

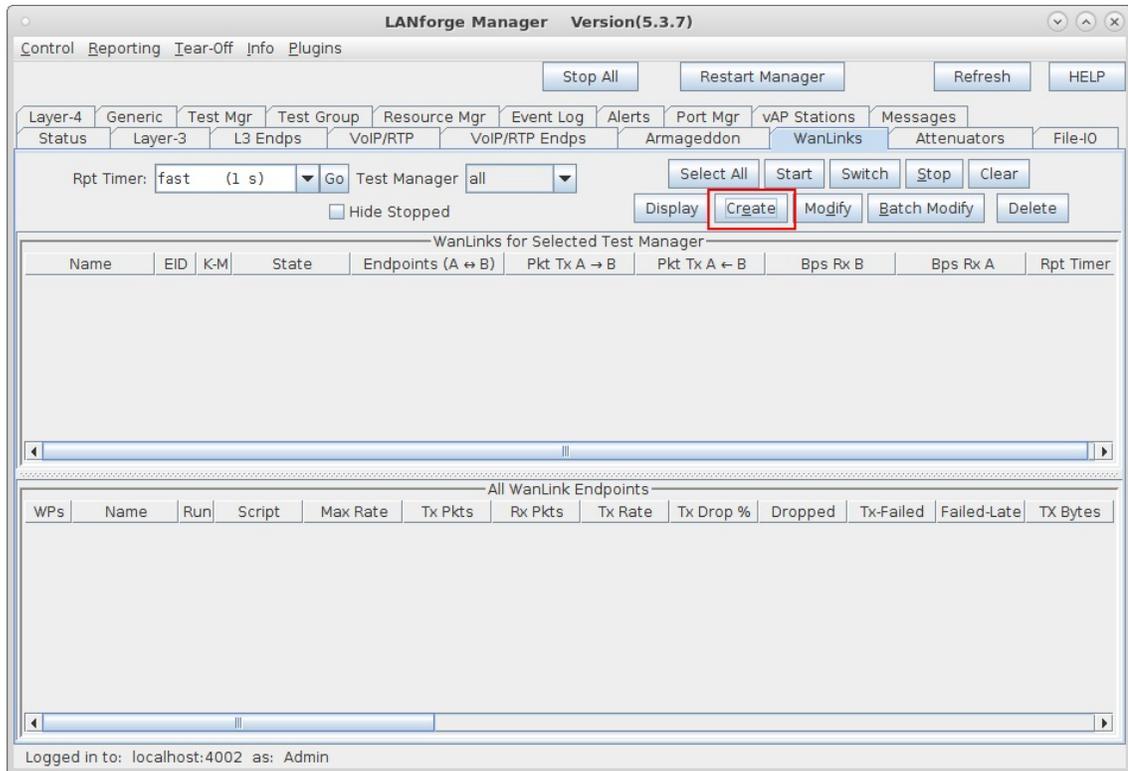
WanPath Corruptions

Goal: Setup a WanLink with WanPath Corruptions.

In this test scenario, LANforge-ICE is used to filter traffic by VLAN on a WanLink with the use of WanPaths and then use WanPath Corruptions to overwrite the DSCP field in the IP packet.

Note: VLAN filtering was recently fixed and should be used with LANforge version 5.3.7 and up.

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 the buttons, the "WanLink Information" section contains the following fields:

	Endpoint A	Endpoint B
Name:	100Mbps-wan	
Presets:	CUSTOM	
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 the WanPaths.

- A. Select **All** to un-hide the other WanLink config panels.

100Mbps-wan - Create/Modify WanLink

Apply OK Display WanLink & WanPaths Cancel

1 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%)

2 WanLink Information
 Pass-Through HW Pass-Through
 Coupled-Mode Kernel-Mode
Resource: 1 (jetway-f24)
Rpt Timer: fast (1 s)
Reorder-Freq: Endpoint A zero (0%) Endpoint B zero (0%)
Dup-Freq: Endpoint A zero (0%) Endpoint B zero (0%)
Drop Burst: min 1 max 1 min 1 max 1
Reorder Amt: min 1 max 20 min 1 max 20

3 Endpoint A WAN Paths Endpoint B WAN Paths
Create-WP Modify-WP Delete-WP Create-WP Modify-WP Delete-WP

Name	Tx Rate	Disabled	!	Filter Pattern	Delay
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Name	Tx Rate	Disabled	!	Filter Pattern	Delay
------	---------	----------	---	----------------	-------

4 CPU-ID: 0 Test Manager: default_tm

WanLink Information
Endpoint A Endpoint B
 ICEcap Replay ICEcap Replay
Replay File: Dir Dir
 Loop Replay Loop Replay

Dump File: Dir Dir
 Dump Packets Dump Packets
 Force Packet Gap Force Packet Gap
 Drop-Xth Drop-Xth
 Reorder-Xth Reorder-Xth

- B. In panel 3, for Endpoint-A WAN Paths, select **Create-WP**.

