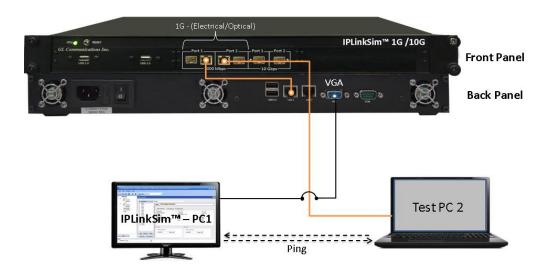


*If this is your First-Time-Use of IPLinkSim<sup>™</sup> 1G (IPN511) rack option, then we recommend you follow all the steps explained in IPLinkSim 1G-10G-Rack-Quick-Install-Guide before proceeding with the steps below.* 

#### **Quick Checkout**

The IPLinkSim<sup>™</sup> 1G functional verification can be performed using a single IPLinkSim<sup>™</sup> 1G/10G hardware unit.

'IPLinkSim' test scenario is demonstrated on 10G rack unit and a Test PC, where Ethernet port of Rack PC is connected to Port 1 (1G) of IPLinkSim<sup>TM</sup> hardware unit and Ethernet port of PC2 is connected to Port 2 (1G) of IPLinkSim<sup>TM</sup> hardware unit using Ethernet CAT5 cables, as shown in the figure.



*The IPLinkSim*<sup>TM</sup> *application and the related license (IPN511) are pre-installed on the rack PC. Plug the monitor and get started with the application as explained in the steps below.* 

Before we perform the actual test, perform the following changes in both the Rack PC and PC2. Disconnect PCs from the public or private networks and create a small isolated network. Turn-off windows firewall for both private and public networks on each PC. Assign Static IP address to each PC, subnet masks, and default gateway addresses.

*The IPLinkSim™ acts as a transparent bi-directional link between PC1 and PC2, and they work as if connected directly, back-to-back.* 

This is the simplest possible network configuration, and helps configuring WAN conditions in a simple lab setup, emulating real world conditions without any elaborate setup.

*We will conduct a simple Ping test between IPLinkSim™ PC1 and Test -PC2, and verify the WAN Emulation functionality.* 

<u>Note:</u> To use LC optical cables (for Optical Interface) in the following test, requires NIC card with optical ports on the PC.





# Step 1: Note down the IP Addresses

Note down the IP addresses of PC1 and PC2 to conduct Ping test. Ensure that IP address of PC and Hardware are in the same subnet. In this example, we consider the PC IP Addresses as:

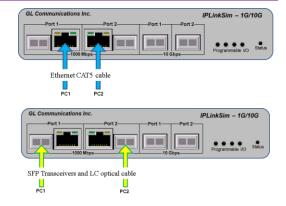
- ➢ PC1 − 192.168.1.43
- ➢ PC2 − 192.168.1.127

#### Step 2: Connect the cables

#### Perform Test on Port 1 and Port 2 (Electrical or Optical Interface)

- For Electrical Interface type, connect Port1 to PC1 (Rack) using Ethernet cable as shown in the figure. Connect Port2 to PC2 using Ethernet cable
- For Optical Interface type, plug-in SFP Transceivers to the optical ports and connect Port1 and PC1 (Rack), and connect Port2 and PC2 using LC optical cable (refer to figure).

**Note:** Make sure SFP is properly locked and the optical cable is properly plugged-in



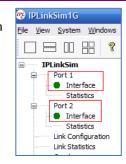
# Step 3: Launch IPLinkSim 1G Application

Right-click on the IPLinkSim 1G shortcut icon Received on the desktop and select "Run as administrator" to launch IPLinkSim 1G application.

Note: The application may take some time to get started due to hardware and software initializations.

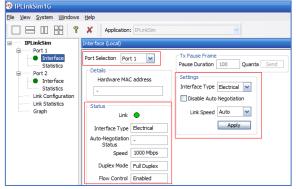
#### Step 4: Verify Links

• Verify that the Link Status is UP on both ports, that is, the LHS tree should display port 1 and port 2 with green LEDs link status (refer to figure). If the LED shows red (refer to the figure), then link is down. If links are not up, refer to the next section on how to bring the links up.



#### Step 5: Configure Interface parameters

- From IPLinkSim function tree, double click on the **Interface** option, to open "**Interface**" in one of the window on the RHS panes, select the ports from the **Port Selection** drop-down list and do the following for Port1 and Port2:
- Interface Type = Electrical (for Electrical test, else Optical)
- Link Speed = Auto
- Click on the **Apply** button (this will set the Interface Type in the hardware)
- Wait for some time as the port auto-negotiates with its link partner. Verify the following:
- Link LED shows Green, indicating link is up
- Auto Negotiation Status = Complete
- Speed = 1000 Mbps (if connected PC's NIC card operates in 1G mode, else 100 Mbps or 10 Mbps)



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# Step 6: Link Configuration

On the RHS side, double click on **Link Configuration** to check the Impairments. Initially impairments are not configured, and the screen appears as shown here.

IPLinkSim1G Elle <u>View</u> System <u>Windows</u>	Help				
IPLinkSim	Application: IPU	inkSim	×		
IPLinkSim     Port 1     Interface     Statistics     Port 2	Link Configuration	)Symmetrical 🔘 A	symmetrical Status	4	
Interface	Parameters	P1 -> P2	P1 -> P2 Manual	P2 -> P1	P2 -> P1 Manual
Statistics Unk Configuration Unk Statistics Graph	Traffic Bandwidth Background Traffic Ba. Latency Packet Loss Packet Duplication Logic Error Insertion FCS Error Insertion P1->P2	1000.00 Mbps None None None None None None None None	Drop Reorder Duplicate Insert	1000.00 Mbps None None None None None None None	Drop Reorder Duplicate Insert
	Traffic Bandwidth	Mbps 💌			

# Step 7: Start IPLinkSim

• Click Start button available in the Function tree and start the IPLinkSim application.

