

Bridged Mode (Non-routed) WanLink

Goal: Allow LANforge-ICE to sit transparently on a network segment by using a Bridged Mode WanLink to simulate a WAN.

In this test scenario, a LANforge-ICE WanLink is created in Bridged Mode to simulate a WAN consisting of a DS1 speed (1.544Mbps) link with 20ms of delay in one direction and 30ms of delay in the other direction.

- 1. Setup the LANforge Ports so that they have 0.0.0.0 IP addresses. (Bridged Mode WanLinks use ports that have no IP address because the ports are transparent to the traffic flowing through them.)
 - A. A: Go to the Port Manager to see what ports are available. In this example, we will use eth1 and eth2. eth0 is the management port and cannot be used for WanLinks.

•	LANforge M	anager Ve	rsion(5.3.6))				\odot \otimes \times	
<u>Control</u> <u>Reporting</u> <u>Tear-Off</u> <u>Info</u> <u>Plugins</u>									
		Stop	All	Restart N	lanager		Refresh	HELP	
Layer-4 Generic Test Mgr Test Grou	p Resource Mgr	Event Log	Alerts P	ort Mgr	vAP Statio	ns Message	es		
Status Layer-3 L3 Endps	Status Layer-3 L3 Endps VoiP/RTP VoiP/RTP Endps Armageddon WanLinks Attenuators File-10								
Disp: 192.168.100.239:0 S Rpt Timer: medium (8 s) ▼	Sniff Packets Apply	1 Clear	· Counters w Details	Reset Cr <u>e</u> a	Port te	Delete Mo <u>d</u> ify	<u>B</u> atch Modif	X	
		nterfaces (Por	ts) for all Res	ources. —					
Port Pha Down IP SEC	Alias Parent Dev	RX Bytes	RX 🛵ts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps TX	
1.1.0 🔲 192.168.100.106 0	eth0	1,695,061	14, Total	number o	f packets	received by th	is Interface	. 1	
1.1.1 0.0.0.0 0	ethl	0	0	0	0	1,208	16	0	
1.1.2 0.0.0.0 0	eth2	0	0	0	0	1,208	16	0	
Logged in to: 192.168.100.106:4002 as: A	dmin								

For more information see LANforge-GUI User Guide: Ports (Interfaces)

- 2. Create a WanLink.
 - A. Go to the **WanLinks** tab

LANforge Manager Version(5.3.6)
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
Rpt Timer: fast (1 s) Go Test Manager all Select All Start Switch Stop Clear Hide Stopped Display Create Modify Batch Modify Delete
WanLinks for Selected Test Manager
Name EID K-M State Endpoints (A ↔ B) Pkt Tx A → B Pkt Tx A ← B Bps Rx B Bps Rx A Rpt Timer
<u>د</u>
All WanLink Endpoints
WPs Name Run Script Max Rate Tx Pkts Tx Rate Tx Drop % Dropped Tx-Failed Failed-Late TX Bytes
Logged in to: 192.168.100.106:4002 as: Admin

B. Create a WanLink

WL-01 - Create/Modify WanLink								\odot
+ - All			6		Apply	OK Display WanL	nk & WanPaths	Cancel
Name: Presets:	WanLink Information WL-01 CUSTOM			•	2	WanLink Information Pass-Through Coupled-Mode	☐ HW Pass-Through ✓ Kernel-Mode	1
Port:	Endpoint A 1 (eth1)	-	Endpoint B 2 (eth2)	•	Resource: Rpt Timer:	1 (lf0350-10ac) fast (l s)		
Transfer Rate: Delay:	T1 (1.544 Mbps) small (20 ms)	•	T1 (1.544 Mbps) 30 (30 ms)	▼	Reorder-Freg:	Endpoint A zero (0%)	Endpoint B zero (0%)	•
Drop-Freq: Jitter:	zero (0%) zero (0 us)	- -	zero (0%) zero (0 us)	• •	Dup-Freq:	zero (0%)	zero (0%)	-
Jitter-Freq:	zero (0%)	•	zero (0%)	•	Reorder Amt:	min 1 max 20	min 1 max 20	
						Script	Script	

- A. To simulate a WAN, enter a specific amount of delay or other impairment
- B. For this example, enter 20ms of delay for Entry Point A and 30ms of delay for Entry Point B
- C. Be sure to set the correct ports and transfer rate for each Entry Point
- D. Click \mathbf{OK} when done
- C. Verify the WanLink was created

LANforge Manager Version(5.3.6)	\odot \otimes \otimes							
Control Reporting Tear-Off Info Plugins								
Stop All 😡 Start 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 VolP/RTP VolP/RTP Endps Armageddon WanLinks Atte	enuators File-IO							
Rpt Timer: fast (1 s) 🔻 Go Test Manager all 💌 Select All Start Switch Stop Clear								
Hide Stopped Display Create Modify Batch Modify	odify Delete							
WanLinks for Selected Test Manager								
Name EID K-M State Endpoints (A ↔ B) Pkt Tx A → B Pkt Tx A ← B Bps Rx B B	ps Rx A Rpt Timer							
WL-01 6.2 ✓ Stopped WL-01-A <=> WL 0 0 1,544,000	1,544,000 1,000							
All WanLink Endpoints								
WPs Name Run Script Max Rate Tx Pkts Rx Pkts Tx Rate Tx Drop % Dropped Tx-Failed	Failed-Late TX Bytes							
+ WL-01-A None 1,544,000 0 0 0 0 0 0 0	0 0							
+ WL-01-B None 1,344,000 0 0 0 0 0 0 0	0							
Logged in to: 192.168.100.106:4002 as: Admin								

