

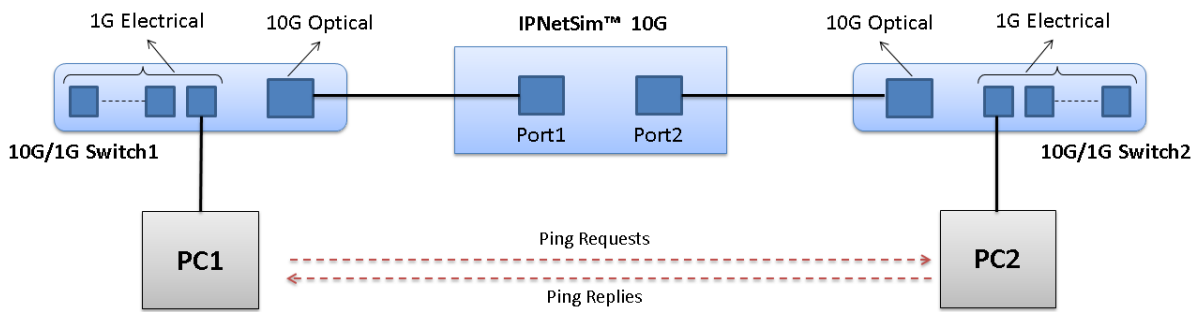
If this is your First-Time-Use of IPNetSim™ rack option, then we recommend you follow all the steps explained in [IPNetSim-Quick-Install-Guide](#) before proceeding with the steps below.

**Quick Checkout**

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

Test Setup:

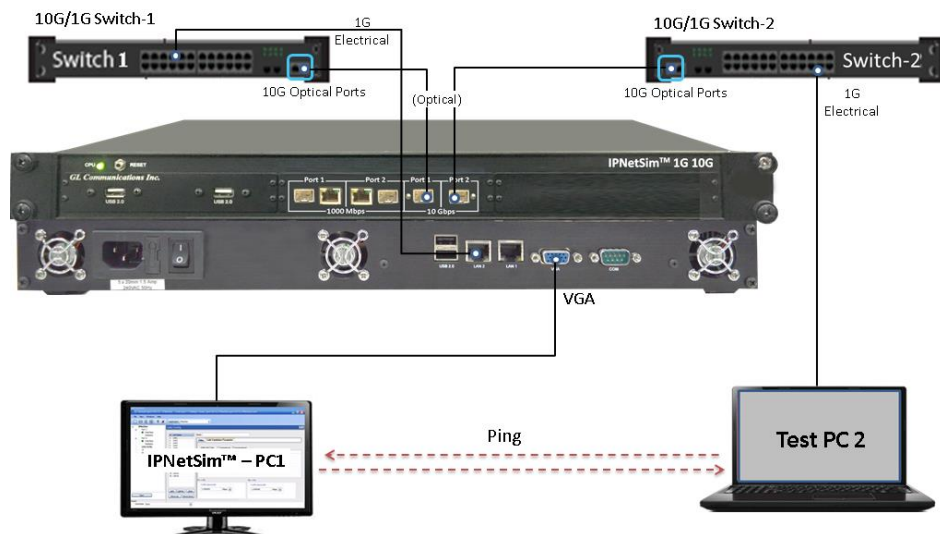
The setup requires two switches with at least one 10G port and one 1G port. We will connect the two switches using the 10G ports, and connect IPNetSim™ in between the two 10G ports, so that the traffic between the two switches passes through IPNetSim™ 10G ports. We will connect two PCs –PC1 and PC2 to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



In this example, we are using IPNetSim™ 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 cables. Connect **Switch-1 (10G)** port to **Port 1 (10G)** of IPNetSim™ hardware unit and **Switch-2 (10G)** port to **Port 2 (10G)** of IPNetSim™ hardware unit using SFP Transceivers and LC optical cables. IPNetSim™ can be controlled by connecting a monitor to the **VGA display port (back panel)**, as shown below.

**Note:** The IPNetSim™ 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 getting started with the actual test, perform the following changes in both the Rack PC (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 IPNetSim™ 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 Rack PC (PC1) and PC2 and verify the basic Stream Definition and WAN Emulation functionality.

