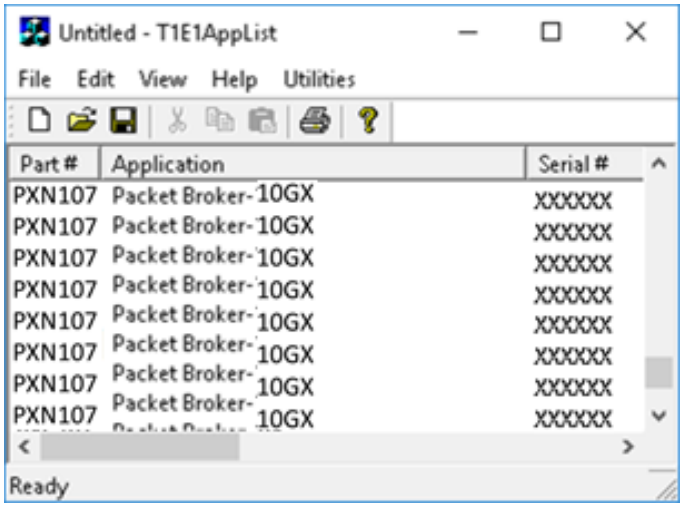
If this is the First-Time use of PacketExpert™ 10GX unit, then it is recommended to follow all the steps explained in PacketExpert-10GX-Quick-Installation-Guide before proceeding with the steps below.

Normal Instructions – Follow these precisely

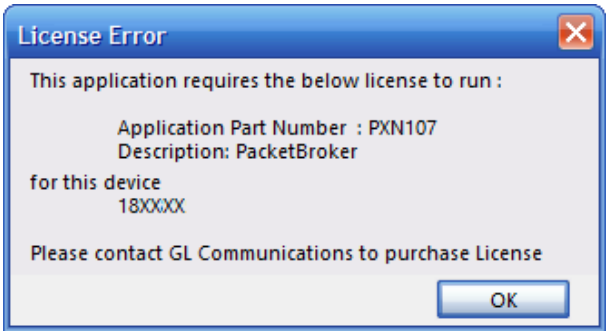
- '**PacketBroker**' is an optional application and requires purchased licenses to be installed.
- Plug-in the USB installation stick (pen drive) provided with the shipment package by GL Communications.
- Execute **GLHWLicenseInstaller.exe** from the USB Installation Stick to install the optional application licenses.
- Follow onscreen instructions, the license for the purchased optional application will be installed.
- In addition, PXN101 license installation is required to enable testing on 10G ports
- Run **T1E1AppList.exe** available in the **C:\Program Files\GL Communications Inc\GL Hardware License Installer** directory and confirm that the purchased **PacketBroker** licenses **(PXN107)** is listed against the hardware purchased.

Note: For multi-device appliance, verify that the PXN107 optional license is listed against all the hardware devices

