

## **Routed Mode WanLinks with Virtual Routers**

**Goal**: Setup a Routed Mode WanLink between two Virtual Routers.

In this test scenario, LANforge-ICE is used to simulate a routed network where incoming traffic on one port is sent through one Virtual Router then through a WanLink, then through a second Virtual Router and then finally out to a port on a different network.

- 1. Setup a Netsmith Connection.
  - A. Go to the **Status** tab and click **Netsmith**

0	LANforge Manager	ersion(5,4,3)		$\bigcirc$ $\land$ $\bigcirc$
Control Reporting Windows Info Test	is is			
	Chamber View Stop	All Restart	Manager	efresh HELP
Status Port Mor Laver-3 L3 Endo	os Laver 4-7 WanLinks Resource	Mar Alerts Me	ssages Warnings Wifi-Me	essages +
License Info	Current Users		Saved Test Configurations	<u>5</u>   ·
Licenses expire in: 656 days.	* Admin from:127.0.0.1 gnuserver from:127.0.0.1	Configuration:	FACTORY_DFLT	Load
Support expires in: 656 days.		Download DB	Show Progress	Delete
Status Vie <u>w</u> : Ports by Resource 💌		Name:		Save
Realm 0	Managar/Porques	. 1		
		e 1		
	•• 🔳			
	•• 🔳			
	Netsmith			
ogged in to: localhost:4002 as: Admin				2 stations: 21 01 00

B. Right-click in the Netsmith window and select New Connection



C. Accept defaults, Auto Create everything then click  $\mathbf{OK}$ 



D. Click Apply in the Netsmith window to create the connection



For more information see LANforge-GUI User Guide: Netsmith

2. Setup two Virtual Routers.

A. Right-click in the Netsmith window and select New Router



B. Accept defaults, or change the name, graphical size and notes about the Virtual Router.

				Create/Modifi	Virtual Roy	utor	•		
lame: <auto cre<="" th=""><th>ate New Name:</th><th>&gt;</th><th></th><th>Width:</th><th>100</th><th>ater</th><th>Height:</th><th>100</th><th></th></auto>	ate New Name:	>		Width:	100	ater	Height:	100	
Use OSPF	Multicast Routi	ng 🗌 Us	e OLSR		IP Dflt Route	Xorp SHA	IPv6 Rou	iter 🔲 IPv6	RADV
Use Existing Cfg	BGP Rout	ter 🗌 BC	SP 4B AS	BGP Reflect	tor BGP (	Confederation	BGP Dar	mping	
				Notes about th	is Virtual Rout	ier			
				BGP Configura	tion Informatio	on			
	Router ID		Loca	al AS	0	Cluster ID			
	Confederation	ID 0	Dan	nping Half Life		Damping Ma	x Suppress 3		
	Damping Reus	е З	Dam	nping Suppress					
BGP Peer Flags			Peer AS	Peer ID	Local Iface	Nexthop	Nexthop6	Hold Time	Delay Oper
Active Clie	nt Confed	Ucast							
Active Clie	nt Confed	🖌 Ucast							
Active Clie	nt 🗌 Confed	🖌 Ucast							
Active Clie	nt 🗌 Confed	🕑 Ucast							
Active Clie	nt Confed	Ucast							
Active Clie	nt 🗌 Confed	Ucast							
Active Clie	nt 🗌 Confed	Ucast							
Active Clie	nt Confed	Ucast							
								115	
				(1K	Cancel				

A. Click OK when done

C. Click the Apply button and repeat for the second Virtual Router



- A. NOTE: After making any changes to the Netsmith window, you must click Apply or your changes will NOT be implemented and could be lost.
- D. Click the Apply button followed by the Sync button



- A. NOTE: Clicking Sync makes sure any changes are synchronized with the current database.
- B. Also, note the Netsmith Apply Progress bar displayed at the bottom of the Netsmith window.

For more information see LANforge-GUI User Guide: Netsmith

- 3. Configure the ports on the ends of the WanLink.
  - A. Right-click port rddVR0 and select Modify Port



