

## Layer 3 Testing on Windows

Goal: Test layer-3 connection throughput between two Windows hosts.

This scenario involves installation on one physical Windows 7 workstation with three network ports and a Windows XP virtual host with four network ports running within VirtualBox. We will create a pair of layer three connections and see test results.





- 1. Configure Virtual Guest Windows machine
  - A. Note: LANforge installations on Windows are not able to change the IP of ports. Please do this before running LANforge.

B. Set up four network ports on the virtual guest. This example shows three ports connected to the host machine over bridge interfaces.



- C. Set the IPs for the various ports using the Windows Network Settings control panel.
  - A. Local Area Connection: DHCP This is the default VirtualBox NAT port. We'll leave this one as a backup port for safety sake.
  - B. Local Area Connection 2: 192.168.1.201, we will use this for normal LAN and LANforge communications
  - C. Local Area Connection 3: 10.26.39.1, for LANforge use.
  - D. Local Area Connection 4: 10.26.39.10, for LANforge use.

For more information see Windows IP Address

D. Review the IPs for the various ports using netsh.

🛤 Command Prompt	- 🗆	×
C:\Documents and Settings\IEUser>netsh interface ip show address		•
Configuration for interface "Local Area Connection 3" DHCP enabled: No IP Address: 10.26.39.10 SubnetMask: 255.255.255.0 InterfaceMetric: 0		
Configuration for interface "Local Area Connection 2" DHCP enabled: Yes InterfaceMetric: Ø		
Configuration for interface "Local Area Connection 4" DHCP enabled: No IP Address: 10.26.39.11 SubnetMask: 255.255.255.0 InterfaceMetric: 0		
Configuration for interface "Local Area Connection" DHCP enabled: Yes InterfaceMetric: Ø		
C:\Documents and Settings\IEUser>		

- E. Set up network ports on the Windows workstation. The configuration includes one physical port on the motherboard and a four-port Intel PCIe card.
  - A. Local Area Connection: 192.168.100.39, we will use this for normal LAN and LANforge communications
  - B. Local Area Connection 2: 10.26.39.2, for LANforge use.
  - C. Local Area Connection 3: 10.26.39.3, for LANforge use.
  - D. Local Area Connection 4: 10.26.39.4, for LANforge use.
- F. Make sure your LANforge client GUI can ping the IP of the virtual guest management port.
- G. Make sure your LANforge Manager can ping the IPs of the virtual guest management ports.
- H. If necessary, configure the Windows firewall to allow ICMP packets. Or disable the Windows firewall.

Windows Firewall with Advanced	d Security				
File Action View Help					
🗢 🔿 🖄 🖬 🗟 🖬					
Windows Firewall with Advance	Inbound Rules				Actions
Inbound Rules	Name	Group	Profile	Enablec ^	Inbound Rules
Connection Security Rules	🕑 Java(TM) Platform SE binary		Public	Yes	🗱 New Rule
Monitoring	SJava(TM) Platform SE binary		Public	Yes	▼ Filter by Profile ► E
	Tight/NC		All	Yes	▼ Filter by State ►
	BranchCache Content Retrieval (HTTP-In)	BranchCache - Content Retr	All	No	▼ Filter by Group
	BranchCache Hosted Cache Server (HTT	BranchCache - Hosted Cach	All	No	View 🕨
	BranchCache Peer Discovery (WSD-In)	BranchCache - Peer Discove	All	No	@ Refresh
	Connect to a Network Projector (TCP-In)	Connect to a Network Proje	Private	No T	Export List
۰		connect to a Network Proje	Domain	110	12 Help
	1				

2. Install LANforge Server on the Windows workstation

😪 LANforge-Server 5.2.11 Inst	aller Setup
	Welcome to LANforge-Server 5.2.11 Installer Setup Setup will guide you through the installation of LANforge-Server 5.2.11 Installer. It is recommended that you dose all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer. Click Next to continue.
	Next > Cancel

A. Make sure you install WinPCAP if it is not already installed.

B. At the end of the LANforge Server install, launch the LANforge Configuration Utility



- A. Set the **Realm** to 1
- B. Set the Resource to 1
- C. Set the Mode to Both
- D. Set the Management port to the local LAN addressed port.