100Mbps-wan - Create/Modify WanLink

Apply OK Display WanLink & WanPaths Cancel

1 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%)

2 WanLink Information
 Pass-Through HW Pass-Through
 Coupled-Mode Kernel-Mode
Resource: 1 (jetway-f24)
Rpt Timer: fast (1 s)
Reorder-Freq: Endpoint A zero (0%) Endpoint B zero (0%)
Dup-Freq: Endpoint A zero (0%) Endpoint B zero (0%)
Drop Burst: min 1 max 1 min 1 max 1
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3 Endpoint A WAN Paths Endpoint B WAN Paths
Create-WP Modify-WP Delete-WP Create-WP Modify-WP Delete-WP

Name	Tx Rate	Disabled	!	Filter Pattern	Delay
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WanLink Information
Endpoint A Endpoint B
 ICEcap Replay ICEcap Replay
Replay File: Dir Dir
 Loop Replay Loop Replay

Dump File: Dir Dir
 Dump Packets Dump Packets
 Force Packet Gap Force Packet Gap
 Drop-Xth Drop-Xth
 Reorder-Xth Reorder-Xth

- C. Enter a Name and Transfer Rate for the WanPath.
Here we are matching the WanLink's transfer rate.

Create/Modify WanPath for Endpoint: 100Mbps-wan-A

Display Clear Counters Apply OK Cancel

Name: wp-a Backlog Buffer: AUTO

PCAP Filter:

Source IP/MAC: 0.0.0.0 Source Mask: 0.0.0.0

Dest IP/MAC: 0.0.0.0 Dest Mask: 0.0.0.0

Transfer Rate: 100M (100 Mbps) Delay: zero (0 us)

Jitter: zero (0 us) Drop-Freq: zero (0%)

Min Drop Burst: 1 Max Drop Burst: 1

Min Reorder Amount: 1 Max Reorder Amount: 20

Reorder-Freq: zero (0%) Dup-Freq: zero (0%)

Jitter-Freq: zero (0%) Test Manager:

ICEcap Replay Replay File: Dir

Disabled Loop Replay Replay Latency Replay Loss

Same As WanLink Replay Dup Replay Bandwidth Use Pcap Filter

Inverse Match Drop-Xth Duplicate-Xth Reorder-Xth

Corruption #0

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

Corruption #1

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

Corruption #2

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

Corruption #3

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

Corruption #4

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

Corruption #5

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

D. Select checkbox for **Use Pcap Filter**

The image shows a Windows-style dialog box titled "Create/Modify WanPath for Endpoint: 100Mbps-wan-A". At the top, there are buttons for "Display", "Clear Counters", "Apply", "OK", and "Cancel". The main area contains various configuration fields:

- Name: wp-a
- Backlog Buffer: AUTO
- PCAP Filter: (empty)
- Source IP/MAC: 0.0.0.0
- Source Mask: 0.0.0.0
- Dest IP/MAC: 0.0.0.0
- Dest Mask: 0.0.0.0
- Transfer Rate: 100M (100 Mbps)
- Delay: zero (0 us)
- Jitter: zero (0 us)
- Drop-Freq: zero (0%)
- Min Drop Burst: 1
- Max Drop Burst: 1
- Min Reorder Amount: 1
- Max Reorder Amount: 20
- Reorder-Freq: zero (0%)
- Dup-Freq: zero (0%)
- Jitter-Freq: zero (0%)
- Test Manager: (empty)

Below these fields is an "ICEcap Replay" section with a "Replay File:" field and a "Dir" button. There are several checkboxes for replay options:

- Disabled
- Same As WanLink
- Inverse Match
- Loop Replay
- Replay Dup
- Drop-Xth
- Replay Latency
- Replay Bandwidth
- Duplicate-Xth
- Use Pcap Filter (highlighted with a red box)
- Reorder-Xth

At the bottom, there are six "Corruption" sections (Corruption #0 through #5). Each section has fields for Rate (0), Corruption (Random Write), Byte-to-Write (0), Min Offset (0), and Max Offset (0). There are also checkboxes for "Chain-to-Next" and "Do Checksum" in each section.

- E. Enter the PCAP Filter **vlan 1010** to apply any WanPath impairment or corruptions only to packets with 802.1q vlan id 1010
Expression is based on the tcpdump expression field.