B. Assign an IP address and Network Mask.

		LANfo	rge Manager V	ersion(5.4.3)		(*) (*
		rddVR0 (	lf0350-c8dc) Co	nfigure Settings		$\odot$ $\otimes$ $\otimes$
			Port Status Informa	tion		
		Current: LINK-UP	PROBE-ERROR TSO GSO	GRO		
		Driver Info: Port Typ	pe: Redirect-Device Peer	r: rddVR0b rddVR0b		
			Port Configurab	les		
Enable		General Ir	nterface Settings		Port Rates	Advert Rates
Set MAC		_			Q 10bt-HD	10bt-HD
Set TX Q Len	Down	Aux-Mgt	DHCP Hostname:	None	8 10bt-FD 100bt-HD	10bt-FD
Set MTU	DHCP-IPv6	🗹 DHCP Release	DHCP Vendor ID:	None 🗸	0 100bt-FD 1000-FD	100bt-HD
Set Offload	DHCP-IPv4	Secondary-IPs	DHCP Client ID:	None	0 2.5G-FD 5G-FD	100bt-FD
Set PROMISC	DNS Servers		Poor IP:	NA	0 10G-FD	1000-FD
Set Rx-All/FCS	ID Address:	10011100			Autonegotiate	2.5G-FD
Set Bridge Info	I <u>F</u> Address:	255 255 255 0		AUTO		G-FD
	IP Mask:	255.255.255.0		AUTO	Renegotiate	10G-FD
Services	Gateway IP:	0.0.0.0	IPv6 GW:	AUTO	Restart Xcvr	40G-FD
HTTP	Alias:		MTU:	1500	PROMISC	Flow-Control
FTP	MAC Addr:	fe:1d:d6:79:aa:aa	TX Q Len	1000	RX-ALL	Offload
DNS	Br Cost:	Ignore 💌	Priority:	Ignore 💌	RX-FCS	🖌 TSO Enabled
RADIUS	Rot Timer:	medium (8 s) 🔻	WiFi Bridge:	NONE	Bypass NOW!	UF0 Enabled
IPSEC-Client	IDCas CW		IDCos Doceword		Bypass Power-UP	🖌 GSO Enabled
IPsec-Upstream	IPSec Gw:		IPSec Password:		Bypass Power-DOWN	LRO Enabled
	IPSec Local ID.		IPSec Remote ID.:		Bypass Disconnect	🖌 GRO Enabled
	Print [	Display Pro	obe <u>S</u> ync	Apply OK	Cancel	

A. This example uses 10.1.1.100 and 255.255.255.0.

C. Right-click port rddVR1 and select Modify Port



D. Assign an IP address and Network Mask.

		LANfo	rge Manager	ersion(5.4.3)		(*) (*
		rddVR1 (	lf0350-c8dc) Co	nfigure Settings		$\sim$ $\sim$ $\times$
			Port Status Informa	tion		
		Current: LINK-UP	PROBE-ERROR TSO GSO	GRO		
		Driver Info: Port Typ	pe: Redirect-Device Pee	rddVR1b rddVR1b		
			Port Configurab	les		
Enable		General Ir	nterface Settings		Port Rates	Advert Rates
Set MAC		_			Q 10bt-HD	10bt-HD
Set TX Q Len	Down	Aux-Mgt	DHCP Hostname:	None	Q 100bt-HD	10bt-FD
Set MTU	DHCP-IPv6	DHCP Release	DHCP Vendor ID:	None 💌	8 1006t-FD 1000-FD	100bt-HD
Set Offload	DHCP-IPv4	Secondary-IPs	DHCP Client ID:	None	8 2.5G-FD 5G-FD	100bt-FD
Set PROMISC	DNS Servers	BLANK	Peer IP	NA	10G-FD 40G-FD	1000-FD
Set Rx-All/FCS	IR Addross	10011101			Autonegotiate	2.5G-FD
Set Bridge Info	IP Moole	255 255 255 0				G-FD
	IF Mask:	255.255.255.0		AUTO	Renegotiate	10G-FD
Services	Gateway IP:	0.0.0.0	IPV6 GW:	AUTO	Restart Xcvr	40G-FD
НТТР	Alias:		MTU:	1500	PROMISC	Flow-Control
FTP	MAC Addr:	4e:24:c9:61:34:8b	TX Q Len	1000	RX-ALL	Offload
DNS	Br Cost:	Ignore 🔻	Priority:	Ignore 🗸 🗸	RX-FCS	🖌 TSO Enabled
RADIUS	Rpt Timer:	medium (8 s) 🖵	WiFi Bridge:	NONE	Bypass NOW!	UF0 Enabled
IPSEC-Client	IPSec GW:	0.0.0.0	IPSec Password:		Bypass Power-UP	GS0 Enabled
IPsec-Upstream	IPSec Local ID		IPSec Remote ID		Bypass Power-DOWN	LRO Enabled
	Il occ Local ID.		Il occiliote ibii		Bypass Disconnect	GRO Enabled
	Print [	Display Pro	obe <u>S</u> ync	<u>A</u> pply <u>O</u> K	<u>C</u> ancel	

A. This example uses 10.1.1.101 and 255.255.255.0.

For more information see LANforge-GUI User Guide: Netsmith

4. Drag the ends of the WanLink into the Virtual Routers.

A. Left-click and drag rddVR0 into Router R0(1)



B. Left-click and drag rddVR1 into Router R1(2)



C. Click the Apply button at the bottom of the Netsmith window



For more information see LANforge-GUI User Guide: Netsmith

- 5. Setup the Routed Mode WanLink characteristics.
  - A. Right-click the WanLink and select Modify Wanlink