LANforge Installation and Configuration			
Basic Logging Network Clustering Advanced			Close Help
Setup Mode	Both	Let's configu	are LANforge Server!
Resource ID	1 -	Your LANforge	system should be configured for a specific
Management Device	1-4439-ab56-24e1	Realm, with a Ma Resource or Both	anagement Port, and as a Manager, a
Realm	IP: 192.168.100.39 MAC: 00:15:17:d1:91:43		ne LANforge system will have the
	GUID: {8ef281b8-e961-4439-ab56-24 (intel(r) pro/1000 pt quad port lp serve	e 1fa 7ef922} r adapter)	5 (the stand-alone realm)
	Name:         local area connection           IP:         10.26.39.2           MAG:         0015.17.d1001.42		h (Both a Manager and a Resource)
	GUID: {417c49d9-56ad-4451-9dd9-1 (intel(r) pro/1000 pt quad port lp serve Name: local area connection 2	ff513164bdc} r adapter #2)	forge systems, pick a single realm -254 for all LANforge systems to be
	IP: 10.26.39.3 MAC: 00:15:17:d1:91:41 GUID: {cab7f9c2-a728-468b-8d2d-39 (ntel(c) pro/1000 pt quad port in serve	12e059c1feb}	ager is also a Resource and will have the
Reset to De	Name:         Local Area Connection 4           IP:         10.26.39.4           MAC:         00:15:17:d1:91:40           GUID:         (c459e0d1-7347-436F-b7fc-fb           chel():         0:00:100:00:00:00:00:00:00:00:00:00:00:0	2dd0053cfb}	1 (a clustered realm) -

C. Apply the configuration and LANforge Server will start in Manager mode.

🛓 LANforge Installa	ation and Configuration							
Bi	Basic Logging Network Clustering Advanced							
	Setup Mode	🖲 Both 🔘 Resource 🔘 Manager						
	Resource ID	1 💌						
	Management Device	d-4451-9dd9-1ff513164bdc} ▼						
	2 Realm	1 -						
	Reset to Defaults Pestart o							
	Reset to benduits	Apply Apply Exit Califorde Coning						
Applying Configu	uration		_ 0 <b>X</b>					
Applying Configure Validating LA Validated.	uration Nforge configuration		- • ×					
Applying Configure Validating LA Validated. Validating ne validated	uration Nforge configuration twork configuration							
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor	uration Nforge configuration twork configuration ge configuration							
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANf	uration Nforge configuration etwork configuration ege configuration							
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANfor stopped	uration Nforge configuration etwork configuration ege configuration corge server							
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANfor stopped Applying LANfor applied.	uration Nforge configuration etwork configuration ege configuration forge server forge configuration							
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANfor stopped Applying LANf applied. Checking for management	uration Nforge configuration etwork configuration rge configuration forge server forge configuration management interface network interface has de	etected link.						
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANfor stopped Applying LANf applied. Checking for management Restarting LA	uration Nforge configuration etwork configuration ege configuration corge server corge configuration management interface c network interface has do Nforge server	etected link.						
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANfor stopped Applying LANf applied. Checking for management Restarting LA restarted * LANforge se	uration Nforge configuration Etwork configuration Ege configuration Forge server Forge configuration management interface In network interface has de Nforge server Erver configured.	etected link.						
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANfor stopped Applying LANf applied. Checking for management Restarting LA restarted * LANforge se	uration Nforge configuration etwork configuration rge configuration forge server forge configuration management interface intervork interface has de Nforge server erver configured. erver successfully restar	etected link. ted.						
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANfor stopped Applying LANfor management Restarting LA restarted * LANforge se	uration Nforge configuration etwork configuration rge configuration corge server corge configuration management interface network interface has do Nforge server erver configured. erver successfully restar	etected link.						
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANfor stopped Applying LANf applied. Checking for management Restarting LA restarted * LANforge se	uration Nforge configuration etwork configuration rege configuration forge server forge configuration management interface in network interface has de Nforge server erver configured. erver successfully restar	etected link. ted.						
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANfor stopped Applying LANf applied. Checking for management Restarting LA restarted * LANforge se	uration Nforge configuration etwork configuration rege configuration forge server forge configuration management interface in network interface has de Nforge server erver configured. erver successfully restar	etected link. ted.						
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANf stopped Applying LANf applied. Checking for management Restarting LA restarted * LANforge se	uration Nforge configuration etwork configuration rege configuration forge server forge configuration management interface has de Nforge server erver configured. erver successfully restar	etected link. ted.						
Applying Configure Validating LA Validated. Validating ne validated. Saving LANfor saved. Stopping LANf stopped Applying LANf applied. Checking for management Restarting LA restarted * LANforge se * LANforge se	uration Nforge configuration etwork configuration rege configuration forge server forge configuration management interface has de Nforge server erver configured. erver successfully restar Return to LANforge C	etected link. ted.						