# Step 8: Conduct Ping Test (without impairments)

- On PC1, open a command prompt, and Ping PC2's IP Address, as shown in the figure.
- Verify that Ping works fine.

Note that all 4 Ping trials have succeeded, with no impairments. Note that the Round trip time average is around 2 milliseconds.

C:\WINDOWS\system32\cmd.exe	$-\Box \times$
C:\Users>ping 192.168.1.127	-
C. (05er 57ping 192.108.1.127	
Pinging 192.168.1.127 with 32 bytes of data:	
Reply from 192.168.1.127: bytes=32 time=3ms TTL=128	
Reply from 192.168.1.127: bytes=32 time=2ms TTL=128	
Reply from 192.168.1.127: bytes=32 time=2ms TTL=128	
Reply from 192.168.1.127: bytes=32 time=3ms TTL=128	
Ping statistics for 192.168.1.127:	
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),	
Approximate round trip times in milli-seconds:	
Minimum = 2ms, Maximum = 3ms, Average = 2ms	
C:\Users>	

• From IPLinkSim function tree, double click on the **Link Statistics** option, to open "**Link Statistics**" in one of the window on the RHS panes. Verify that no impairments have been introduced.

	<u>^</u>				
IPLinkSim	Link Statistics				
Port 1		1	1		1
Interface	Statistic	Value P1->P2	Percent P1->P2	Value P2->P1	Percent P2->P1
Statistics	TxBytes	6 352	NA	9 249	NA
Port 2	10 Sec Average Throughput	0.003	NA	0.006	NA
Interface	1 Min Average Throughput	0.000	NA	0.000	NA
Statistics	10 Min Average Throughput	0.000	NA	0.000	NA
Link Configuration	RxFrames	92	NA	61	NA
Link Statistics	TxFrames	92	NA	61	NA
Graph					
	Dropped Frames(Bandwidth Control	0	0.000	0	0.000
	No of Packets With Errors	0	0.000	0	0.000
	Dropped Packets (Packet Loss)	0	0.000	0	0.000
	Duplicated Packets	0	0.000	0	0.000
	Reordered Packets	0	0.000	0	0.000
	Inserted Bursts for BKG Traffic	0.00 bps	NA	0.00 bps	NA

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# Step 9: Configure Impairments – 1000ms Latency in one direction (P1 $\rightarrow$ P2) and 250 msec in the reverse direction (P2 $\rightarrow$ P1)

- Stop IPLinkSim by clicking on the **Stop** button.
- From IPLinkSim function tree, double click on the Link Configuration option, to open "Link Configuration" in one of the window on the RHS panes.
- Select Asymmetrical WAN Stream Type, select Latency in the Parameters list. Enter the value of '1000msec' in the "Latency" edit box at the bottom, below "P1  $\rightarrow$  P2". This means that in the P1  $\rightarrow$ P2 direction, every packet is delayed by 1000 msec. Similarly, enter "250 msec" in the "Latency" edit box at the bottom, below "P2  $\rightarrow$  P1". This means that in the P2  $\rightarrow$ P1 direction, every packet is delayed by 250 msec. So, total Round Trip delay for the ping packet should be around 1000 msec (P1  $\rightarrow$ P2 delay) + 250 msec (P2  $\rightarrow$  P1 delay) + normal Ping delay of 1 to 2 msec = 1251 to 1252 msec.

IPLinkSim	Link Configuration				
Port 1 Interface Statistics Port 2	WAN Stream Type 🔘	Symmetrical 💿 Asymmetrical	Status 🔺		
Interface	Parameters	P1->P2	P1 -> P2 Manual	P2 -> P1	P2 -> P1 Manual
Statistics	Traffic Bandwidth	1000.00 Mbps		1000.00 Mbps	
Link Configuration	Background Traffic Ba			None	
Link Statistics	Latency	Single Delay, 1000 ms		Single Delay, 250 ms	
Graph	Packet Loss	None	Drop	None	Drop
	Packet Reordering	None	Reorder	None	Reorder
	Packet Duplication	None	Duplicate	None	Duplicate
	Logic Error Insertion	None	Insert	None	Insert
	FCS Error Insertion	None		None	
	P1->P2		P2 ->	-	
	Latency		Later		
	Single Delay	Min 1000	msec 💽 Si	ngle Delay	Min 250 ms
	O Uniform Distributio	n Max 8000	msec Our	niform Distribution	Max 8000 mse
	Random Exponent	tial Distribution	OR	andom Exponential Distribution	

• Click "Start" again to restart IPLinkSim with impairments.

# Step 10: Conduct Ping Test (with Impairments – 1250 msec Round Trip Latency)

• On PC1, conduct the Ping test again, and verify that this time, the results shows 1251 - 1252ms delay.

This shows that the 1250 msec delay impairment introduced between PC1 and PC2 and reflects how IPLinkSim can be used to introduce impairments between two end points. of the network.

C:\WINDOWS\system32\cmd.exe
C:\Users>ping 192.168.1.127
Pinging 192.168.1.127 with 32 bytes of data: Reply from 192.168.1.127: bytes=32 time=1251ms TTL=128 Reply from 192.168.1.127: bytes=32 time=1251ms TTL=128 Reply from 192.168.1.127: bytes=32 time=1251ms TTL=128 Reply from 192.168.1.127: bytes=32 time=1251ms TTL=128
Ping statistics for 192.168.1.127: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds: Minimum = 1251ms, Maximum = 1251ms, Average = 1251ms
C:\Users>

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