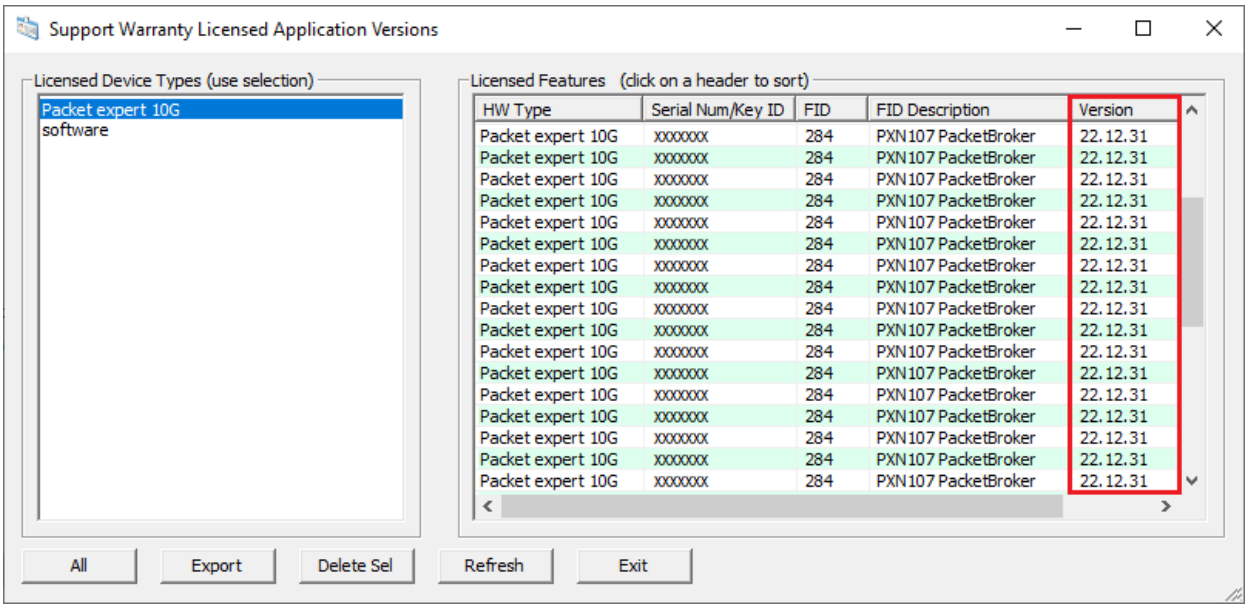


Note:

- When the application is loaded, if the following "**License Error**" is prompted, then you may not have installed the Hardware licenses. You can do so as explained in section above at any time after installing the software.
- Ensure that warranty license (**GLSupportWarrantyLicenseInstaller.exe**) is installed and also confirm that **PacketBroker 10GX (PXN107)** is listed in **Warranty Application List.**



- For multi-device appliance, verify that the warranty licenses are installed for all the hardware devices and are listed against the serial number in the **Warranty Application List**.



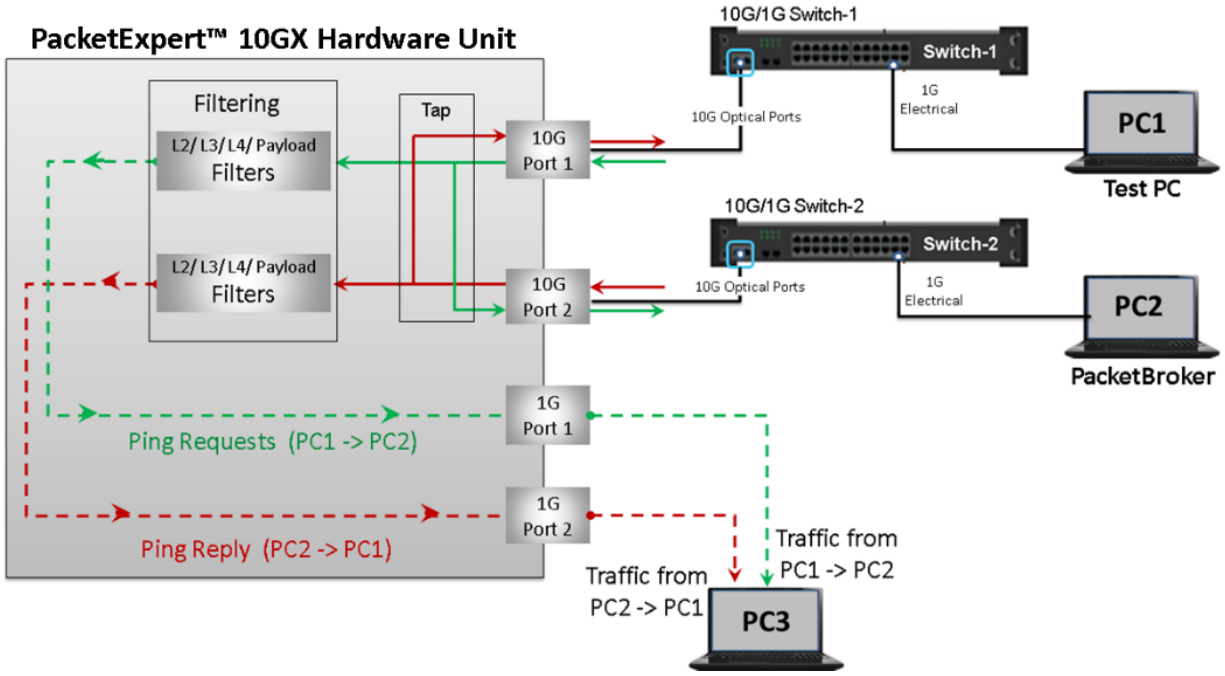
- In the **Version** column, verify the warranty expiry date to be as expected (depending on the support warranty purchased).

Note:

- Any latest software updates after warranty period will not be available until warranty licenses are renewed.

