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Network Testing and Emulation Solutions

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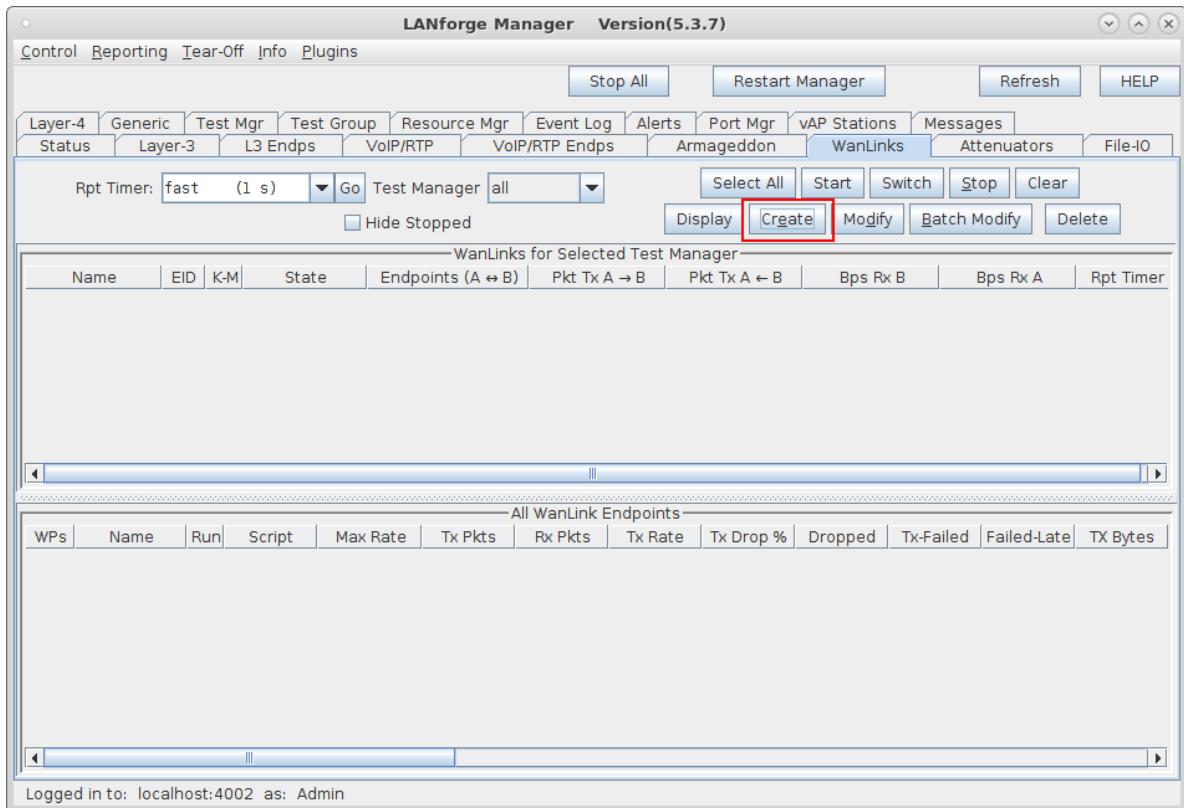
B. Enter the WanLink name, physical ports, base transfer rate, delay, jitter etc...
   These impairments will be applied to all traffic on the WanLink.
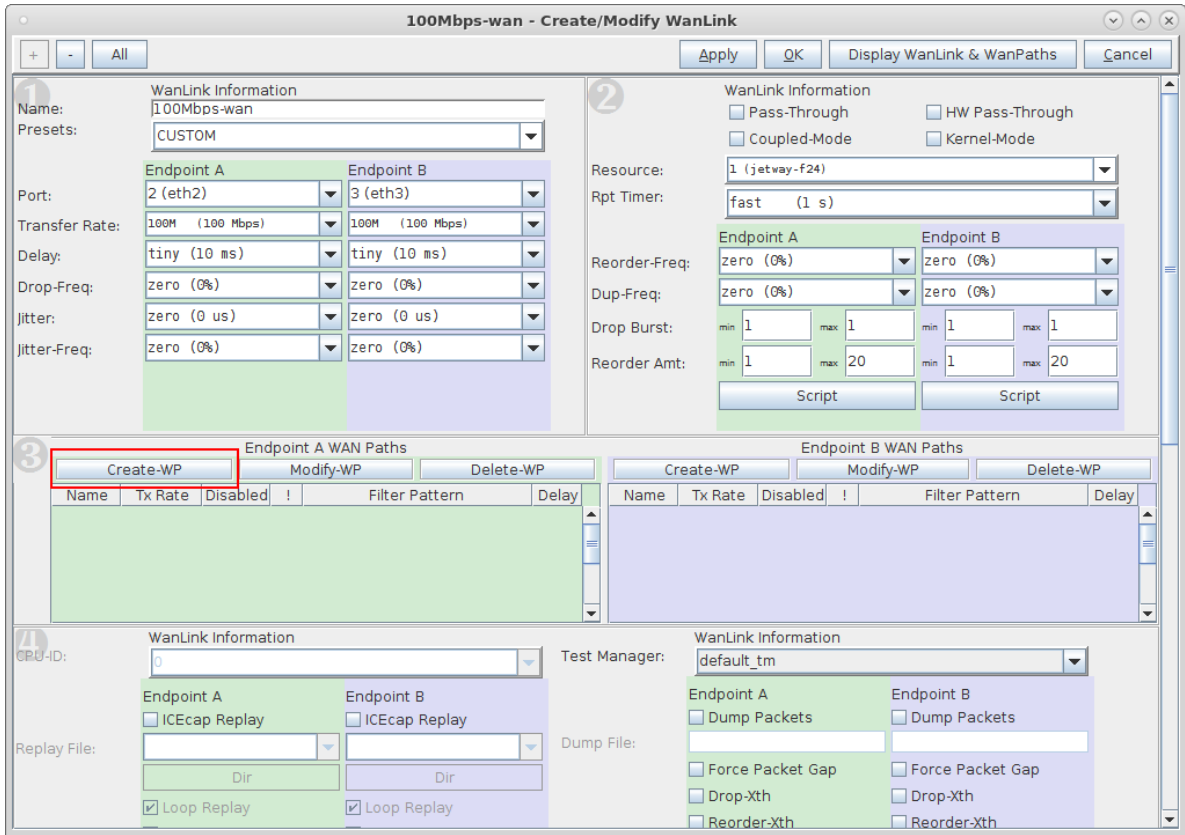

