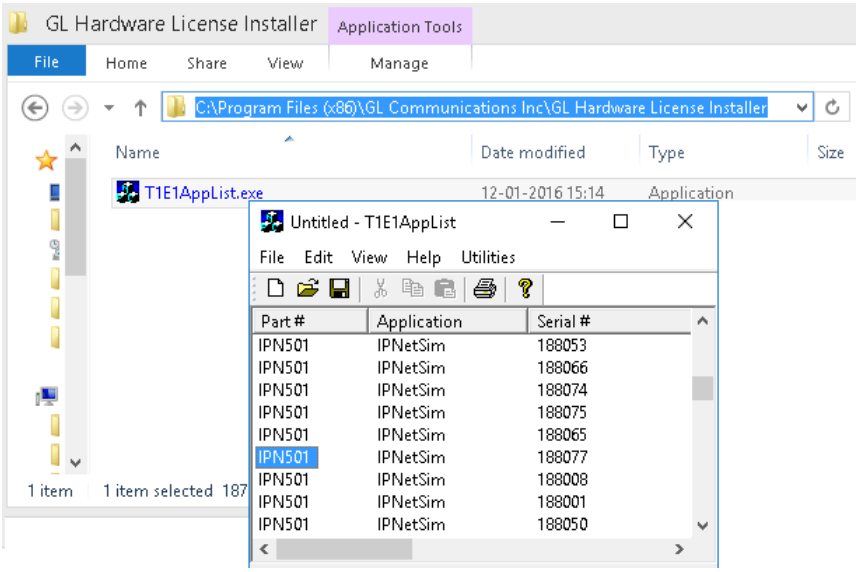
If this is your First-Time-Use of PacketExpert™ 10G unit, then we recommend you to follow all the steps explained in PacketExpert-10G-Quick-Install-Guide before proceeding with the steps below.

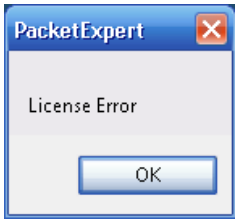
Normal Instructions – Follow these precisely

REFER TO PACKETEXPERT™ QUICK INSTALL GUIDE FOR SOFTWARE AND HARDWARE INSTALLATION PROCEDURE.

- 'IPNetSim' is an optional application and requires purchased licenses (IPN501) to be installed.
- Plug-in the USB installation stick (pen drive) provided with the shipment package by GL Communications.
- Execute **GLHWLicenseInstaller.exe** from the **USB Installation Stick** to install optional application licenses.
- Follow onscreen instructions, the license for the purchased optional application will be installed.
- Run **T1E1AppList.exe** available in the **C:\Program Files (x86)\GL Communications Inc\GL Hardware License Installer** (or C:\Program Files\GL Communications Inc\GL Hardware License Installer) directory and confirm that the purchased **IPNetSim licenses (IPN501)** is listed against the hardware purchased.



Note: The following 'License Error' is prompted, if the licenses are not installed before getting started with the application. You can do so as explained in section above at any time after installing the software.



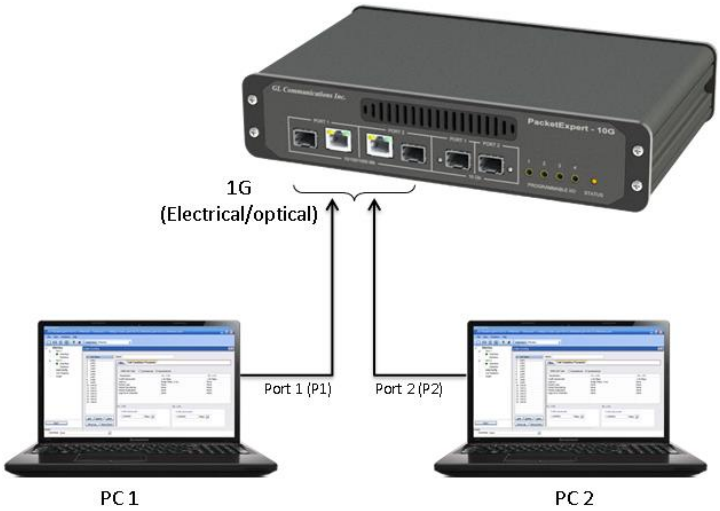
Quick Checkout

For IPNetSim™ functional verification, the "IPNetSim" test can be performed using a single PacketExpert™ 10G unit.