B. Verify that the B-side ports, rddVR0b and rddVR1b are filled in.

			VRWL-1.1.000 -	Cr	eate/Modify Wa	nLink			0	
+ - All					Display WanLink	& WanPaths Sync		<u>Apply</u> <u>O</u> K	<u>C</u> a	ncel
Name: Presets:	WanLink Information VRWL-1.1.000 CUSTOM		•		2	WanLink Information Pass-Through Coupled-Mode		HW Pass-Throu	gh	
Port:	Endpoint A 12 (rddVR0b)	-	Endpoint B 14 (rddVR1b)	]	Resource: Rpt Timer:	1 fast (1 s)				-
Transfer Rate: Delay:	T1 (1.544 Mbps) Zero (0 us)	•	T1 (1.544 Mbps) zero (0 us)	]	Reorder-Freq:	Endpoint A zero (0%)	•	Endpoint B zero (0%)		•
Drop-Freq: Jitter:	zero (O%) zero (O us)	•	zero (0%) -		Dup-Freq:	zero (0%)	-	zero (0%)		
Jitter-Freq:	zero (0%)	•	zero (0%) ▼	]	Reorder Amt:	min 1 max 20		min 1 max 2	20	
						Script	_	Script		
CONFIN	2								_	

- A. NOTE: Be sure to set the impairment, if any, and transfer rate.
- B. Click **OK** when done

C. Right-click the WanLink and select Toggle Wanlink to set its status to Running (green).



For more information see LANforge-GUI User Guide: Netsmith

- 6. Setup the physical ports.
  - A. Right-click port eth1 and select Modify Port



B. Assign port eth1 an IP address and Network Mask

		eth1 (lf0)	350-10ac) Confi	gure Settings			$\bigcirc$ $\bigcirc$
	Current: LINK- Driver Info: Port	UP 1000bt-FD AUTO-N Type: Ethernet Drive	Port Status Info NEGOTIATE Flow-Co er: igb(5.4.0-k) Bu	ormation ontrol PROMISC os: 0000:02:00.0	) Cur: 2.5	GT/s xl Max: 2.5GT/s xl	₽
			Port Configur	ables			
Enable Set IF Down Set MAC	Down	General In	terface Settings		[	Port Rates	Advert Rates-
Set TX Q Len Set MTU Set Offload Set Rate Info Set PROMISC	DHCP-IPv6 DNS Servers: IP Address: IP Mask:	DHCP Release     Secondary-IPs     BLANK     172.1.1.1/24     255.255.0	DHCP Vendor ID: DHCP Client ID: Peer IP: Global IPv6: Link IPv6:	None None NA DELETED DELETED		100bt-FD     1000-FD     100-FD     40G-FD     40G-FD     Autonegotiate     Renegotiate	<ul> <li>✓ 100bt-HD</li> <li>✓ 100bt-FD</li> <li>✓ 1000-FD</li> <li>☐ 10G-FD</li> <li>↓ 40G-FD</li> <li>✓ Elem Centre</li> </ul>
Set Bypass Set Bridge Info	Gateway IP: Alias: MAC Addr: Br Cost:	0.0.0.0 00:0d:b9:47:10:ad Ignore	I <b>Pv6 GW:</b> MTU: TX Q Len Priority:	DELETED 1500 1000 Ignore		PROMISC  RX-ALL  RX-FCS  Bypass NOW!	Offload TSO Enabled UFO Enabled
HTTP FTP RADIUS	Rpt Timer: CPU Mask:	<mark>slower (30 s)</mark> ▼ NO-SET ▼	Watchdog: WiFi Bridge:	0 NONE	<ul> <li></li> <li></li> </ul>	Bypass Power-UP Bypass Power-DOWN Bypass Disconnect	GSO Enabled

- A. NOTE: This example uses 172.1.1.1 and 255.255.255.0
- C. Drag port eth1 into Router R0(1)



