

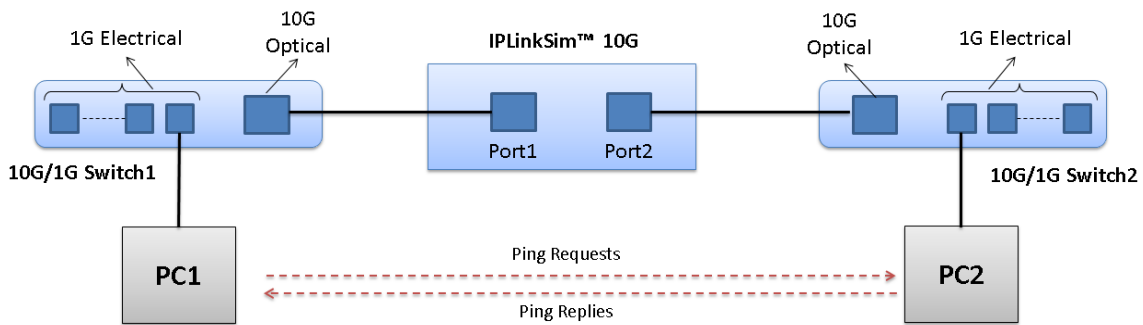
If this is your First-Time-Use of IPLinkSim™ 10G (IPN510) portable option, then we recommend you follow all the steps explained in [IPLinkSim 1G-10G-Portable-Quick-Install-Guide](#) before proceeding with the steps below.

Quick Checkout

The IPLinkSim™ functional verification can be performed using a single PacketExpert™ 10G hardware unit.

Test Setup:

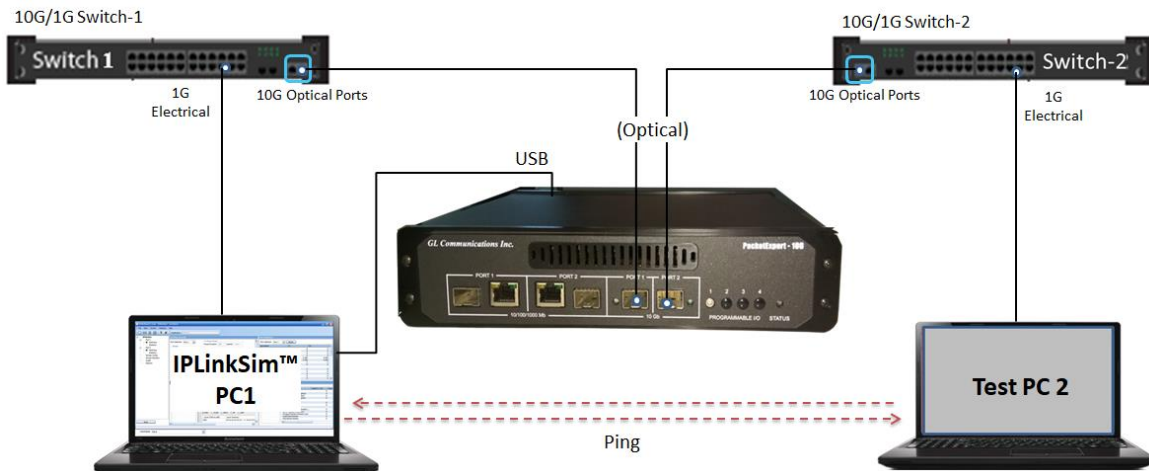
The setup requires two switches with at least one 10G port and one 1G port. We will connect the two switches using the 10G ports, and connect PacketExpert™ hardware in between the two 10G ports, so that the traffic between the two switches passes through PacketExpert™ 10G ports. We will connect two PCs – PC1 and PC2 to the 1G ports of the switches, and send Ping traffic between PC1 and PC2. Since PC1 and PC2 are in different switches, Ping traffic passes through the 10G ports of PacketExpert™. We can then introduce impairments on this traffic and verify the functionality.



In this example, we are using IPLinkSim™ PC itself as PC1, so we just need another PC to act as PC2 as in the above figure, for which we are using another PC/laptop 'Test PC'.

Here, **Ethernet port** of PC1 is connected to **Switch-1 Port (1G)** and Ethernet port of PC2 is connected to **Switch-2 port (1G)** using Ethernet CAT5 cables. Connect **Switch-1 (10G)** port to **Port 1 (10G)** of PacketExpert™ hardware unit and **Switch-2 (10G)** port to **Port 2 (10G)** of PacketExpert™ hardware unit using SFP Transceivers and LC optical cables, as shown below.

Note: The test requires IPLinkSim™ (IPN510) license to be installed on PC1. After successful software installation, plug in the hardware unit to USB 2.0 port on PC1 as indicated in the figure below:



Before we perform the actual test, perform the following changes in both PC1 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.

Since the IPLinkSim™ acts as a transparent bi-directional link between Switch-1 and Switch-2, 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 PC1 and PC2 and verify the basic WAN Emulation functionality.