C. Select **Apply** to create the base WanLink.

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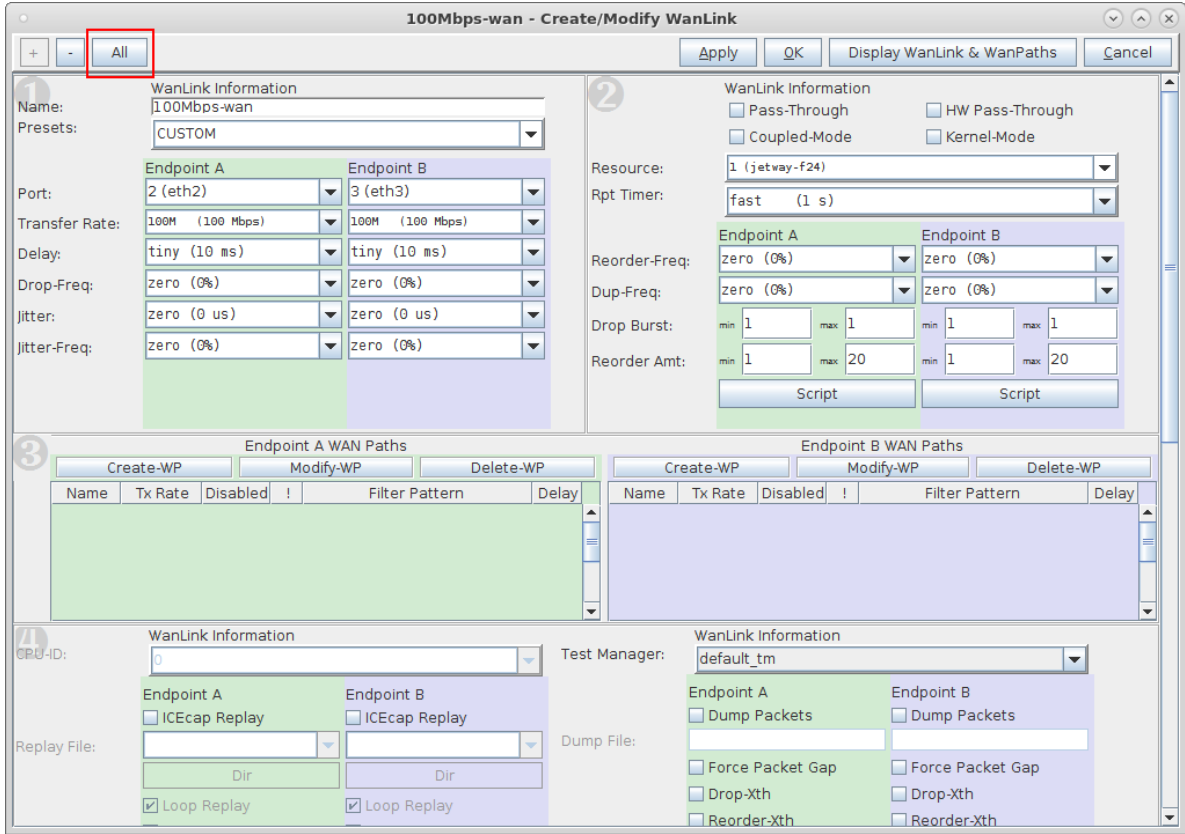
B. In panel 3, for Endpoint-A WAN Paths, select **Create-WP**.

