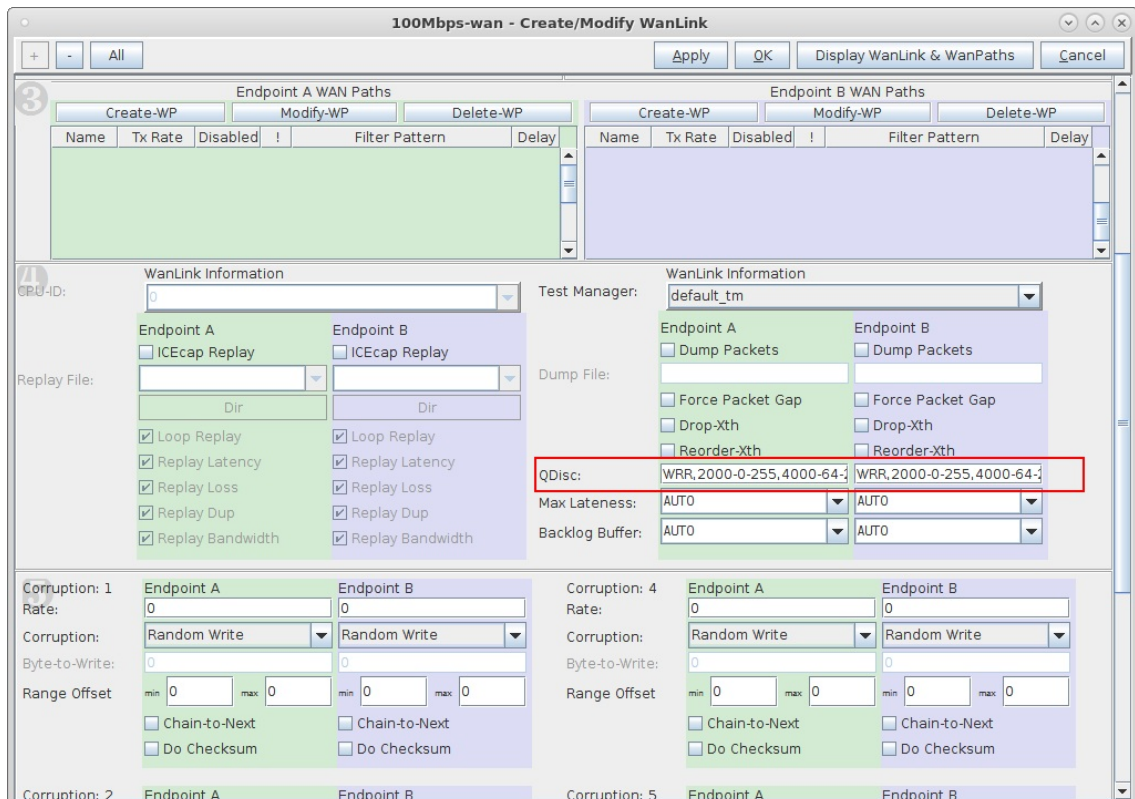
A. Select the **Stop All** button to stop all connections, then **Modify** the WanLink.



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.



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.

The screenshot shows the LANforge Manager interface with the 'WanLinks' tab selected. The 'WanLinks for Selected Test Manager' table is as follows:

Name	EID	K-M	State	Endpoints (A ↔ B)	Pkt Tx A → B	Pkt Tx A ← B	Bps Rx B	Bps Rx A	Rpt Timer
100Mbps-wan	6.32	<input type="checkbox"/>	Run	100Mbps-wan-A <-...	0	0	100,000,000	100,000,000	1,000

Below this, the 'All WanLink Endpoints' table is shown:

WPs	Name	Run	Script	Max Rate	Tx Pkts	Rx Pkts	Tx Rate	Tx Drop %	Dropped	Tx-Failed	Failed-Late	Tx Bytes
+	100Mbps-w...	<input checked="" type="checkbox"/>	None	100,000,000	0	0	0	0	0	0	0	0
+	100Mbps-w...	<input checked="" type="checkbox"/>	None	100,000,000	0	0	0	0	0	0	0	0

Logged in to: localhost:4002 as: Admin

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

The screenshot shows the LANforge Manager interface with the 'Cross Connects for Selected Test Manager' table selected. The table is as follows:

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
udp-001-ToS-0	LF/UDP	Run	5,785	3,705	6,763,717	4,331,818	66.944	84.413	17,056	17,056
udp-002-ToS-64	LF/UDP	Run	38,161	41,833	13,897,326	15,332,256	52.24	43.04	41,741	41,741
udp-003-ToS-96	LF/UDP	Run	43,067	34,538	15,736,044	12,619,674	44.292	53.409	36,468	36,468
udp-004-ToS-128	LF/UDP	Run	80,270	62,238	25,151,921	19,501,747	10.9	28.267	10,152	10,152
udp-005-ToS-192	LF/UDP	Run	104,400	77,234	32,449,505	24,003,895	0	15.729	0	15,729

Logged in to: localhost:4002 as: Admin

For more information see [LANforge-GUI User Guide: Layer-3 Cross-Connects](#)