D. Right-click port eth2 and select Modify Port



E. Assign port eth2 an IP address and Network Mask.

		etii2 (110	Joo Loac, com	igure securitys			00
			Port Status Info	ormation		\$	
	Current: LINK-	UP 1000bt-FD AUTO-	NEGOTIATE Flow-Co	ontrol PROMISC			
	Driver Info: Port	Type: Ethernet Drive	er: igb(5.4.0-k) Bu	IS: 0000:03:00.0	Cur: 2.5	GT/s x1 Max: 2.5GT/s x1	
			Port Configu	rables			
		General In	terface Settings		1	Port Rates	-Advert Rates
Set IF Down						Q 10bt-HD	☑ 10bt-HD
Set MAC	Down	Aux-Mgt				0 10bt-FD 0 100bt-HD	☑ 10bt-FD
Set TX Q Len	DHCP-IPv6	DHCP Release	DHCP Vendor ID:	None	-	O 100bt-FD	▶ 100bt-HD
Set MTU		Secondary-IPs	DHCP Client ID:	None	-	0 10G-FD	100bt-FD
Set Offload	DNS Sonvors	PLANK	Boor IP:	NA		Autonegotiate	🗹 1000-FD
Set Rate Info	Divis Servers:	172.2.2.1	Clabal IDv6			1	10G-FD
Set PROMISC	IP Address:	255 255 255 0	Liels Duc	DELETED		Renegotiate	40G-FD
Set Rx-All/FCS	IP Mask:	255.255.255.0	LINK IPVO:	DELETED		🗌 Restart Xcvr	Flow-Contro
Set Bypass	Gateway IP:	0.0.0.0	IPV6 GW:	DELETED		PROMISC	
Set Bridge Info	Alias:		MIU:	1500		RX-ALL	Offload -
Set CPU Mask	MAC Addr:	00:0d:b9:47:10:ae	TX Q Len	1000		RX-FCS	I ISO Enable
— Services —	Br Cost:	Ignore 💌	Priority:	Ignore	-	Bypass NOW!	UFO Enable
HTTP	Rpt Timer:	medium (8 s) 🔻	Watchdog:	0	-	Bypass Power-UP	GSO Enable
FTP	CPU Mask:	NO-SET 💌	WiFi Bridge:	NONE	-	Bypass Power-DOWN	CRO Enable
RADIUS			1			Bypass Disconnect	
	Print	ew Details	Probe Sync	Apply		K Cancel	

A. NOTE: This example uses 172.2.2.1 and 255.255.255.0

F. If either physical port connects to a larger routed network, right-click the port and select **Modify** and enter values for Next Hop and Subnets as follows:

<u>\$</u>	Create/M	od	ify Connection	×
Port 1-A:	1 (eth0)	-	Interface-Cost:	1
Port 1-B: 🗹 Skip	<auto create="" new="" port=""></auto>	•	RIP-Metric	1
WanLink: 🗹 Skip	<auto create="" new="" wanlink=""></auto>	-	OSPF Area:	0.0.0.0
Port 2-B: 🔽 Skip	<auto create="" new="" port=""></auto>	•	Next-Hop:	0.0.0.0
Port 2-A: 🗹 Skip	<auto create="" new="" port=""></auto>	•	Subnets (a.b.c.d/xx):	
DHCP Lease Time:	43200			
DHCP DNS:				
DHCP Range Min:				
DHCP Range Max:				
DHCP Domain:				]
DHCPd Config File:				
🗌 NAT 🔄 DHCP	Custom DHCP Gand-R	•		
	ок		Cancel	

- A. NOTE: Next Hop is the default gateway of your next network hop
- B. Up to 8 different subnets can be configured or 0.0.0.0/0 for any subnet
- C. Click **OK** when done, then click **Apply** in Netsmith to apply your changes
- G. Drag port eth2 into Router R1(0)



H. Click the Apply button at the bottom of the Netsmith window



For more information see LANforge-GUI User Guide: Netsmith

- 7. Run traffic and verify results. (Refer to LANforge FIRE Cookbook to run traffic)
  - A. Verify that the traffic on eth1 is being sent to Default Gateway 172.1.1.1 and that traffic on eth2 is being sent to Default Gateway 172.2.2.1



- A. NOTE: In this example, traffic to eth1 is from a port configured with IP address 172.1.1.105 Network Mask 255.255.0 and Default Gateway 172.1.1.1
- B. Traffic to eth2 is from a port configured with IP address 172.2.2.106 Network Mask 255.255.255.0 and Default Gateway 172.2.2.1
- C. To generate routed network traffic refer to the LANforge FIRE Cookbook Routed Network Testing section.
- D. If your physical configuration is complete, Netsmith should appear as shown here:

B. Right-click one of the Virtual Routers and select **Show Routing Table** to view the internal routing table for the Virtual Router



C. LANforge Virtual Routers by default use simple subnet routing, but can also use OSPF or BGP routing protocols. LANforge can also perform IPv4 multicast routing.

	LANforge Dialog	$\odot$
i	Routing table for Virtual Router: Router-0 (1) unreachable default 100.1.1.0/24 dev rddVR0 scope link 172.1.1.0/24 dev eth1 scope link 172.2.2.0/24 via 100.1.1.101 dev rddVR0 unreachable default dev lo metric 1024 error -	09/07 12:20:39.886
	ОК	

For more information see LANforge-GUI User Guide: Netsmith

For more information see LANforge FIRE Cookbook

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