Create/Modify WanPath for Endpoint: 100Mbps-wan-A

Buttons: Display, Clear Counters, Apply, OK, Cancel

Name: wp-a Backlog Buffer: AUTO

PCAP Filter: vlan 1010

Source IP/MAC: 0.0.0.0 Source Mask: 0.0.0.0

Dest IP/MAC: 0.0.0.0 Dest Mask: 0.0.0.0

Transfer Rate: 100M (100 Mbps) Delay: zero (0 us)

Jitter: zero (0 us) Drop-Freq: zero (0%)

Min Drop Burst: 1 Max Drop Burst: 1

Min Reorder Amount: 1 Max Reorder Amount: 20

Reorder-Freq: zero (0%) Dup-Freq: zero (0%)

Jitter-Freq: zero (0%) Test Manager:

ICEcap Replay Replay File: Dir

Disabled Loop Replay Replay Latency Replay Loss

Same As WanLink Replay Dup Replay Bandwidth Use Pcap Filter

Inverse Match Drop-Xth Duplicate-Xth Reorder-Xth

Corruption #0

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

Corruption #1

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

Corruption #2

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

Corruption #3

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

Corruption #4

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

Corruption #5

Rate: 0

Corruption: Random Write

Byte-to-Write: 0

Min Offset: 0

Max Offset: 0

Chain-to-Next Do Checksum

- F. Select **Apply** to create the WanPath.

For more information see [Tcpdump man page](#) , [Pcap Filter Syntax](#)

C. Select **OK** then create a second WanPath for this WanLink on Endpoint-B using the same values.

Create/Modify WanPath for Endpoint: 100Mbps-wan-B

Buttons: Display, Clear Counters, Apply, OK, Cancel

Name: wp-b Backlog Buffer: AUTO

PCAP Filter: vlan 1010

Source IP/MAC: 0.0.0.0 Source Mask: 0.0.0.0

Dest IP/MAC: 0.0.0.0 Dest Mask: 0.0.0.0

Transfer Rate: 100M (100 Mbps) Delay: zero (0 us)

Jitter: zero (0 us) Drop-Freq: zero (0%)

Min Drop Burst: 1 Max Drop Burst: 1

Min Reorder Amount: 1 Max Reorder Amount: 20

Reorder-Freq: zero (0%) Dup-Freq: zero (0%)

Jitter-Freq: zero (0%) Test Manager:

ICEcap Replay Replay File: Dir

Disabled Loop Replay Replay Latency Replay Loss
 Same As WanLink Replay Dup Replay Bandwidth Use Pcap Filter
 Inverse Match Drop-Xth Duplicate-Xth Reorder-Xth

Corruption #0: Rate: 100000, Corruption: Write Byte, Byte-to-Write: 40, Min Offset: 19, Max Offset: 20, Chain-to-Next, Do Checksum

Corruption #1: Rate: 0, Corruption: Random Write, Byte-to-Write: 0, Min Offset: 0, Max Offset: 0, Chain-to-Next, Do Checksum

Corruption #2: Rate: 0, Corruption: Random Write, Byte-to-Write: 0, Min Offset: 0, Max Offset: 0, Chain-to-Next, Do Checksum

Corruption #3: Rate: 0, Corruption: Random Write, Byte-to-Write: 0, Min Offset: 0, Max Offset: 0, Chain-to-Next, Do Checksum

Corruption #4: Rate: 0, Corruption: Random Write, Byte-to-Write: 0, Min Offset: 0, Max Offset: 0, Chain-to-Next, Do Checksum

Corruption #5: Rate: 0, Corruption: Random Write, Byte-to-Write: 0, Min Offset: 0, Max Offset: 0, Chain-to-Next, Do Checksum

D. Verify that the WanPaths on this WanLink are setup correctly, then select **OK** on the Create/Modify WanLink window shown here

100Mbps-wan - Create/Modify WanLink

Buttons: Apply, OK, Display WanLink & WanPaths, Cancel

1 WanLink Information: Name: 100Mbps-wan, Presets: CUSTOM

2 WanLink Information: Resource: 1 (jetway-f24), Rpt Timer: fast (1 s)

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

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

3 Endpoint A WAN Paths

Name	Tx Rate	Disabled	!	Filter Pattern	Delay
wp-a	100 M	<input type="checkbox"/>	<input type="checkbox"/>	Pcap: vlan 1010	0
wp-b	100 M	<input type="checkbox"/>	<input type="checkbox"/>	Pcap: vlan 1010	0

Endpoint B WAN Paths

4 CPU-ID: 0, Test Manager: default_tm

Replay File: Dir

Endpoint A: ICEcap Replay, Loop Replay

Endpoint B: ICEcap Replay, Loop Replay

Endpoint A: Dump Packets, Force Packet Gap, Drop-Xth, Reorder-Xth

Endpoint B: Dump Packets, Force Packet Gap, Drop-Xth, Reorder-Xth

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

4. Run traffic through LANforge-ICE ports **eth2** and **eth3**, and capture traffic on eth2.

A. Here we are using LANforge-FIRE on a secondary resource to send a 10Mbps bi-directional UDP flow between 802.1q VLAN endpoints eth2.1010 and eth3.1010 with an IP ToS value of decimal 184 which corresponds to DSCP value decimal 46 or Expedited Forwarding

B. Go to the **Port Mgr** tab and highlight WanLink port eth2, then select the **Sniff Packets** button to bring up Wireshark.