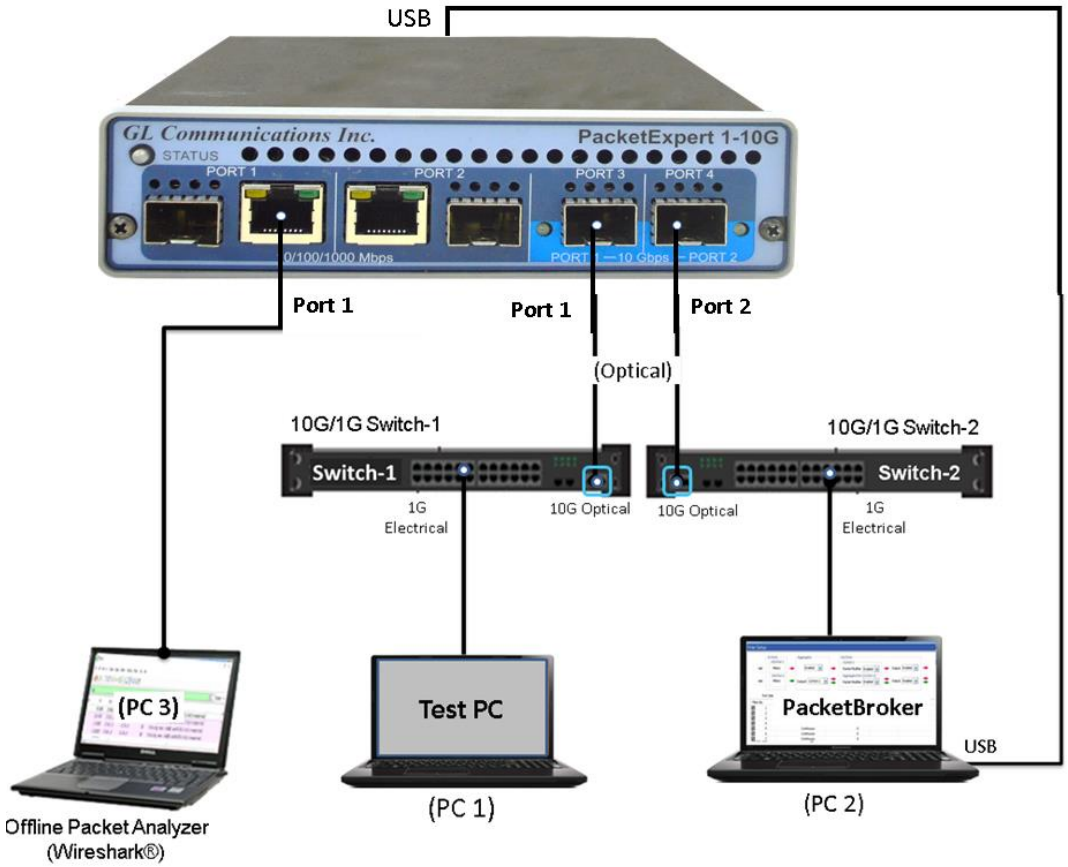
Quick Verification

For 'PacketBroker' functional verification, self-test can be performed using a single PacketExpert™ 10GX unit. *The test setup requires 3 PCs/laptops and 2 switches with at least 1 - 1G port and 1 - 10G port. 2 PCs/laptops are connected to the 1G ports of the two switches, while the two switches are connected to each other through the* ***10G ports (or In Ports)*** *– 10G:* ***Port 1*** *and 10G:* ***Port 2*** *of the hardware unit, and 1 PC/laptop is connected to one of the 1G "Out Ports" - 1G:Port1 or 1G:Port2, using* ***Ethernet cables*** *(for Electrical Interface test). PC1 and PC2 act as traffic generators, generating Ping traffic between them. Since they are connected to different switches, the Ping traffic passes through the 10G ports. Using 'PacketBroker' functionality, we will filter this Ping traffic between 10G:Port1 and 10G:Port2, and direct traffic in each direction to a different 'Out Port' i.e. we will direct 10G:Port1 → 10G:Port2 traffic to Output 1G:Port1 and 10G:Port2 → 10G:Port1 traffic to Output 1G:Port2, as shown in the image below.*



Here, PC1 is connected to 1G port of switch1, and PC2 is connected to 1G port of switch2. The 10G port of switch1 is connected to 10G:Port1 of the hardware unit. Similarly, the 10G port of switch2 is connected to the 10G:Port2 of the hardware unit. PC3 is connected either to 1G:Port1 or 1G:Port2, as shown above. We will conduct a simple Ping test between PC1 and PC2 and verify the 'PacketBroker' functionality.