D. Go to the Status tab and click Netsmith to view the graphical representation of the WanLink

	LANforge Man	ager Versio	n(5.4.3)					
<u>C</u> ontrol <u>R</u> eporting Wind <u>o</u> ws <u>I</u> nfo <u>T</u> ests	6							
	Chamber <u>V</u> iew	<u>S</u> top All	Re	start Manage	r	<u>R</u> ef	resh	HELP
Status Port Mgr Layer-3 L3 Endps	s Layer 4-7 WanLinks	Resource Mgr	Alerts	Messages	Warnings	Wifi-Mes	sages	+
License Info	Current Users			Saved	Test Configur	ations		
Licenses expire in: 656 days.	* Admin from:127.0.0.1 gnuserver from:127.0.0.1	Con	figuration	FACTO	RY_DFLT	-	Loa	ad
Support expires in: 656 days.			ownload	DB	Show Progres	S	Dele	ete
Status Vie <u>w</u> : Ports by Resource 💌		Nan	ne:				Sai	/e
Realm 0	Mani	ager/Resource 1						
ogged in to: localhost:4002 as: Admin						2	stations:	21010

E. This is the general form of a Bridged Mode WanLink in Netsmith. It consists of two 0.0.0.0 IP addressed ports with a vertical bar between them.



For more information see LANforge-GUI User Guide: WanLinks (ICE)

3. Run traffic and verify results.

A. Right-click on the WanLink and select **Toggle WanLink** to allow traffic to flow from a transmitting device to a receiving device



B. The transmitting/receiving devices can be just about anything that generates and receives traffic such as a web server and client or a pair of LANforge-FIRE ports.



- A. Right-click the WanLink and select **Display WanLink**
- C. View the WanLink display

WanLink Display: WL-01 Manager: 192.168.100.106						
	Endpoint: WL-01-A (1.1.1.1)		Endpoint: WL-01-B (1.1.2.2)			
ов	30-sec Averages		30-sec Averages	в		
	WAN Speed: 1.544 Mbps TX Rate: 207.778 Kbp	s	WAN Speed: 1.544 Mbps TX Rate: 1.558 Mbps			
	RX Rate: 207.778 KDps TX Pkts: 250857		RX Rate: 1.558 Mbps IX PKts: 33024			
	Reordered: 0 TX Failed: 0		Reordered: 0 TX Failed: 0			
	4.295 Obps	_	4.295 Obps			
	16.777 Mbps -		- 16.777 Mbps			
	65.536 Kbps -		— 65.536 Кbps			
	256 bps -		– 256 bps			
	0 bps	_	0 bps			
	1.544 Mbps	_	1.544 Mbps			
	1.158 Mbps -		— 1.158 Mbps			
	772 Кыра —		— 772 Кырз			
	386 Кыря —		— 386 Кърз			
79 KB Backlog	0 bps By Throughput (Recorded)		0 bps 75	5 KB acklog		
	NX mioughput [Necolded]					
	WanPaths for	WanLin	k Endpoint: WL-01-A			
Name	Ix Rate Disabled ! !F Filter Pat	tern	IX PKts RX PKts IX Bytes RX Bytes Dropped Dup	Pkts 00		
			2			
		Wanlin	k Endpoint: WI-01-B			
Name	Tx Rate Disabled ! !F Filter Pat	tern	Tx Pkts Rx Pkts TX Bytes RX Bytes Dropped Dup	Pkts OC		
				/		
				Þ		
Display	y Selected Paths Pause Display Print	M	odify Stop Refresh Clear	Close		

For more information see Refer to the LANforge FIRE Cookbook to run traffic.

4. View the **WanLinks** tab

○ LANforge Manager Version(5.3.6) (♥ (♠) (𝔅)
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 VolP/RTP VolP/RTP Endps Armageddon WanLinks Attenuators File-IO
Rpt Timer: fast (1 s) V Go Test Manager all V Select All Start Switch Stop Clear
Hide Stopped Display Create Modify Batch Modify Delete
WanLinks for Selected Test Manager
Name EID K-M State Endpoints (A ↔ B) Pkt Tx A → B Pkt Tx A ↔ B Bps Rx B Bps Rx A Rpt Timer
WL-01 6.2 ☑ Run WL-01-A <=> WL 63,510 479,506 1,544,000 1,544,000 1,000
8
All WanLink Endpoints
WPs Name Run Script Max Rate Tx Pitts Rx Pitts Tx Rate Tx Drop % Dropped Tx-Failed Failed-Late TX Bytes RX Bytes
+ WL01-X V None 1,544,000 479,500 05,510 1,345,125 0 0 0 042,185,610 3,566,544 + WL01-B V None 1,544,000 63,510 479,512 06,004 0 0 0 0 5,588,01642,184,344

- A. Selecting a WanLink automatically selects the WanLink Endpoints on the bottom panel
- B. Scroll to the right on the bottom panel to note the Serialization Delay (delay injected by LANforge to account for packet size and transfer rate). Also, the WanLink must have a high enough transfer rate to pass all the traffic. In other words, if a layer-3 connection is sending 100Mbps of traffic, the WanLink must allow at least 100Mbps transfer rate
- C. In this case, SD = (1514 bytes * 8 bits/byte) / 1.544Mbps = 7.8ms
- D. The total delay as experienced by the transmitting/receiving device is the sum of the WanLink configured delay and the serialization delay which in this case would be about 28ms in one direction and 38ms in the other.

For more information see LANforge FAQ: Serialization Delay Candela Technologies, Inc., 2417 Main Street, Suite 201, Ferndale, WA 98248, USA www.candelatech.com | sales@candelatech.com | +1.360.380.1618