### Step 1: Note down the IP Addresses of Rack PC (PC1) and PC2

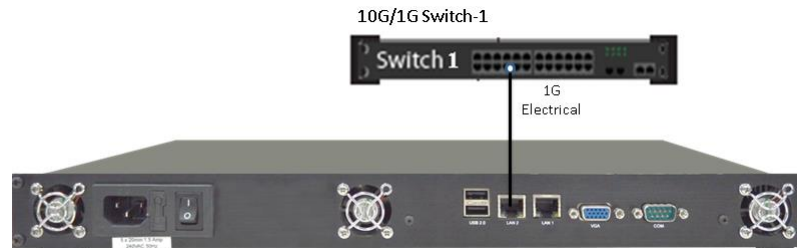
We need IP addresses of Rack PC (PC1) and PC2 to conduct Ping test. Note down the IP addresses of both the PCs. In this example, the IP Addresses used are:

- PC1 – 192.168.1.60
- PC2 – 192.168.1.127

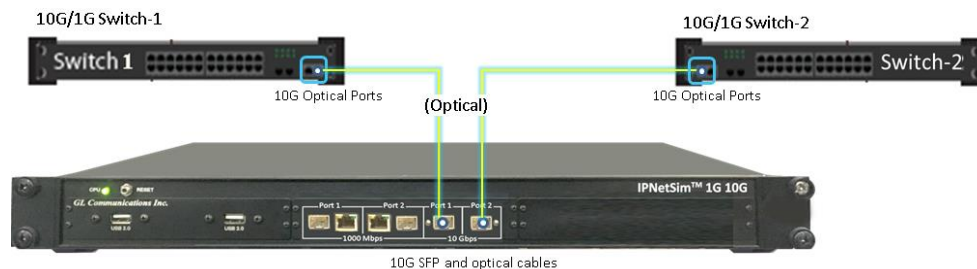
### Step 2: Connect the cables

#### Rack PC (PC1) connection:


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



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



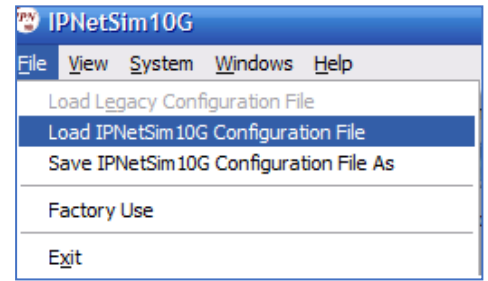
### Step 3: Launch IPNetSim™ 10G Application

- Double click on the IPNetSim™10G shortcut icon  created on the desktop and the application should invoke without any errors.

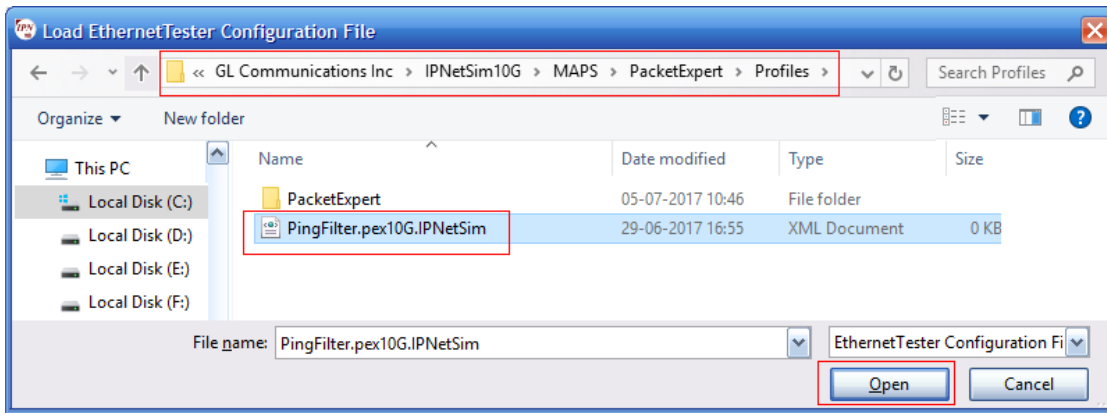
**Note:** The application may take some time to get started due to hardware and software initializations.