"IPNetSim" *test scenario can be demonstrated on* ***1G ports*** *by directly connecting* ***Port 1*** *and* ***Port 2*** *using* ***Ethernet CAT5 cables*** *(for Electrical Interface test) or using SFP Transceivers and LC optical cables (for Optical Interface test).*

The test setup requires 2 PCs/laptops which are connected through Ports 1 and 2 of the IPNetSim hardware unit. Here, PC1 is connected to 1G: Port1 and PC2 is connected to 1G: Port2 of IPNetSim™ hardware unit, as shown below:

Note: *The following test requires PacketExpert 10G application and IPNetSim licenses to be installed on PC1. After successful Software installation, plug in the PacketExpert 10G Hardware unit to PC1.*



Since the IPNetSim acts as a transparent bi-directional link between PC1 and PC2, 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 Stream Definition and WAN Emulation functionality.

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

Step1: Note down the IP Addresses of PC1 and PC2

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

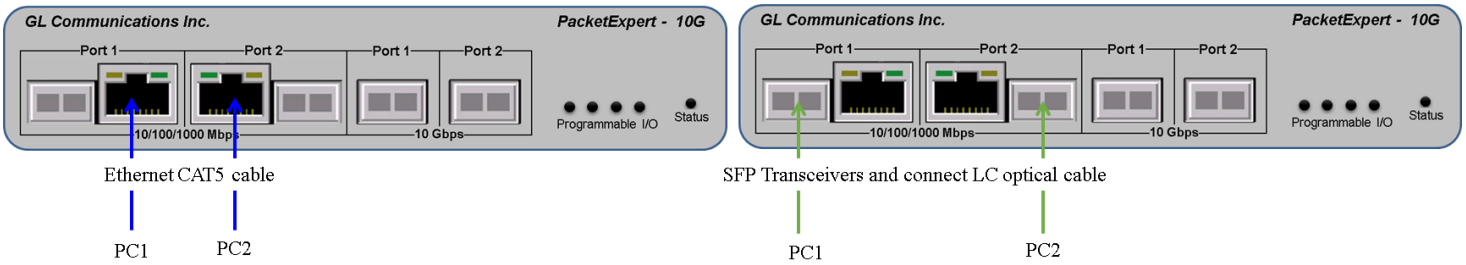
- PC1 – 192.168.1.194
- PC2 – 192.168.1.181

Step2: Connect the cables

Perform Test on 1G (Electrical or Optical Interface)

- For 1G Electrical Interface type, connect 1G: Port 1 to PC1 using Ethernet CAT5 cable as shown in the figure.
- Similarly, connect 1G: Port2 to PC2 using Ethernet CAT5 cable
- For 1G Optical Interface type, plug-in SFP Transceivers to the optical ports and connect LC optical cable between 1G: Port 1 and PC1, (refer to figure). Similarly, connect 1G: Port2 and PC2.

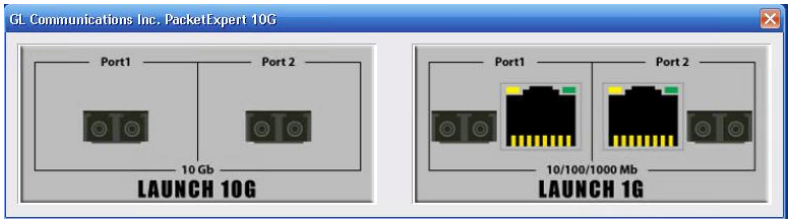
Note: Make sure SFP is properly locked and the optical cable is properly plugged-in.



