

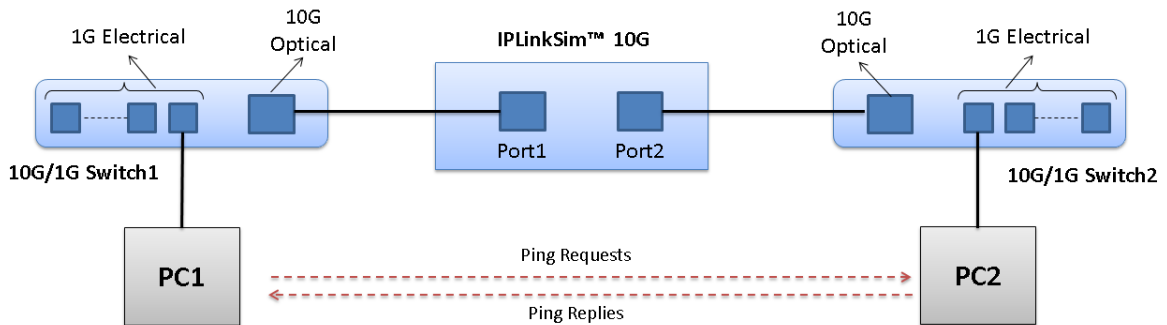
If this is your First-Time-Use of IPLinkSim™ 10G (IPN511) rack option, then we recommend you follow all the steps explained in [IPLinkSim 1G-10G-Rack-Quick-Install-Guide](#) before proceeding with the steps below.

Quick Checkout

The IPLinkSim10G™ functional verification can be performed using a single IPLinkSim™ 1G/10G hardware unit.

Test Setup:

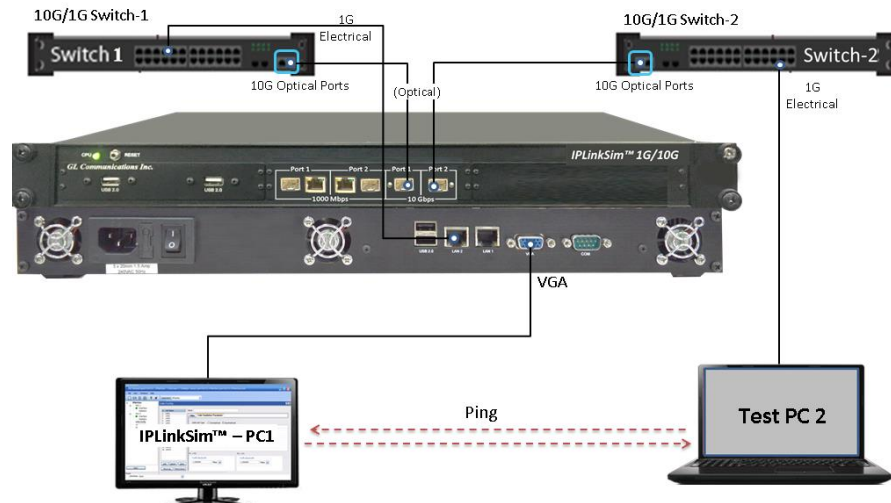
The setup requires two switches with at least one 10G port and one 1G port. We will connect the two switches using the 10G ports, and connect IPLinkSim™ in between the two 10G ports, so that the traffic between the two switches passes through IPLinkSim™ 10G ports. We will connect two PCs – PC1 and PC2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



In this example, we are using IPLinkSim™ Rack 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 Rack PC 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 IPLinkSim™ hardware unit and Switch-2 (10G) port to Port 2 (10G) of IPLinkSim™ hardware unit using SFP Transceivers and LC optical cables. IPLinkSim™ can be controlled by connecting a monitor to the VGA display port (back panel), as shown below.

Note: *The IPLinkSim™ application and the related licenses 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.

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

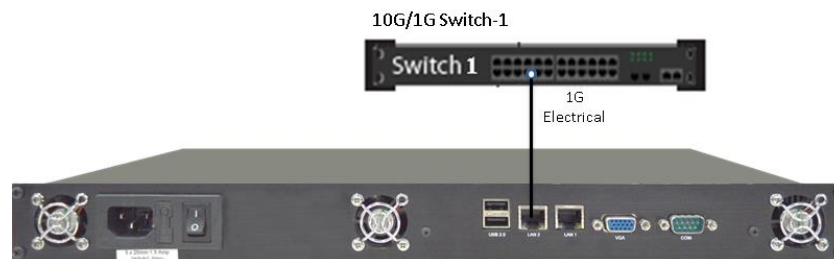
Note down the IP addresses of PC1 and PC2 to conduct Ping test. Ensure that IP address of PC and Hardware are in the same subnet. In this example, we consider the PC IP Addresses as:

- > PC1 – 192.168.12.43
- > PC2 – 192.168.12.127

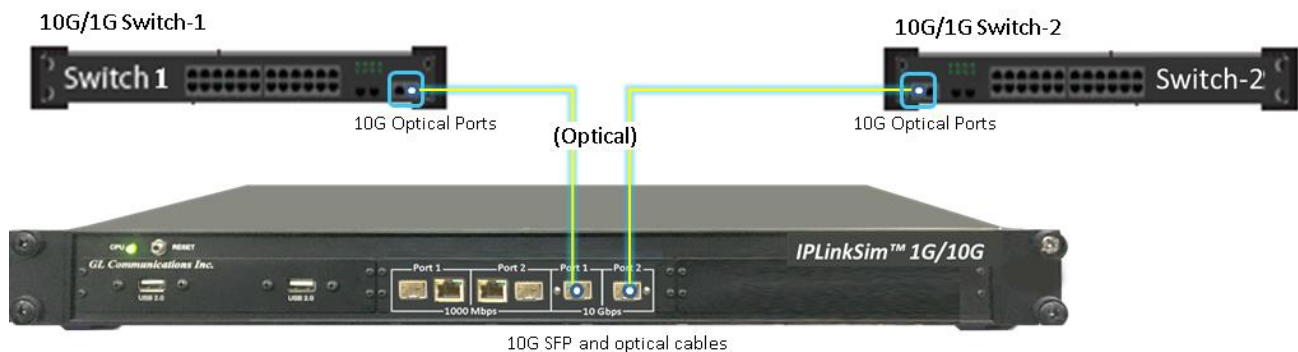
Step 2: Connect the cables

Rack PC (PC1) connection:

- Connect the LAN1 Ethernet port of Rack 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 IPLinkSim™ 10G Port1, and Switch2 10G port to IPLinkSim™ 10G Port2, using 10G SFP and optical cables, as shown below:



Step 3: Launch IPLinkSim 10G Application

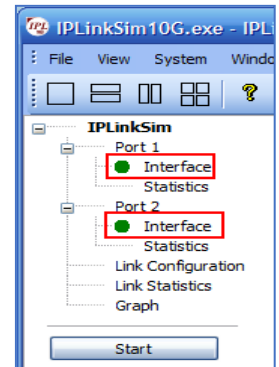


- Right-click on the IPLinkSim 10G shortcut icon on the desktop and select "**Run as administrator**" to launch IPLinkSim 10G application.

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

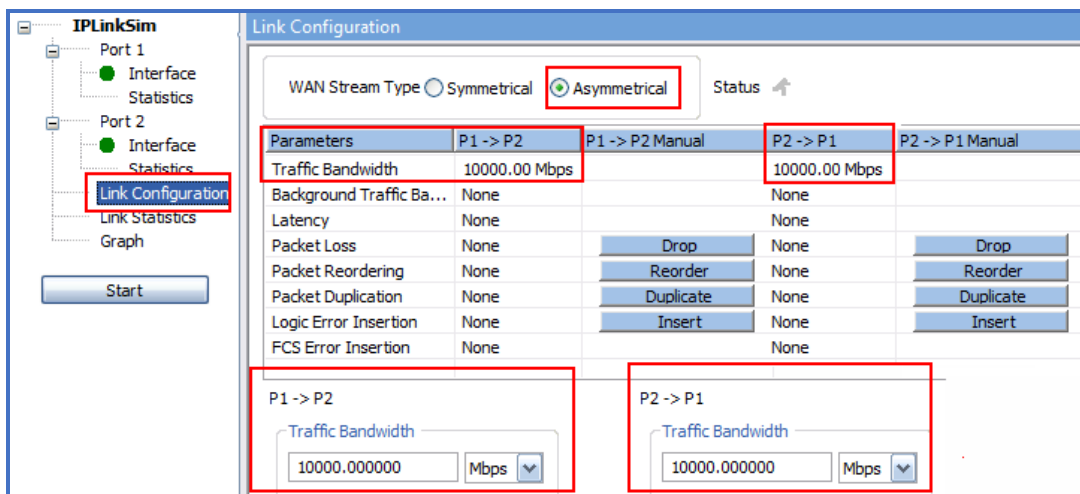
Step 4: Verify Links

- 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.

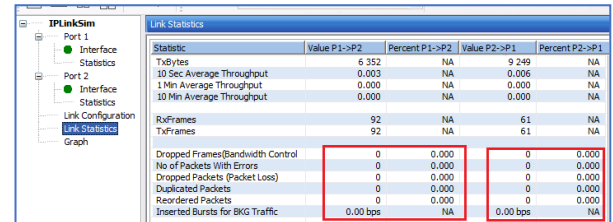
Note that all 4 Ping trials have succeeded, with no impairments. Note that the Round trip time average is around 2 milliseconds.

```
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:



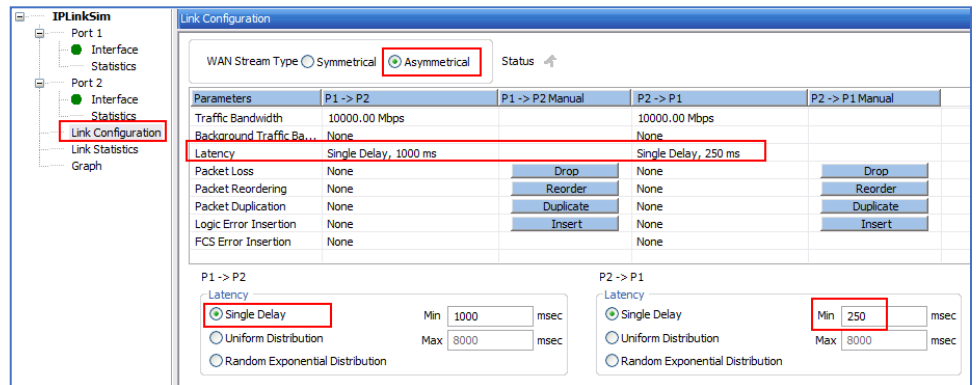
| Statistic | Value P1->P2 | Percent P1->P2 | Value P2->P1 | Percent P2->P1 |
|-----------------------------------|--------------|----------------|--------------|----------------|
| TxBytes | 6.352 | NA | 9.249 | NA |
| 10 Sec Average Throughput | 0.003 | NA | 0.006 | NA |
| 1 Min Average Throughput | 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.



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 Rate | 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)

- Click “**Start**” again to restart IPLinkSim with impairments.

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>
```