

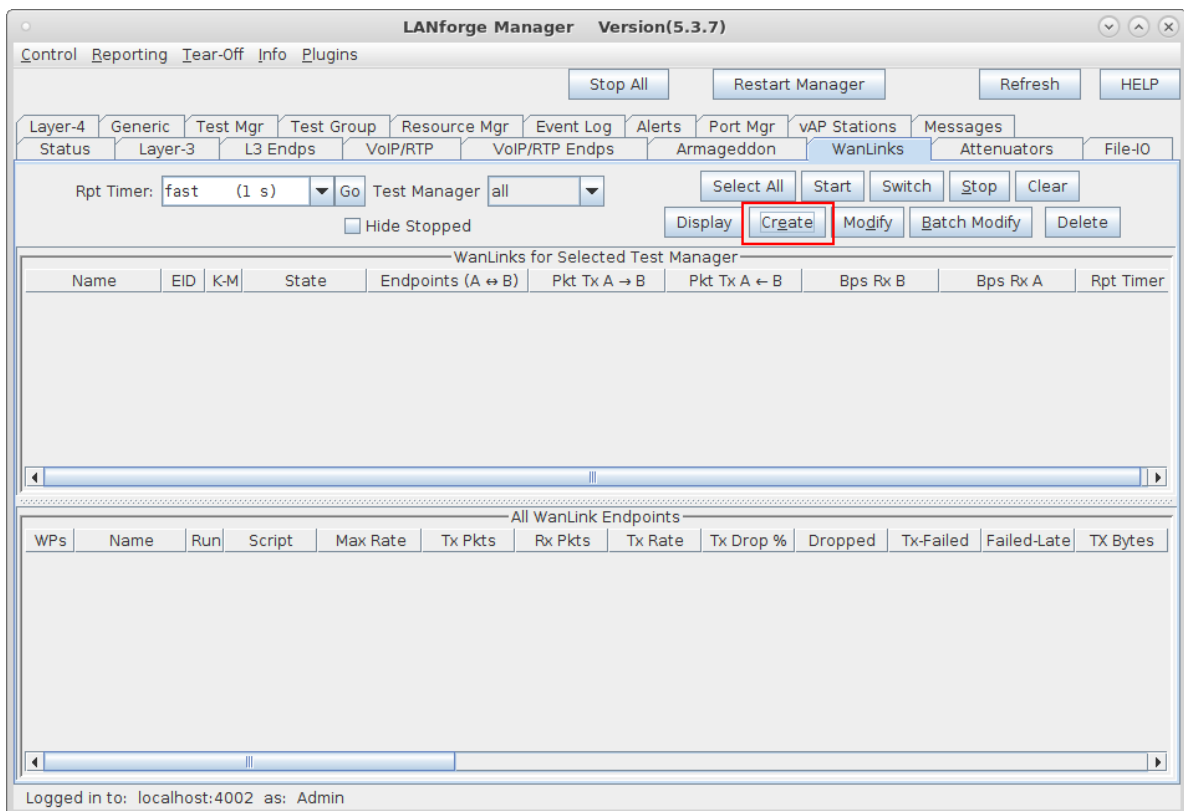
WanLink Queue Discipline

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**.



The screenshot shows the LANforge Manager interface. The 'WanLinks' tab is selected, and the 'Create' button is highlighted with a red box. The interface includes various control buttons like 'Stop All', 'Restart Manager', 'Refresh', and 'HELP'. Below the buttons, there are several tabs for different management functions, and a table for 'WanLinks for Selected Test Manager' which is currently empty. At the bottom, there is a table for 'All WanLink Endpoints' and a login status bar indicating 'Logged in to: localhost:4002 as: Admin'.

- B. Enter the WanLink name, physical ports, base transfer rate, delay, jitter etc...
These impairments will be applied to all traffic on the WanLink.

100Mbps-wan - Create/Modify WanLink

+ - All Apply OK Display WanLink & WanPaths Cancel

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:** WanLink Information. Name: 100Mbps-wan, Presets: CUSTOM. Endpoint A: 2 (eth2), Endpoint B: 3 (eth3). Transfer Rate: 100M (100 Mbps), Delay: tiny (10 ms), Drop-Freq: zero (0%), Jitter: zero (0 us), Jitter-Freq: zero (0%).
- Panel 2:** WanLink Information. Pass-Through, HW Pass-Through, Coupled-Mode, Kernel-Mode. Resource: 1 (jetway-f24), Rpt Timer: fast (1 s), Reorder-Freq: zero (0%), Dup-Freq: zero (0%), Drop Burst: min 1 max 1, Reorder Amt: min 1 max 20.
- Panel 3:** Endpoint A WAN Paths and Endpoint B WAN Paths. Both tables are empty.
- Panel 4:** CPU-ID: 0, Test Manager: default_tm, Replay File, Dump File, Force Packet Gap, Drop-Xth, Reorder-Xth.