D. Click the **Exit LANforge Config** button. Leave the LANforge Server running (you may minimize the DOS windows.)

E. Desktop icons allow you to start and configure LANforge Server later.



3. Install the LANforge GUI on the Windows workstation.



A. Don't forget to install the licences.

🛃 LANforge Manager	Version(5.2.11)									• ×
Control Reporting Te	ear-Off <u>I</u> nfo <u>P</u> lugi	ıs								
<u>C</u> onnect Disconnect				Stop	All	Restart M	lanager		Refresh	HELP
Client <u>A</u> dmin or Login	eneric Test Mgr L3 Endps	Test Group VolP/RTP	Resource Mgr VoIP/RTP Endps	Event Log	Alerts ageddon	Port Mgr WanLin	Messages ks Atter	uators	Collision-Do	mains
Preferences	nfo	-	Current Users	1		1	Test Configura	tion Databa	se	
Install Licknse		* Admin from:	127.0.0.1		List	DELT		-	Load	
Shutdown Machine	days.				LIGU	DIEI			Loud	_
E <u>x</u> it					Name:				Delete	
					Load Beha	avior: Choos	e One	-	Save	
Support expires in: 35	9 days.						Download DB		Show Progress	
			Virt	ual Shelf 1						1
			Resource 1	Res	ource 2					
			••							
			Netsmith	Ne	tsmith					
Longed in to: localhos	t:4002 as: Admin									
Logged in to. Tocalitos	14002 a.S. Aumin									

4. Install LANforge Server on the virtual guest

A. Make sure you install WinPCAP if it is not already installed.

- B. At the end of the system install, launch the LANforge Configuration Utility
- C. Set the Mode to Resource
- D. Set the Management port to the local LAN addressed port.

🕌 LANforge Installation and Conf	figuration	
Basic Logging Network Clusterin	ng Advanced	Close Help
Setup Mode	Both  Resource  Manager	ger Let's configure LANforge Server!
Resource ID	2	Your LANforge system should be configured for a specific Realm, with a Management Port, and as a Manager, a
Management Device	{6e43ac27-2c3t-45ac-9c0e-79c382790d27}   Name: local area connection	Resource or Both.
💽 Realm	IP:         10.0.2.15           MAC:         08:00:27:55:f3:64           GUID:         {830d2db0-8c89-4cfb-b526-b4e1at	A typical stand-alone LANforge system will have the following values:
	(and ponet ramily poliethernet adapter - packet sc Name: local area connection 2 IP: 192.168.100.201 MAC: 008:00.27:95:ad:39	Resource 1 (the only LANforge in the realm)     Mode Both (Both a Manager and a Resource)
	GUID:         {6e43ac27-2c3f-45ac-9c0e-79c3s           (amd ponet family pcl ethernet adapter #2 - packe           Name:         local area connection 3           Up         10 ac2 ac 10	For clustered LANforge systems, pick a single realm number between 1-254 for all LANforge systems to be clustered together.
	IF:         10:20:39:10           MAC:         08:00:27:db:21:e7           GUID:         {64533db0-7858-4460-9449-41dt}           (amd pcnet family pci ethernet adapter #3 - packe	Typically, the Manager is also a Resource and will have the following settings:
	Name:         local area connection 4           IP:         10.26.39.11           MAC:         08:00:27:f7:43:ca           GUID:         {62297109-0a7c-4753-a525-bf1t	
	GUID: {62297109-0a7c-4753-a525-bf1t (amd ponet family poi ethernet adapter #4 - packe 🗸	

- E. Set the  $\ensuremath{\text{Realm}}$  to  $\ensuremath{\textbf{1}}$
- F. Set the **Resource** to 2