**Step 4: Load the pre-configured Stream definition**

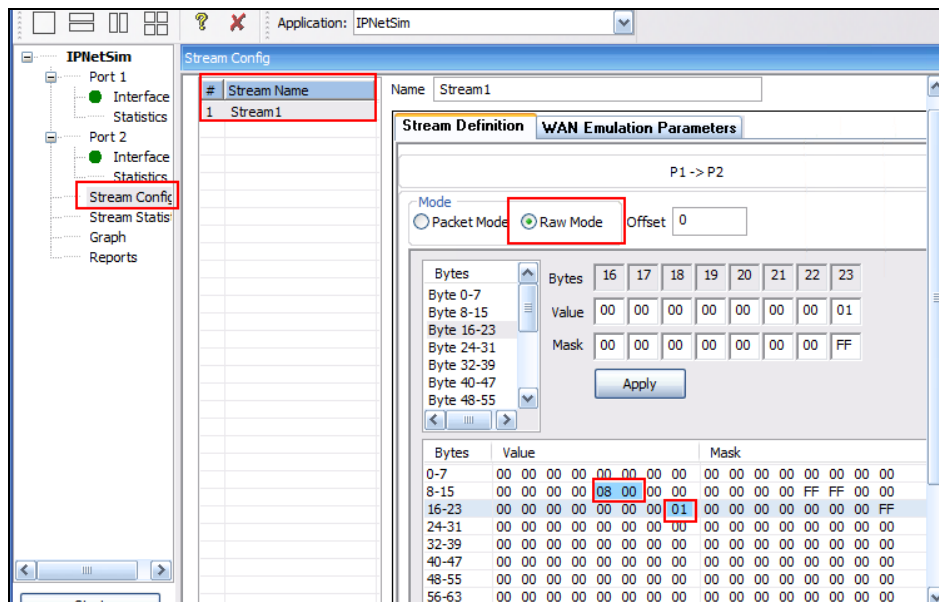
- From IPNetSim™ main screen, go to **File** menu → select **Load IPNetSim10G Configuration File** option.
- The Load Configuration file dialog pops up. Navigate to the IPNetSim™ 10G installation folder, eg: C:\Program Files\GL Communications Inc\IPNetSim10G\.



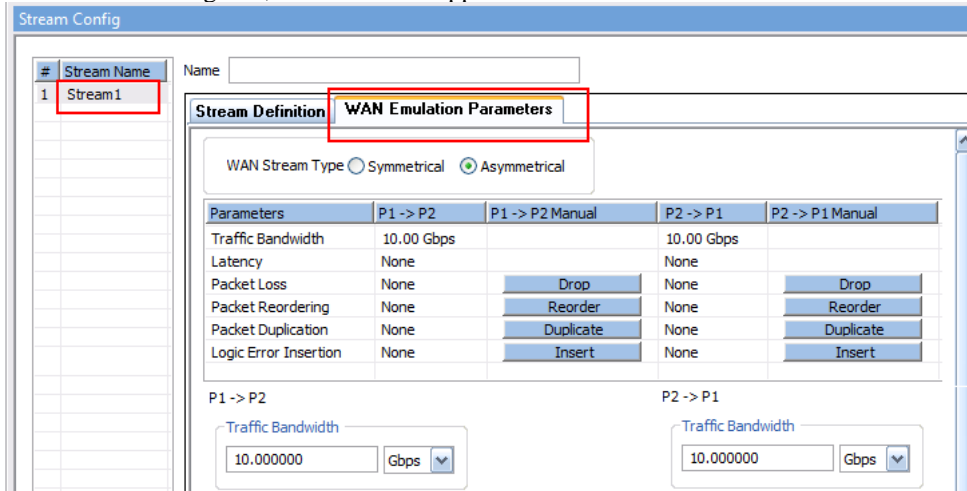
- Inside this folder, further navigate to MAPS\PacketExpert\Profiles folder. Select “PingFilter.pex10G.IPNetSim” file and click “Open”.
- On clicking “Open”, the configuration file is loaded. This configuration file has 1 stream predefined.
- Stream1 is configured to filter only ICMP packets:



**Note** that the Stream definition is in Raw Mode, and has Bytes 12 and 13 (Ethernet Length/Type field) set to filter 08-00 (IP), and Byte 23 (IP Header Protocol field) set to filter 01 (ICMP). Same Stream definition is configured in both directions P1 → P2 and P2 → P1 to filter only ICMP packets in both directions.

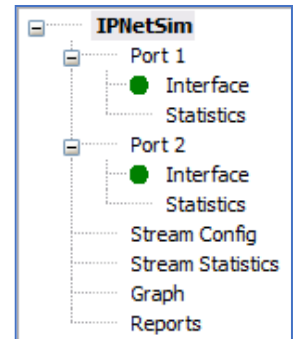


- Initially impairments are not configured, and the screen appears as shown below:



### Step 5: Verify Links

- Verify that the Link Status is UP on both ports, that is, the LHS tree should display 10G: 2 ports with green LEDs link status (refer to figure). If the LED shows red (refer to the troubleshoot section in IPNetSim™ Quick Install Guide).