- 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 unchecked. The dialog is divided into several panels:

- Panel 1:** WanLink Information. Name: 100Mbps-wan, Presets: CUSTOM. Endpoint A: 2 (eth2), Endpoint B: 3 (eth3). Transfer Rate: 100M (100 Mbps), Delay: tiny (10 ms), Drop-Freq: zero (0%), Jitter: zero (0 us), Jitter-Freq: zero (0%).
- Panel 2:** WanLink Information. Pass-Through, HW Pass-Through, Coupled-Mode, Kernel-Mode. Resource: 1 (jetway-f24), Rpt Timer: fast (1 s), Reorder-Freq: zero (0%), Dup-Freq: zero (0%), Drop Burst: min 1 max 1, Reorder Amt: min 1 max 20.
- Panel 3:** Endpoint A WAN Paths and Endpoint B WAN Paths. Both tables are empty.
- Panel 4:** CPU-ID: 0, Test Manager: default_tm, Replay File, Dump File, Force Packet Gap, Drop-Xth, Reorder-Xth.

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

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 with the 'Cross Connects for Selected Test Manager' table. All five entries are in a 'Stopped' state, indicating that traffic has not yet been initiated.

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

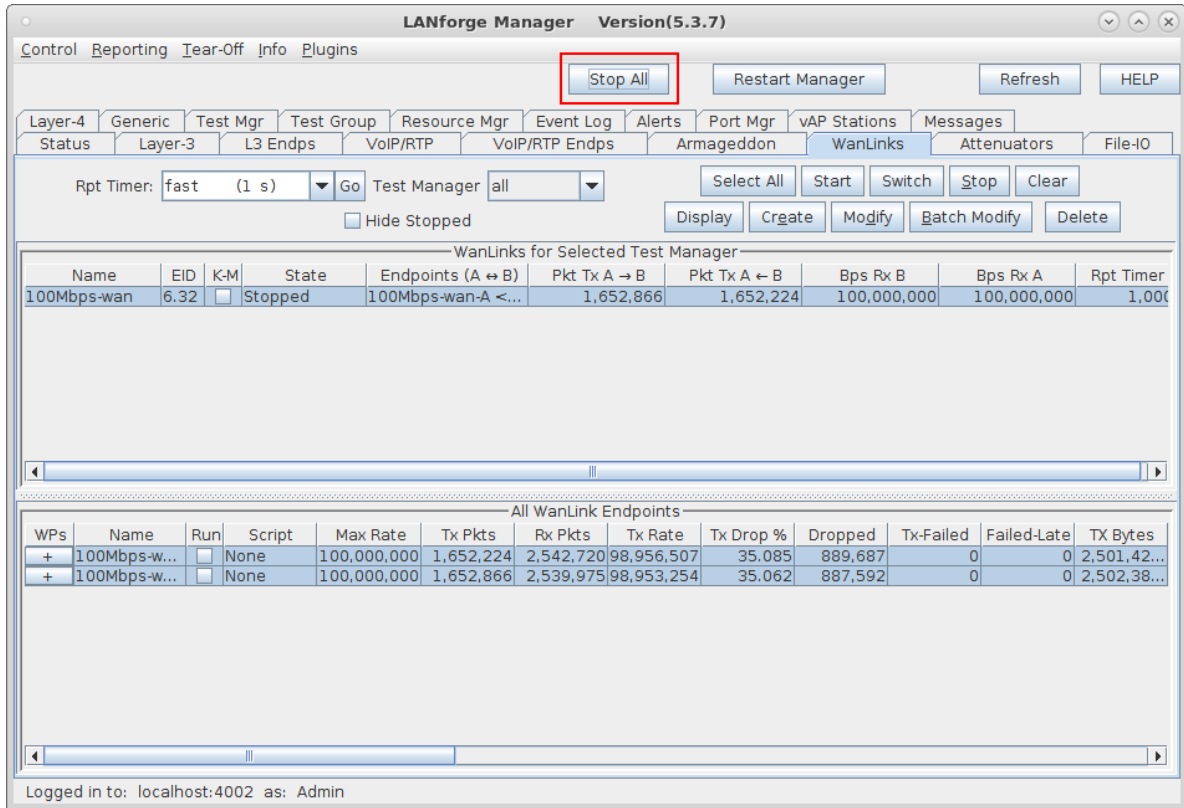
B. The dropped packet percentages show that even with a high value ToS, no priority is observed.

The screenshot shows the LANforge Manager interface with the 'Cross Connects for Selected Test Manager' table. All five entries are now in a 'Run' state, and the table shows significant dropped packet percentages for each flow, demonstrating that higher ToS values do not result in priority.