Step3: Launch PacketExpert 10G Application

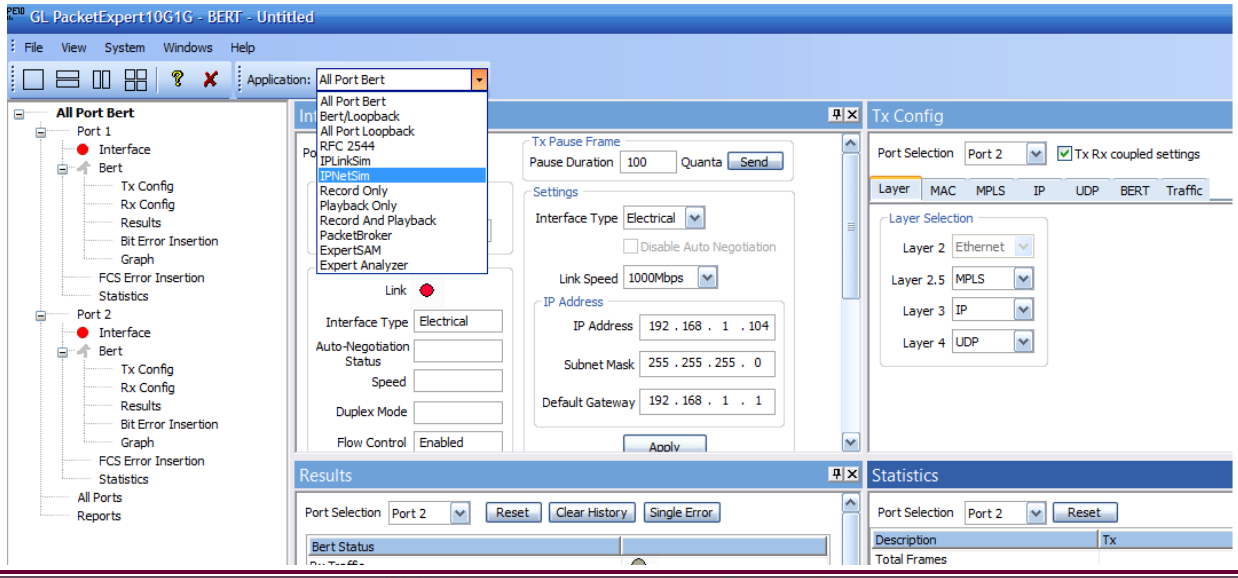
- Right click on the PacketExpert 10G shortcut icon  on the desktop and select "**Run as administrator**" to launch PacketExpert 10G application as shown in the figure below.

- Click on **Launch 1G** option, to invoke the IPNetSim application on 1G ports.



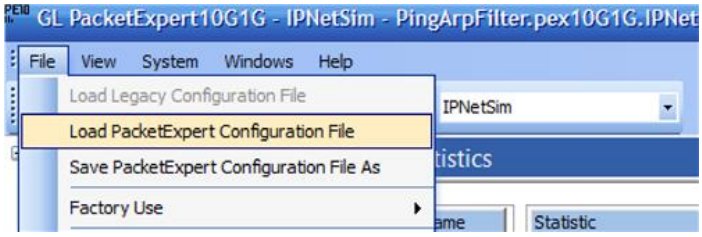
Note: The application may take some time to get started due to hardware and software initializations.

- By default, the PacketExpert 10G1G is invoked displaying All Port Bert application. To load IPNetSim, select **IPNetSim** from the **Applications** drop down list as shown in the figure below.

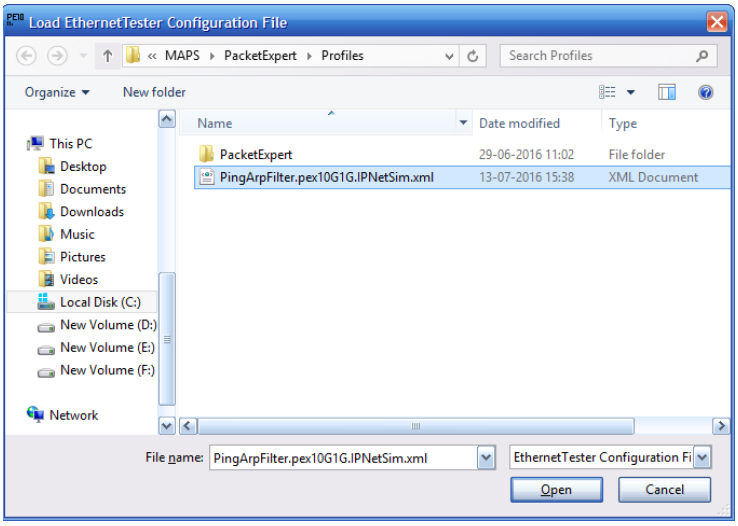


Step4: Load the pre-configured Stream definition

- From IPNetSim main screen, go to **File** menu → select **Load PacketExpert Configuration File** option.