Step 1: Note down the IP Addresses

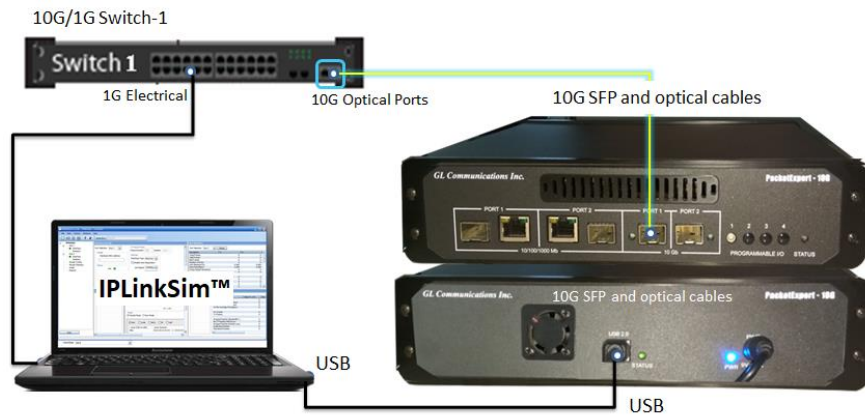
Note down the IP addresses of PC1 and PC2 to conduct Ping test. Ensure that IP address of PC and Hardware are in the same subnet. In this example, we consider the PC IP Addresses as:

- PC1 – 192.168.12.43
- PC2 – 192.168.12.127

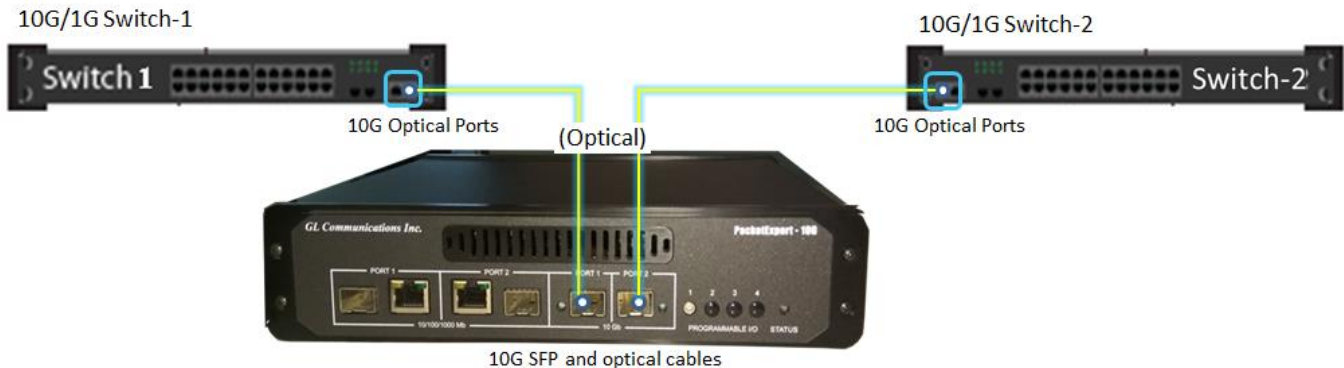
Step 2: Connect the cables

IPLinkSim™ PC (PC1) connection:

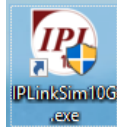
- Connect the LAN1 Ethernet port of PC to the 1G port of Switch1 using Ethernet CAT5 cable, as shown in the figure below:



- Similarly, connect PC2 NIC card to the 1G port of Switch2 using Ethernet CAT5 cable.
- Connect Switch1 10G port to PacketExpert™ 10G Port1, and Switch2 10G port to PacketExpert™ 10G Port2, using 10G SFP and optical cables, as shown below:



Step 3: Launch IPLinkSim 10G Application

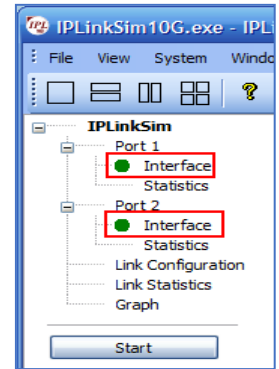


- Right-click on the IPLinkSim 10G shortcut icon on the desktop and select "**Run as administrator**" to launch IPLinkSim 10G application.