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.

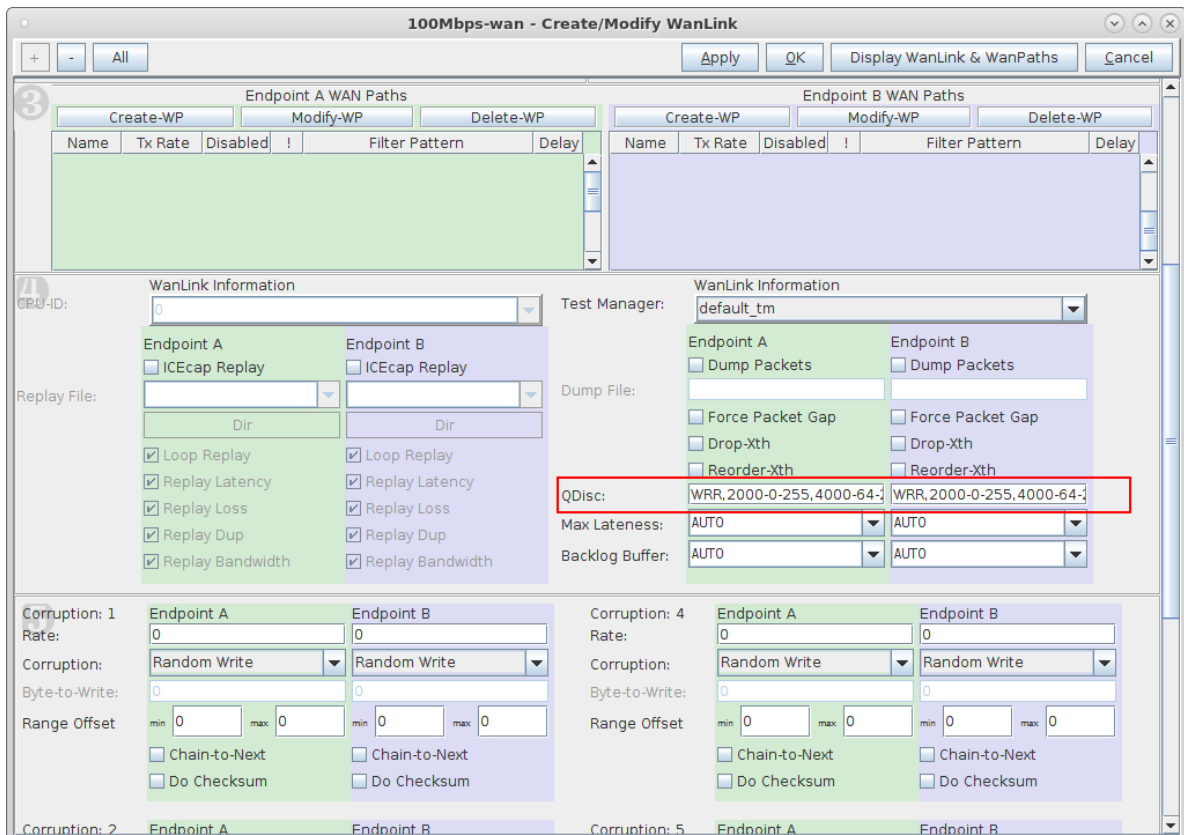
A. Select the **Stop All** button to stop all connections, then **Modify** the WanLink.



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.

For more information see [LANforge-GUI User Guide: Creating & Modifying WanLinks](#)

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 Version(5.3.7) interface. The 'WanLinks' tab is active, displaying a table of WanLinks for the selected Test Manager. The table shows one active WanLink named '100Mbps-wan' with a state of 'Run' and a report timer of 1,000 seconds. Below this, the 'All WanLink Endpoints' table shows two endpoints, both with a state of 'Run' and a maximum rate of 100,000,000 bps.

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

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 Version(5.3.7) interface with the 'Cross Connects' tab active. The table displays five UDP traffic flows with varying ToS values. The flows are all in a 'Run' state. The table shows the number of packets and bytes received on both sides (A and B), as well as the percentage of dropped packets and the total number of dropped packets 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	5,785	3,705	6,763,717	4,331,818	66.944	84.413	17,056	2
udp-002-ToS-64	LF/UDP	Run	38,161	41,833	13,897,326	15,332,256	52.24	43.04	41,741	3
udp-003-ToS-96	LF/UDP	Run	43,067	34,538	15,736,044	12,619,674	44.292	53.409	36,468	3
udp-004-ToS-128	LF/UDP	Run	80,270	62,238	25,151,921	19,501,747	10.9	28.267	10,152	2
udp-005-ToS-192	LF/UDP	Run	104,400	77,234	32,449,505	24,003,895	0	15.729	0	1

Logged in to: localhost:4002 as: Admin

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