Note: *The following test requires PacketExpert™ 10GX application (PXN100) and* ***'PacketBroker'*** *application (PXN107) licenses to be installed on PC2, and Wireshark to be installed on PC3. If you do not have Wireshark, please download from https://www.wireshark.org/download.html. After successful Software installation, plug in the PacketExpert™ 10GX Hardware unit to USB port of PC2. Connect Ethernet interface of PC1 to any one 1G port of switch1 and Ethernet interface of PC2 to any 1G port of switch2, and 1G:Port1/Port2 to Ethernet interface of PC3, 10G:Port1 to the 10G port of switch1 and 10G:Port2 to the 10G port of switch2, as indicated in the image:*

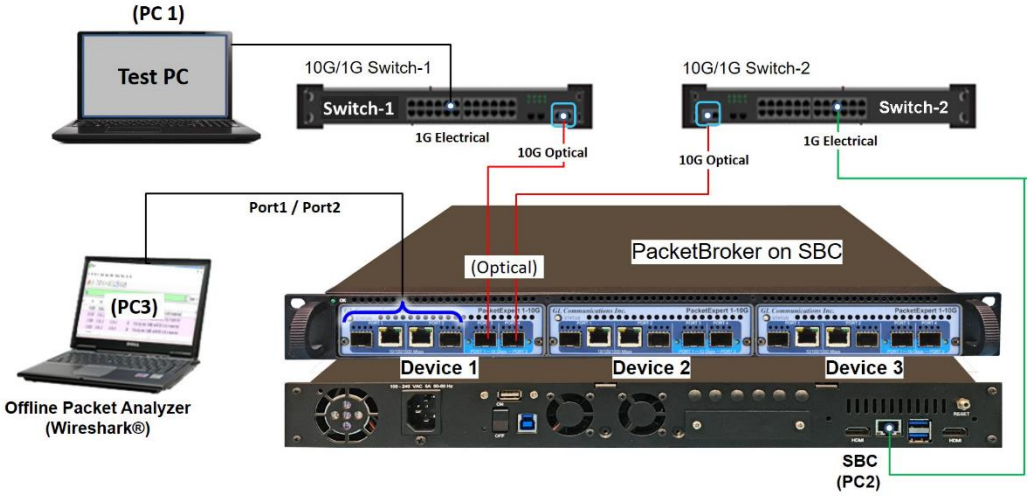


Note: *For Optical Interface test, use SFP Transceivers and LC optical cables between 1G:Port1/Port2 to PC3. In this case test also requires NIC cards with optical ports on the PC.*

Multi-Device Setup

The test setup requires 2 PCs/laptops and PacketExpert™ (PXN112G) hardware unit in addition to the rack SBC and 2 switches with at least 1 - 1G port and 1 - 10G port. Rack SBC and the Test PC/laptop are connected to the 1G ports of the two switches, while the two switches are connected to each other through the ***10G ports (or In Ports)*** *– 10G:* ***Port 1*** *and* ***10G: Port 2*** *of the device 1 of the hardware appliance , and 1 PC/laptop is connected to one of the 1G "Out Ports" - 1G:Port1 or 1G:Port2, using* ***Ethernet cables*** *(for Electrical Interface test).*

PC1 (Test PC) and PC2 (Rack SBC) act as traffic generators, generating Ping traffic between them. Since they are connected to different switches, the Ping traffic passes through the 10G ports. Using 'PacketBroker' functionality, we will filter this Ping traffic between 10G:Port1 and 10G:Port2, and direct traffic in each direction to a different 'Out Port' i.e. we will direct 10G:Port1 → 10G:Port2 traffic to Output 1G:Port1 and 10G:Port2 → 10G:Port1 traffic to Output 1G:Port2, as shown in the image below.



Note: *The following test requires PacketExpert™ hardware unit (PXN112G) and* ***'PacketBroker'*** *application (PXN107) licenses to be installed on PC2 (Rack SBC).*

After successful Software installation, connect Ethernet interface of PC1 to any one 1G port of switch1 and Ethernet interface of PC2 to any 1G port of switch2, and 1G:Port1/Port2 to Ethernet interface of PC3, 10G:Port1 to the 10G port of switch1 and 10G:Port2 to the 10G port of switch2, as indicated in the above image.

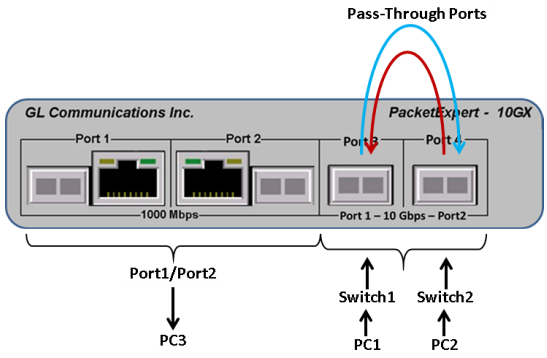
Step 1: Note down the IP Addresses

We need IP addresses of PC1 and PC2 to conduct Ping test. Note down the IP addresses of both the PCs. Ensure the IP address of PCs and PacketExpert™ unit are on the same subnet. In this example, the IP Addresses used are:

- PC1 – 192.168.1.236
- PC2 – 192.168.1.65

Step 2: Connect the cables

- Connect any 1G port on switch1 to PC1 using Ethernet cable as shown in the image
- Similarly, connect any 1G port on switch2 to PC2 using Ethernet cable.
- Connect 1G:Port1 to PC3 using Ethernet cable (or SFP transceivers and LC Optical cable for Optical interface type).
- Connect 10G port of switch1 to 10G:Port1 using SFP Transceivers and LC optical cable. Similarly, connect 10G port of switch2 to 10G:Port2.