LANforge Installation and Configuration									
	Jr.								
Basic Logging Network Clustering Advanced	Close Help								
Setup Mode OBoth O Resource O Manager	Let's configure LANforge Server!								
Resource ID 2	Your LANforge system should be configured for a specific Realm with a Management Port, and as a Manager a								
Management Device {6e43ac27-2c3f-45ac-9c0e-79c382790d27}	Resource or Both.								
Realm	A typical stand-alone LANforge system will have the following values:								
	<ul> <li>Realm 255 (the stand-alone realm)</li> <li>Resource 1 (the only LANforge in the realm)</li> </ul>								
	Mode Both (Both a Manager and a Resource)								
	For clustered LANforge systems, pick a single realm number between 1-254 for all LANforge systems to be clustered together.								
	Typically, the Manager is also a Resource and will have the following settings:								
	Realm 101 (a clustered realm)								
Reset to Defaults V Restart on Apply Apply Exit LANforge Config									

G. Apply the configuration and LANforge Server will start in resource mode.



- 5. Create Layer 3 connections
  - A. In the Layer-3 tab, click Create

🛃 LANforge Manager Version(5.2.11)	
Control Reporting Tear-Off Info Plugins	
	Stop All         Restart Manager         Refresh         HELP
File-IO Layer-4 Generic Test Mgr Test Group Resource Mgr E	event Log Alerts Port Mgr Messages
Status Layer-3 L3 Endps VolP/RTP VolP/RTP Endps	Armageddon WanLinks Attenuators Collision-Domains
Rpt Timer: fast (1 s) 🔻 Go Test Manager all 💌	Select All Start Stop Quiesce Clear
View 0 - 200 🔽 Go	Display Create Modify Delete
Cross Connects for	Selected Test Manager
Name Type State Pkt Tx A → B Pkt Tx A ← B Rate A	→ B Rate A ← B Rx Drop % A Rx Drop % B Drop Pkts A Drop Pkt
Logged in to: localhost:4002 as: Admin	

B. In the Level-1 box, create the first cross connect:

🖆 w7-ad1_xp-ad2 - Create/Modify Cross Connect										
+ - All	Display	S	Sync Batch-Crea	ate A	pply	OK	Cancel			
0	Cross-Connect						<b>^</b>			
CX Name:	w7-ad1_xp-ad2									
CX Type:	LANforge / TCP			-						
	Endpoint A		Endpoint B	Select the C	ross-Co	nnect's tv	ne			
Resource:	1 (atlantis)	-	2 (ie6winxp)	-		inteore ij	<u>, , , , , , , , , , , , , , , , , , , </u>			
Port:	1 (ad1)	-	2 (ad2)	-						
Min Tx Rate:	100M ( 100 Mbps )	-	100M ( 100 Mbp	s) 🔻			=			
Max Tx Rate:	Same	-	Same	-						
Min PDU Size:	TCP Pld (1,460 B)	-	TCP Pld (1,460	B) 🔻						
Max PDU Size:	Same	-	Same	-						
IP ToS:	Best Effort (0)	-	Best Effort (0	) 🗸						
Pkts To Send:	Infinite	-	Infinite	-						
							-			

- A. Name the Cross Connect to w7-ad1\_xp-ad2
- B. The CX Type is LANforge / TCP
- C. Set the Endpoint A Resource to Windows 7  $\,$
- D. The Endpoint A Port to the first 10.x addressed port, ad1
- E. Set the Endpoint A Min PDU Size to TCP (1460 B)
- F. Set the Endpoint A Min Tx Rate to 100Mbit. This is a limit of the XP guest.
- G. Endpoint B Resource: XP Guest
- H. Endpoint B Port: ad2
- I. Endpoint B Min Tx Rate: 100Mbit
- J. Set the Endpoint B Min PDU Size to TCP (1460 B)
- K. Set the Endpoint B Min Tx Rate to 100Mbit. This is a limit of the XP guest.
- L. Click **OK** to commit those settings
- C. For the second cross connect, click **Create** in the **Layer-3** tab.