### Step 6: Start IPNetSim™

- Click **Start** to start the IPNetSim™ 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 below
- Verify that Ping works fine. **Note** that all 4 Ping trials have succeeded, with 0% loss.

```

C:\Users\glitteam>ping 192.168.1.127

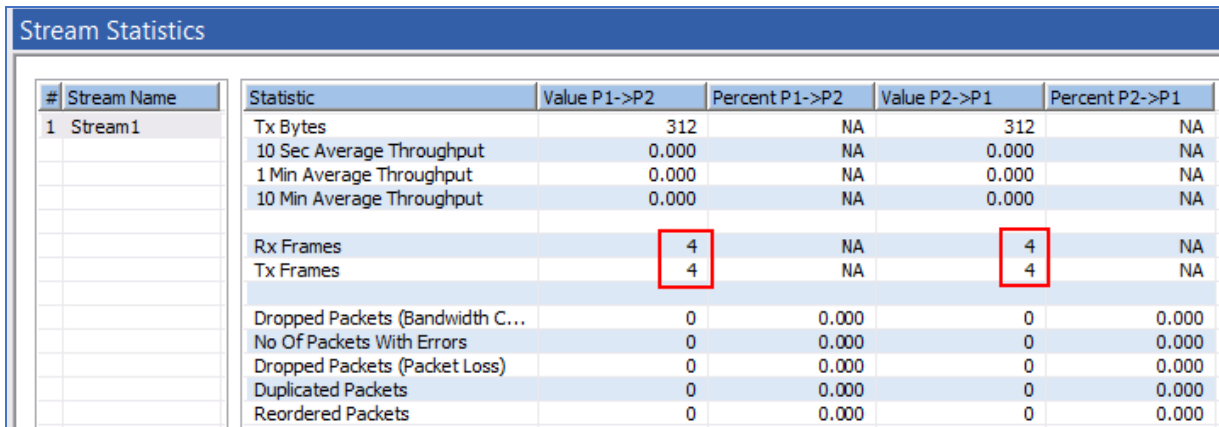
Pinging 192.168.1.127 with 32 bytes of data:
Reply from 192.168.1.127: bytes=32 time=1ms TTL=128
Reply from 192.168.1.127: bytes=32 time<1ms TTL=128
Reply from 192.168.1.127: bytes=32 time<1ms TTL=128
Reply from 192.168.1.127: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.127:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
  
```

- From IPNetSim function tree, click Stream Statistics option, the “Stream Statistics” opens in one of the window on the RHS panes. Select **Stream1**, and verify the following:

Statistics	Value P1→P2	Value P2→P1
Rx Frames	4	4
Tx Frames	4	4

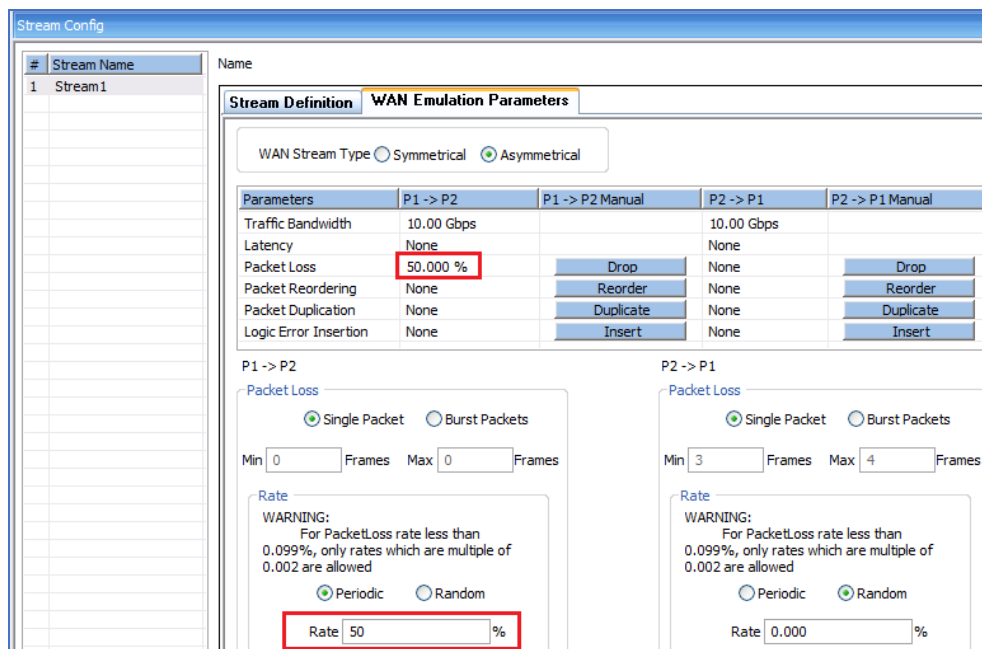
- This shows that 4 ICMP Ping request packets received on P1 was forwarded out on P2. Similarly, all 4 ICMP Ping Reply packets received on P2 was forwarded out on P1.