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

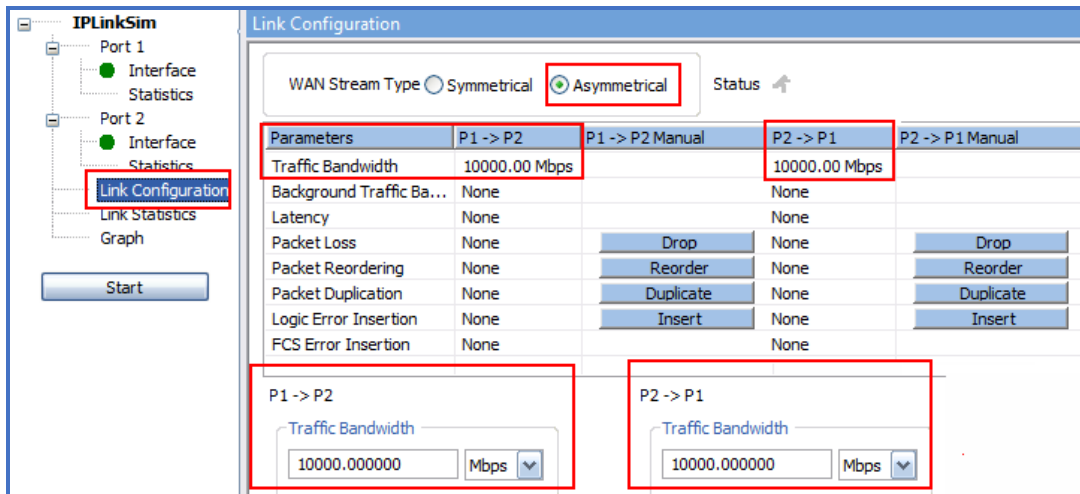
Step 4: Verify Links

- 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.
- Refer to troubleshooting section in IPLinkSim quick install guide



Step 5: Link Configuration

- On the LHS tree, double click on **Link Configuration** to configure the Impairments. Initially impairments are not configured, and the screen appears as shown here:



Step 6: Start IPLinkSim

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

Step 7: 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.

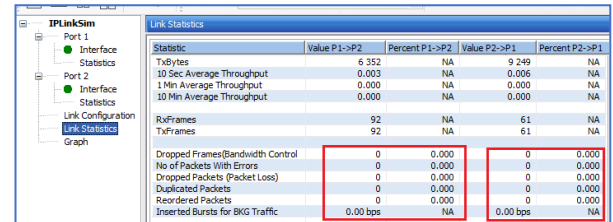
```
C:\WINDOWS\system32\cmd.exe
C:\Users>ping 192.168.1.127

Pinging 192.168.1.127 with 32 bytes of data:
Reply from 192.168.1.127: bytes=32 time=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>
```

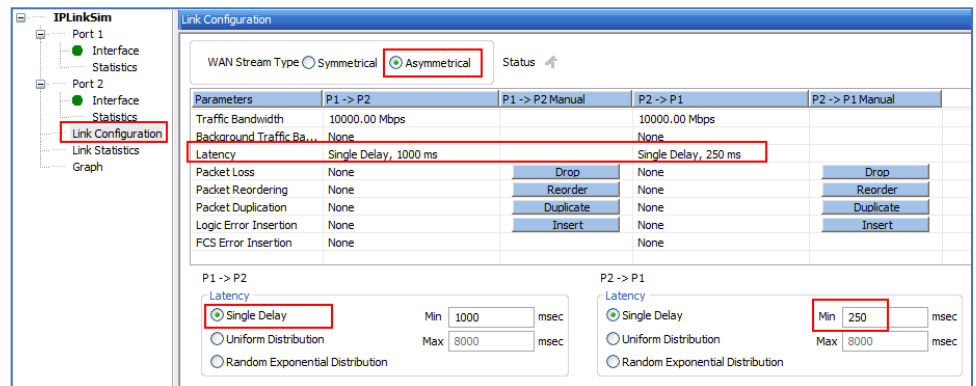
- From IPLinkSim function tree, double click on the **Link Statistics** option, to open “Link Statistics” in one of the window on the RHS panes. Verify that no impairments have been introduced:



Statistic	Value P1->P2	Percent P1->P2	Value P2->P1	Percent P2->P1
TxBytes	6 352	NA	9 249	NA
10 Sec Average Throughput	0.003	NA	0.006	NA
1 Min Average Throughput	0.000	NA	0.000	NA
10 Min Average Throughput	0.000	NA	0.000	NA
RxFrames	92	NA	61	NA
TxFrames	92	NA	61	NA
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

Step 8: Configure impairments – 1000ms Latency in one direction (P1 → P2) and 250 msec in the reverse direction (P2 →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 → P2”. This means that in the P1 →P2 direction, every packet is delayed by 1000 msec. Similarly, enter “250 msec” in the “Latency” edit box at the bottom, below “P2 →P1”. This means that in the P2 →P1 direction, every packet is delayed by 250 msec. So, total Round Trip delay for the ping packet should be around 1000 msec (P1 →P2 delay) + 250 msec (P2 → P1 delay) + normal Ping delay of 1 to 2 msec = 1251 to 1252 msec.
- Click “**Start**” again to restart IPLinkSim with impairments.



WAN Stream Type: Symmetrical Asymmetrical

Parameters	P1 -> P2	P1 -> P2 Manual	P2 -> P1	P2 -> P1 Manual
Traffic Bandwidth	10000.00 Mbps		10000.00 Mbps	
Background Traffic Ba...	None		None	
Latency	Single Delay, 1000 ms		Single Delay, 250 ms	
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 Latency: Single Delay (Min: 1000 msec, Max: 8000 msec)

P2 -> P1 Latency: Single Delay (Min: 250 msec, Max: 8000 msec)

Step 9: 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>
```