D. In the Level-1 box, create the second cross connect:

🎒 w7-ad2_xp-ad3 -	Create/Modify Cross Connec	t					
+ - All	Display	S	Sync Batch-Crea	te Aj	pply	ОК	Cancel
CX Name: CX Tvpe:	Cross-Connect w7-ad2_xp-ad3 LANforge / TCP			-			
Resource:	Endpoint A 1 (atlantis)	-	Endpoint B 2 (ie6winxp)	•			
Port:	2 (ad2)	-	3 (ad3)	-			
Min Tx Rate:	100M ( 100 Mbps )	-	100M ( 100 Mbps	) 🔻			=
Max Tx Rate:	Same	•	Same	-			
Min PDU Size:	TCP Pld (1,460 B)	•	TCP Pld (1,460 B	5) <b>-</b>		•	
Max PDU Size:	Same	-	Same	-			
IP ToS:	Best Effort (0)	-	Best Effort (0)	-			
Pkts To Send:	Infinite	-	Infinite	-			
							-

- A. Name the Cross Connect to w7-ad2\_xp-ad3
- B. The CX Type is LANforge / TCP
- C. Set the Endpoint A Resource to Windows 7
- D. The Endpoint A Port will be the next free 10.x port, ad2
- E. Set the Endpoint A Min PDU Size to TCP (1460 B)
- F. Set the Endpoint A Min Tx Rate to 100Mbit. This is a limit of the XP guest.
- G. The opposite end Endpoint B Resource is the XP Guest
- H. Set the Endpoint B Port to ad3
- I. Set the Endpoint B Min PDU Size to TCP (1460 B)
- J. Set the Endpoint B Min Tx Rate to 100Mbit. This is a limit of the XP guest.
- K. Click **OK** to commit those settings
- E. In the Layer-3 tab, you will now see your two cross-connects:

🛓 LANforge Mana	ger Ver	sion(5.2.11)		N							
Control Reporting Tear-Off Info Plugins											
Stop All         Restart Manager         Refresh									HELP		
File-IO Layer-	4 Gen	eric Test I	Agr Test Gr	oup Resource	Mgr Event Log	Alerts	Port Mg	Message	S		
Status La	yer-3	L3 Endps	VolP/RTP	VoIP/RTP	Endps Arma	geddon	WanLi	nks Att	enuators	Collision-Do	mains
Rpt Timer View	Rpt Timer:     fast     (1 s)     Go     Test Manager     all     Select All     Start     Stop     Quiesce     Clear       View     0 - 200     Image: Go     Image:										
	1	1 1		Cross Con	nects for Selected I	est Mana <u>c</u>	jer				
Name	Туре	State	$PktTxA\toB$	Pkt Tx A ← B	Rate A → B	Rate A	A ← B	Rx Drop % A	Rx Drop % B	Drop Pkts A	Drop Pkt
w7-ad1_xp-ad2	LF/TCP	Stopped	0	0	0		0	0	0	0	
w7-ad2_xp-ad3	LF/TCP	Stopped	0	0	0		0	0	0	0	
										Þ	
Logged in to: loc	alhost:40	002 as: Admi	n								

- 6. Start Layer 3 connections
  - A. Highlight the connections
  - B. Click Start

C. You will see data transferring along the cross connects.

🛃 LANforge Manager Version(5.2.11)										
<u>C</u> ontrol <u>R</u> eporting <u>T</u> ear-Off Info <u>P</u> lugins										
					Stop A	All Restar	t Manager		Refresh	HELP
File-IO Layer-4 Generic Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr Messages										
Status La	iyer-3	L3 Endps	VoIP/RTP	VoIP/RT	P Endps Arma	ageddon WanL	inks Att	enuators	Collision-Do	mains
Rpt Timer: fast (1 s) V Go Test Manager all V Select All Start Stop Quiesce Clear										
View	View 0 - 200 💌 Go					Display Create Modify Delete				
Cross Connects for Selected Test Manager										
Name	Туре	State	Pkt Tx A $\rightarrow$ B	Pkt Tx A ← B	Rate A → B	Rate A ← B	Rx Drop % A	Rx Drop % B	Drop Pkts A	Drop Pkt
w7-ad1_xp-ad2	LF/TCP	Run	34,786	41,408	23,834,133	28,704,697	0	0	0	
w7-ad2_xp-ad3	LF/TCP	Run	35,306	39,356	23,912,674	27,122,851	0	0	0	
•			Ш					Þ		
Logged in to: loc	alhost:40	002 as: Adm	in							

D. Highlight both connections and click **Display** to see the connection statistics for each. Here is the first:



E. Here is the second:



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