#	Stream Name	Statistic	Value P1->P2	Percent P1->P2	Value P2->P1	Percent P2->P1
1	Stream1	Tx Bytes	312	NA	312	NA
		10 Sec Average Throughput	0.000	NA	0.000	NA
		1 Min Average Throughput	0.000	NA	0.000	NA
		10 Min Average Throughput	0.000	NA	0.000	NA
		Rx Frames	4	NA	4	NA
		Tx Frames	4	NA	4	NA
		Dropped Packets (Bandwidth C...	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

**Step 8: Configure Impairments – 50% packet loss in P1 → P2 direction and 1 second constant delay in P2 → P1 direction**

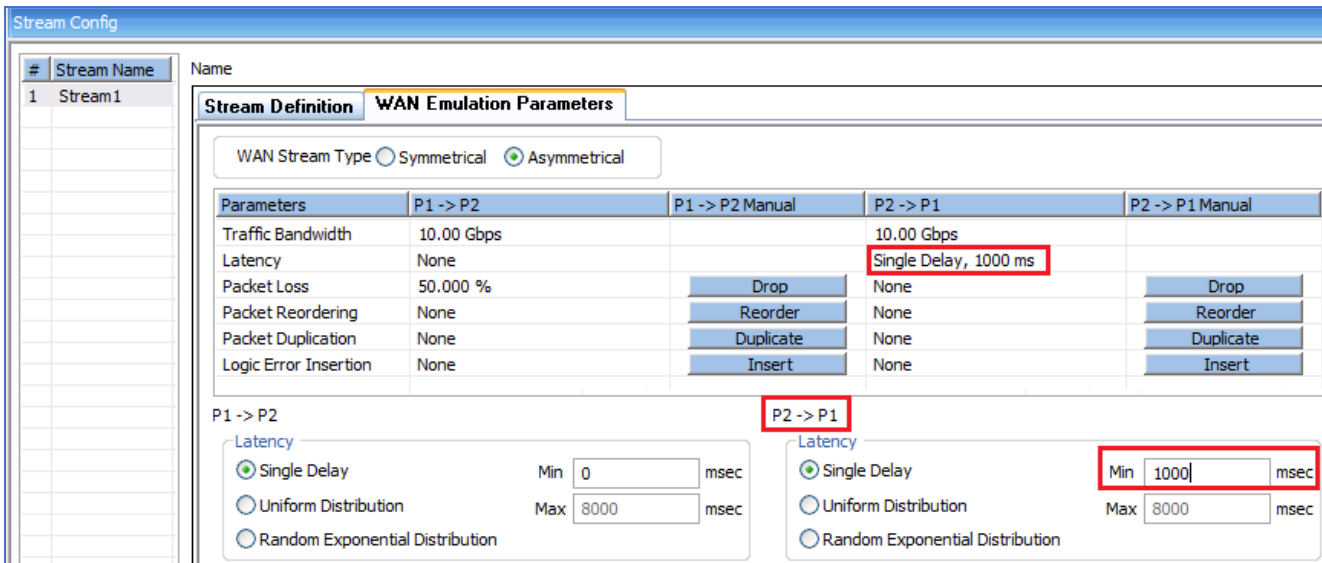
- Stop IPNetSim™ by clicking on the **Stop** button.
- On PC1, in the function tree, click **Stream Config**, and the Stream Config window opens in one of the panes on RHS. Select **Stream1**, select “WAN Emulation Parameters” tab, select **Packet Loss** in the Parameters list. Go to the “Rate” edit box at the bottom, below “P1 → P2” and enter **50** as shown in the figure below:



The screenshot shows the 'Stream Config' window for 'Stream1'. The 'WAN Emulation Parameters' tab is active. Under 'Parameters', 'Packet Loss' is set to '50.000 %' for the 'P1 -> P2' direction. Below this, the 'P1 -> P2' section shows 'Packet Loss' settings with 'Single Packet' selected and a 'Rate' of '50 %' entered in a text box. A warning message is displayed: 'WARNING: For PacketLoss rate less than 0.099%, only rates which are multiple of 0.002 are allowed'. The 'P2 -> P1' section shows 'Packet Loss' settings with 'Single Packet' selected and a 'Rate' of '0.000 %'.



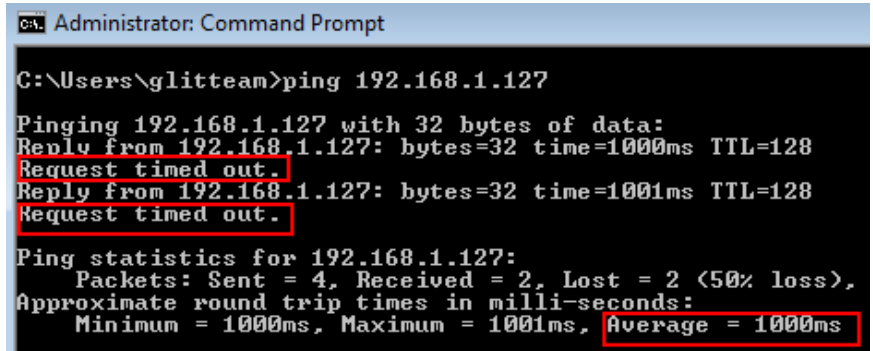
- Under P2 → P1, select **Latency** in the Parameters list. Go to the “Latency” selection at the bottom, below “P2 → P1”, select “Single Delay” and enter 1000 in the Min box as shown in the figure below:



- Click “**Start**” again to restart IPNetSim with impairments. **Note** that 50% packet loss is configured in only one direction (P1 → P2). This means that every 1 out of 2 packets received on P1 will be dropped. Also, Latency of 1000 msec is configured in the reverse direction (P2 → P1). This means that every packet received on P2 will be delayed by 1000 msec.

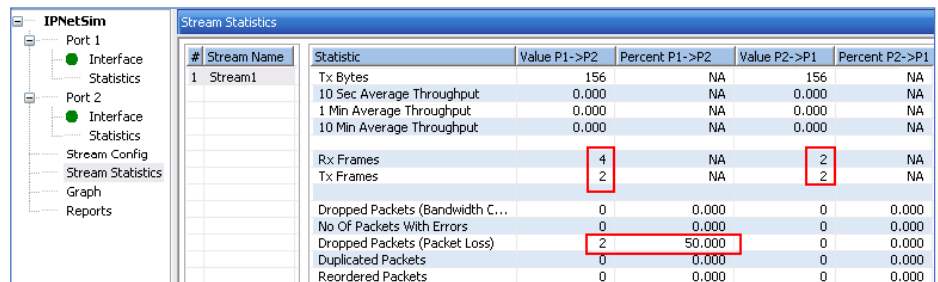
**Step 9: Conduct Ping Test (with impairments – 50% packet loss and Single Delay of 1000 msec)**

- On PC1, enter the Ping command again, and verify that this time, the results shows 2 trials passed and 2 trials failed (Request timed out), with 50% loss. Also, verify that the Approximate Round trip times in milli-seconds show values around 1000 msec as shown in the figure below:



- On the PC1 IPNetSim, again open “**Stream Statistics**” and verify the following values:

- P1 → P2 Rx Frames = 4
- P1 → P2 Tx Frames = 2
- P2 → P1 Tx Frames = 2
- P2 → P1 Rx Frames = 2
- Value P1 → P2 Dropped Packets (Packet Loss) = 2
- Percent P1 → P2 Dropped Packets (Packet Loss) = 50.000



- This means that, P1 received 4 ICMP Ping Requests, but forwarded only 2 ICMP Ping Requests out on P2 (dropped the other 2). P2 → P1 direction does not have Packet Loss configured, so it forwards the 2 ICMP reply packets received back, out on P1, but after introducing a delay of 1000 msec, so the result displays 1000 msec round trip time.