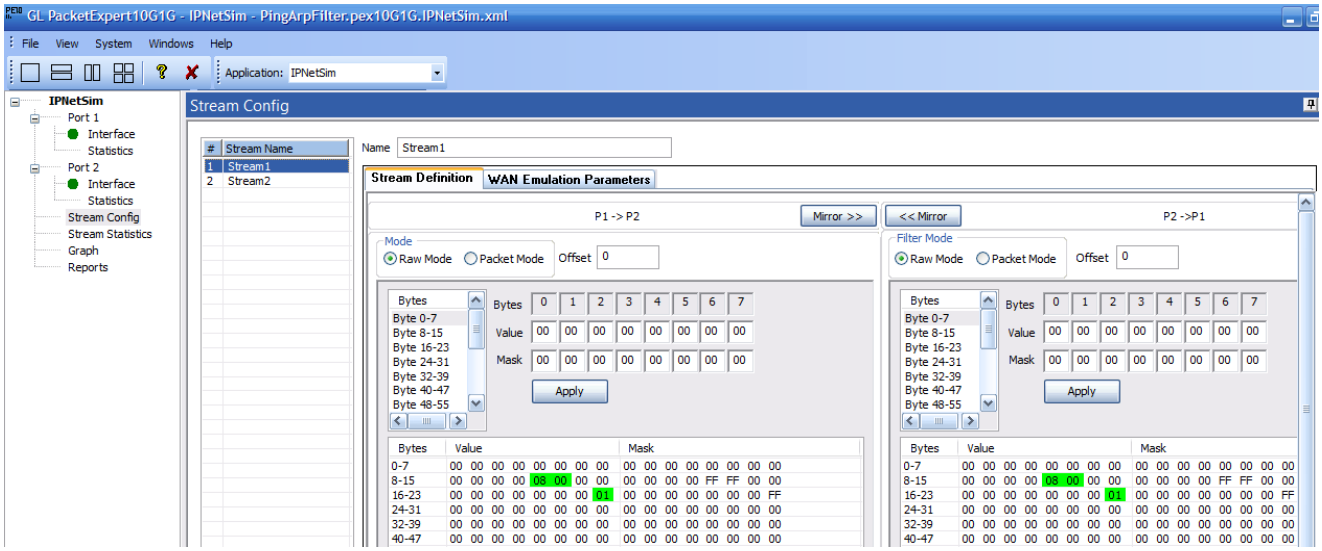


- The Load Configuration file dialog pops up. Navigate to the PacketExpert 10G installation folder, eg: C:\Program Files (x86)\GL Communications Inc\PacketExpert10G. Inside this folder, further navigate to MAPS\PacketExpert\Profiles folder. Select **"PingArpFilter.pex10G1G.IPNetSim"** file and click **"Open".**



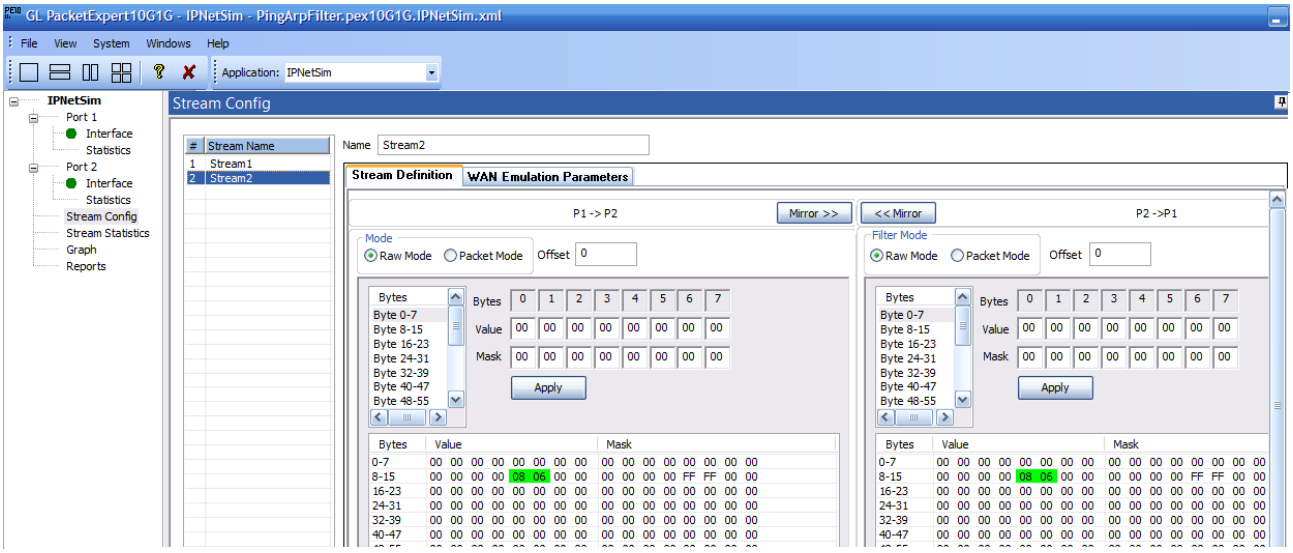
- On clicking "**Open**", the configuration file is loaded. This configuration file has 2 streams predefined.
- Stream1 is configured to filter only ICMP packets:

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.

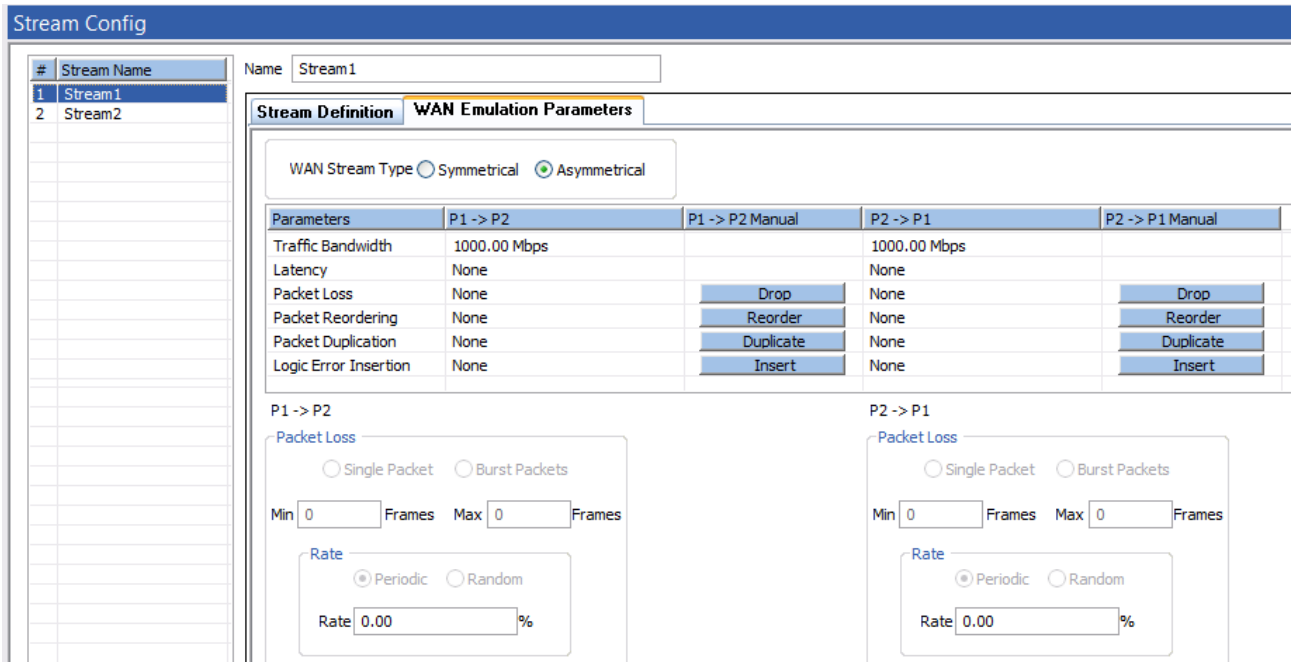


- Stream 2 is configured to filter only ARP packets (for Ping to work properly, it is necessary to pass ARP packets also):

Note that Stream2 is also configured in Raw mode, and has Bytes 12 and 13(Ethernet Length/Type field) set to filter 08-06 (ARP)