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**

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.

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

For more information see Tcpdump man page , Pcap Filter Syntax

3. Setup the Corruptions.

    A. Enter the following values into **Corruption #0** fields

        A. Rate **100000**
        (how often, per million packets, should the corruption be applied)

        B. Corruption **Write Byte**

        C. Byte-to-Write **40**
        (hex 0x00-0xff or decimal 0-255)
        If you enter 0x28 and select OK, the GUI will translate it to decimal 40.

        D. Min Offset **19**

        E. Max Offset **20**
        The Differentiated Services Field is in byte 20 of the ethernet frame which corresponds to the 2nd byte of the IP header.

    B. Select checkbox **Do Checksum** which will re-calculate the checksum after making the errors so that the packet is still valid.

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

| 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

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

udp-1010 - Create/Modify Cross Connect

CX Name:	udp-1010
CX Type:	LANforge / UDP

	Endpoint A	Endpoint B
Resource:	2 (jw2)	2 (jw2)
Port:	25 (eth2.1010)	15 (eth3.1010)
Min Tx Rate:	10M (10 Mbps)	10M (10 Mbps)
Max Tx Rate:	Same	Same
Min PDU Size:	AUTO	AUTO
Max PDU Size:	Same	Same
IP ToS:	Voice (EF) (184)	Voice (EF) (184)
Pkts To Send:	Infinite	Infinite

		Endpoint A	Endpoint B
Report Timer:		fast (1 s)	
Pld Pattern		increasing	increasing
Min IP Port:		AUTO	AUTO
Max IP Port:		Same	Same
Min Duration:		Forever	Forever
Max Duration:		Same	Same
Min Reconn:		0 (0 ms)	0 (0 ms)
Max Reconn:		Same	Same
Multi-Conn:		Normal (0)	Normal (0)

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

LANforge Manager   Version(5.3.7)

Control Reporting Tear-Off Info Plugins

Stop All   Restart Manager   Refresh   HELP

Layer-4 | Generic | Test Mgr | Test Group | Resource Mgr | Event Log | Alerts | Port Mgr | vAP Stations | Messages
Status | Layer-3 | L3 Endps | VoIP/RTP | VoIP/RTP Endps | Armageddon | WanLinks | Attenuators | File-IO

Disp: 127.0.0.1:1   Sniff Packets   Clear Counters   Reset Port   Delete
Rpt Timer: medium (8 s)   Apply   View Details   Create   Modify   Batch Modify

All Ethernet Interfaces (Ports) for all Resources.

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	☐	☑	0.0.0.0	0	eth1		0	0	0	0	0	0	
1.1.02	☐	☐	0.0.0.0	0	eth2		3,482,049,...	2,399,718	0	4	7,757,660,...	4,297,3...	
1.1.03	☐	☐	0.0.0.0	0	eth3		3,482,026,...	2,399,705	0	0	7,757,666,...	4,297,3...	
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	
1.1.07	☐	☐	0.0.0.0	0	wiphy1		0	0	0	0	0	0	
1.1.08	☐	☑	0.0.0.0	0	wlan0	wiphy0	0	0	0	0	0	0	
1.1.09	☐	☑	0.0.0.0	0	wlan1	wiphy1	0	0	0	0	0	0	
1.2.00	☐	☐	192.168.100.103	0	eth0		653,572,601	5,346,946	13	15,109	5,202,101,...	4,863,373	
1.2.01	☐	☑	0.0.0.0	0	eth1		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	

Logged in to: localhost:4002 as: Admin

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.

For more information see LANforge-GUI User Guide: Layer-3 Cross-Connects