Port	Pha...	Down	IP	SEC	Alias	Parent Dev	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps
1.1.00			192.168.100.198	0	eth0		5,529,927,...	8,709,413	55	143,334	5,281,552,...	9,617,541	
1.1.01		<input checked="" type="checkbox"/>	0.0.0.0	0	eth1		0	0	0	0	0	0	0
1.1.02		<input checked="" type="checkbox"/>	0.0.0.0	0	eth2		3,482,049,...	2,399,718	4	7,757,660,...	4,297,300		
1.1.03			0.0.0.0	0	eth3		3,482,026,...	2,399,705	0	0	7,757,666,...	4,297,300	
1.1.04			0.0.0.0	0	eth4		0	0	0	0	12,506	147	
1.1.05			0.0.0.0	0	eth5		0	0	0	0	12,234	147	
1.1.06			0.0.0.0	0	wiphy0		0	0	0	0	0	0	0
1.1.07			0.0.0.0	0	wiphy1		0	0	0	0	0	0	0
1.1.08		<input checked="" type="checkbox"/>	0.0.0.0	0	wlan0	wiphy0	0	0	0	0	0	0	0
1.1.09		<input checked="" type="checkbox"/>	0.0.0.0	0	wlan1	wiphy1	0	0	0	0	0	0	0
1.2.00		<input checked="" type="checkbox"/>	192.168.100.103	0	eth0		653,572,601	5,346,946	13	15,109	5,202,101,...	4,863,373	
1.2.01		<input checked="" type="checkbox"/>	0.0.0.0	0	eth1		0	0	0	0	0	0	0
1.2.02			172.16.0.102	0	eth2		3,460,380,...	2,384,176	0	0	3,482,059,...	2,399,880	
1.2.03			172.16.0.103	0	eth3		3,460,386,...	2,384,178	0	0	3,482,036,...	2,399,868	
1.2.04			0.0.0.0	0	eth4		2,394	7	0	0	9,852	138	
1.2.05			0.0.0.0	0	eth5		2,052	6	0	0	9,852	138	
1.2.06			192.168.9.29	0	eth3.1009	eth3	0	0	0	0	9,306	131	
1.2.07			192.168.8.28	0	eth3.1008	eth3	0	0	0	0	9,306	131	
1.2.08			192.168.1.11	0	eth2.1001	eth2	84,760,294	68,374	0	0	85,730,804	68,508	
1.2.09			192.168.9.19	0	eth2.1009	eth2	0	0	0	0	9,236	130	
1.2.10			192.168.5.15	0	eth2.1005	eth2	0	0	0	0	9,236	130	
1.2.11			192.168.7.17	0	eth2.1007	eth2	0	0	0	0	9,306	131	

- C. The capture will show that periodically the DSCP field gets overwritten per the WanPath corruption logic of writing a decimal value 40 in the IP ToS field which corresponds to a DSCP value of decimal 10 or Assured Forwarding 11.

The image shows a Wireshark capture window titled "ice_ex12_wanpath_corruption.pcap [Wireshark 2.1.1 (Git Rev Unknown from unknown)] (as superuser)". The interface includes a menu bar, a toolbar, a filter field, and a main packet list table. The table shows a series of packets from LANforge to LANforge, with the DSCP field alternating between Expedited Forwarding and Assured Forwarding 11. Packet 158 is highlighted, showing its details in the packet pane below. The packet details pane shows the following structure:

- Frame 147: 1518 bytes on wire (12144 bits), 1518 bytes captured (12144 bits)
- Ethernet II, Src: JetwayIn_cc:5b:d3 (00:30:18:cc:5b:d3), Dst: JetwayIn_cc:5b:d2 (00:30:18:cc:5b:d2)
- 802.1Q Virtual LAN, PRI: 0, CFI: 0, ID: 1010
- Internet Protocol Version 4, Src: 192.168.0.30, Dst: 192.168.0.20
- User Datagram Protocol, Src Port: 33018, Dst Port: 33017
- LANforge Traffic Generator

The packet bytes pane shows the raw data in hexadecimal and ASCII. The status bar at the bottom indicates the file size is 3.038 kB, 00:00:01, with 1981 packets displayed (100.0%) and 2 marked (0.1%).

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

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