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

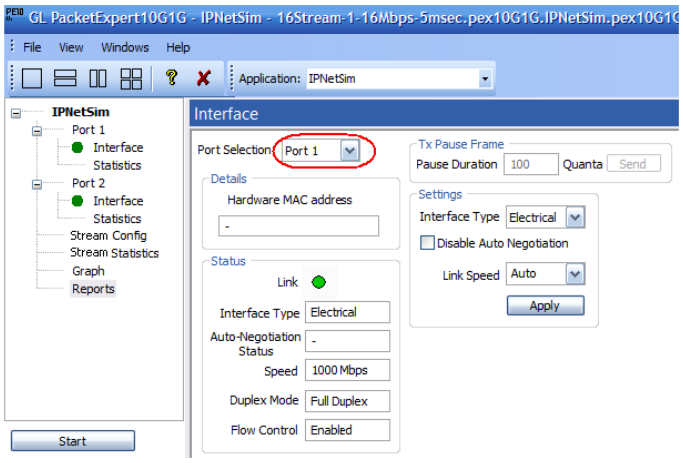


Step5: Configure Interface parameters

For 1G Electrical or Optical connections,

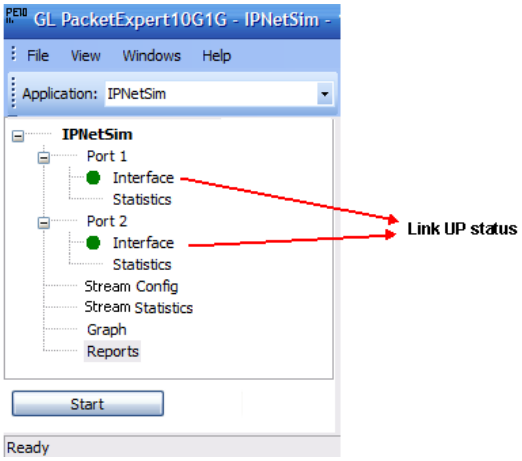
On the RHS side, in the **Interface** pane, select the ports from the **Port Selection** drop-down list and set the following for each port:

- Select **Interface Type** = **Electrical** (or) **Optical** (depending on the ports connected)
- Link Speed = **Auto** (this will set the port to auto negotiate the link speed with the remote port)
- Click on the **Apply** button (this will set the Interface Type in the hardware)



Step6: Verify Links

- Verify that the Link Status is UP on both ports, that is, the LHS tree should display 1G: 2 ports with green LEDs link status (refer to figure). If the LED shows red (refer to the figure), then link is down.
- Refer to troubleshooting steps below to get the links UP:
  - Check if the Electrical/Optical cables are connected to the correct ports (i.e. Ports 1 and 2 are connected) - refer to the figure above.
  - Check if there are any loose connections and secure the cables properly
  - If still link is not UP, double click **"Interface"** under the port in the LHS tree to launch the **"Interface"** dialog in one of the RHS panes. Click the **"Apply"** button. This will reinitialize the port and will force it to go through the auto negotiation cycle again.
  - The above steps should get the link UP. If problem still persists, contact GL Communications Inc.



Step7: Start IPNetSim

- Click **Start** to start the IPNetSim application.

Step8: Conduct Ping Test (without impairments)

- On PC1, open a command prompt, and Ping PC2's IP Address, as shown in the figure below

```
Command Prompt
C:\Users\voip>ping 192.168.1.181
```

- Verify that Ping works fine. **Note** that all 4 Ping trials have succeeded, with 0% loss.

```
Command Prompt

C:\Users\voip>ping 192.168.1.181

Pinging 192.168.1.181 with 32 bytes of data:
Reply from 192.168.1.181: bytes=32 time<1ms TTL=128
Reply from 192.168.1.181: bytes=32 time<1ms TTL=128
Reply from 192.168.1.181: bytes=32 time<1ms TTL=128
Reply from 192.168.1.181: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.181:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\voip>_
```

- 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:
  - P1 → P2 Rx Frames = 4
  - P1 → P2 Tx Frames = 4
  - P2 → P1 Tx Frames = 4
  - P2 → P1 Rx Frames = 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.

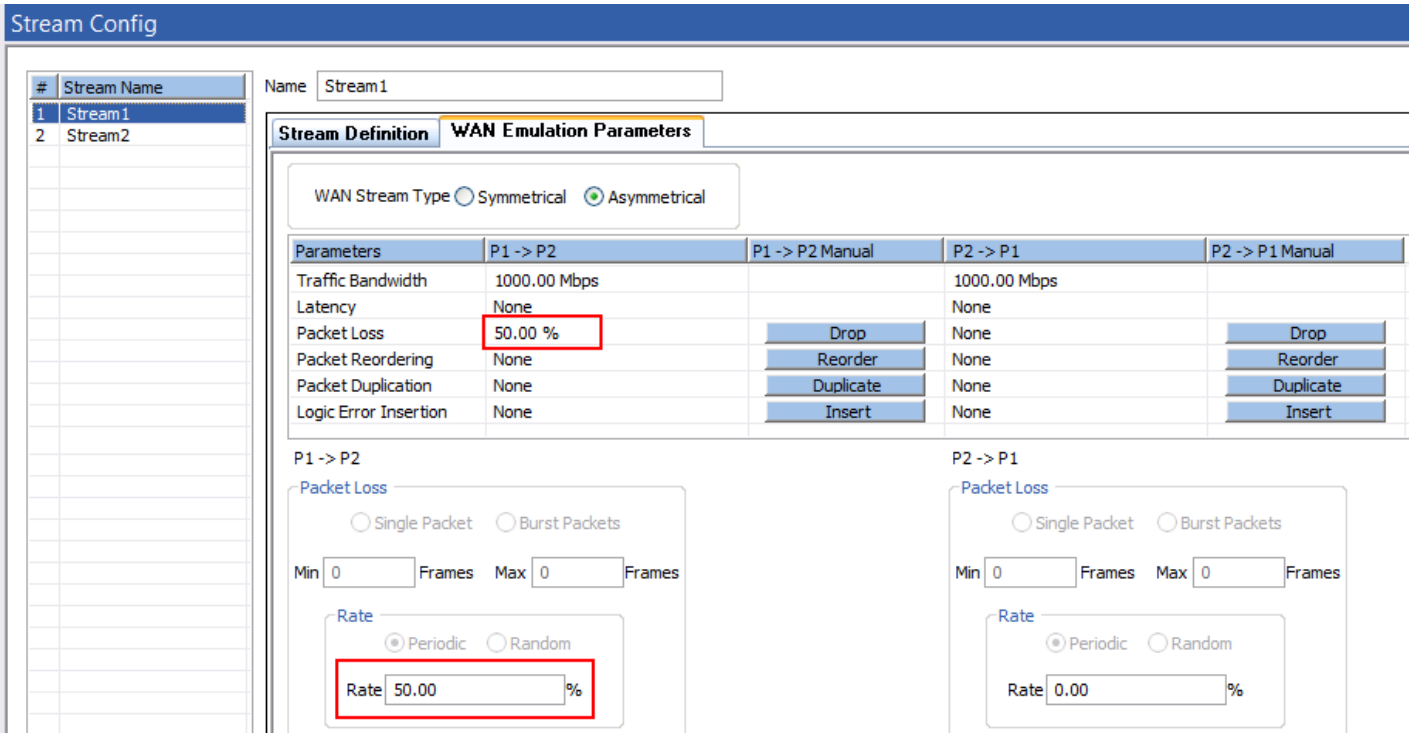
Stream Statistics

#	Stream Name
1	Stream1
2	Stream2

Statistic	Value P1->P2	Percent P1->P2	Value P2->P1	Percent P2->P1
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

Step9: Configure impairments – 50% packet loss

- 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:



- 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.

Step10: Conduct Ping Test (with impairments – 50% packet loss)

- 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.

Command Prompt

```
Pinging 192.168.1.181 with 32 bytes of data:
Reply from 192.168.1.181: bytes=32 time<1ms TTL=128
Reply from 192.168.1.181: bytes=32 time<1ms TTL=128
Reply from 192.168.1.181: bytes=32 time<1ms TTL=128
Reply from 192.168.1.181: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.181:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\voip>ping 192.168.1.181

Pinging 192.168.1.181 with 32 bytes of data:
Reply from 192.168.1.181: bytes=32 time<1ms TTL=128
Request timed out.
Reply from 192.168.1.181: bytes=32 time<1ms TTL=128
Request timed out.

Ping statistics for 192.168.1.181:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\voip>
```

- 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 any impairments configured, so it forwards the 2 ICMP reply packets received back, out on P1.

Stream Statistics

#	Stream Name
1	Stream1
2	Stream2

Statistic	Value P1->P2	Percent P1->P2	Value P2->P1	Percent P2->P1
Tx Bytes	156	NA	156	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	2	NA
Tx Frames	2	NA	2	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)	2	50.000	0	0.000
Duplicated Packets	0	0.000	0	0.000
Reordered Packets	0	0.000	0	0.000