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

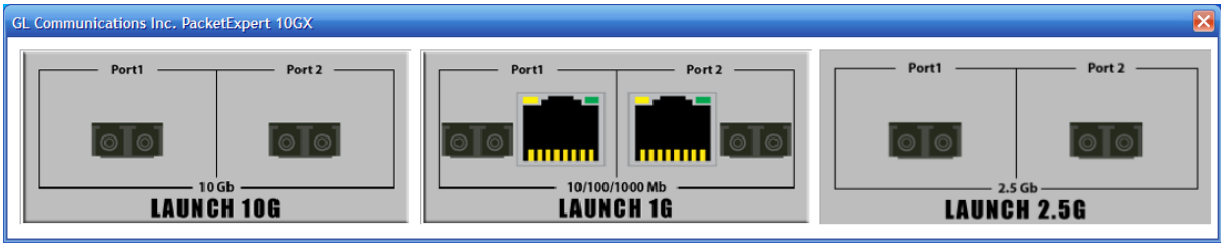
Step 3: Launch PacketExpert™ 10GX Application on PC2

- Right click on the PacketExpert 10GX shortcut icon 

on the desktop and select "**Run as administrator**" to launch PacketExpert 10GX application.

  Note: If optional license PXN101 (license for 10G ports) is installed, then launch window to select 1G/10G type testing is prompted as shown in the screenshot. If this license is not installed, then the application is loaded on 1G ports by default.

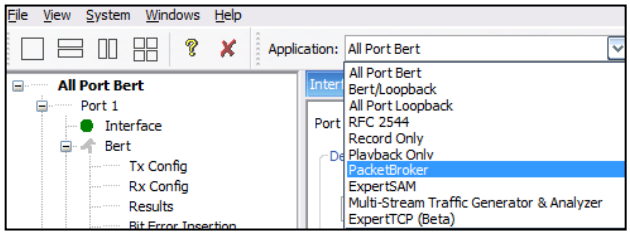
- Click on **Launch 10G** option, to invoke the application with 10G ports.



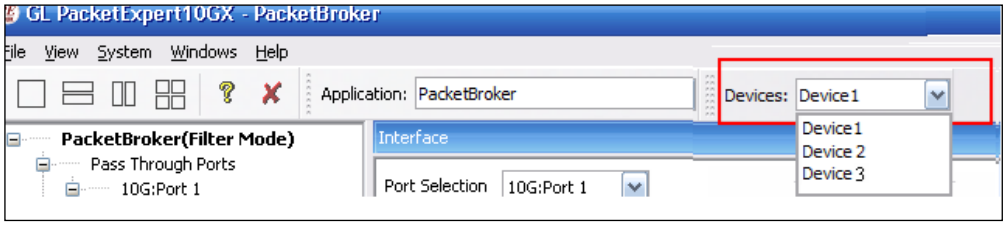
Note:

- The application may take some time to get started due to hardware and software initializations
- PacketBroker application is not supported for 2.5G ports.

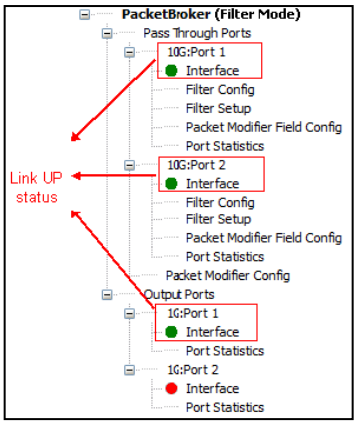
- By default, the PacketExpert is invoked displaying **All Port Bert** application. Load **PacketBroker** from the **Application** drop-down list as shown in the screenshot.



- For **multi-device (PXN112G) appliance**, select the device from the drop-down list and configure the PacketBroker test parameters. Refer to screenshot for device selection.



- Verify that the Link Status is UP on all the 3 ports, that is, the function tree should display 10G:Port1, 10G:Port2, and 1G:Port1 with Green LEDs link status (refer to screenshot).



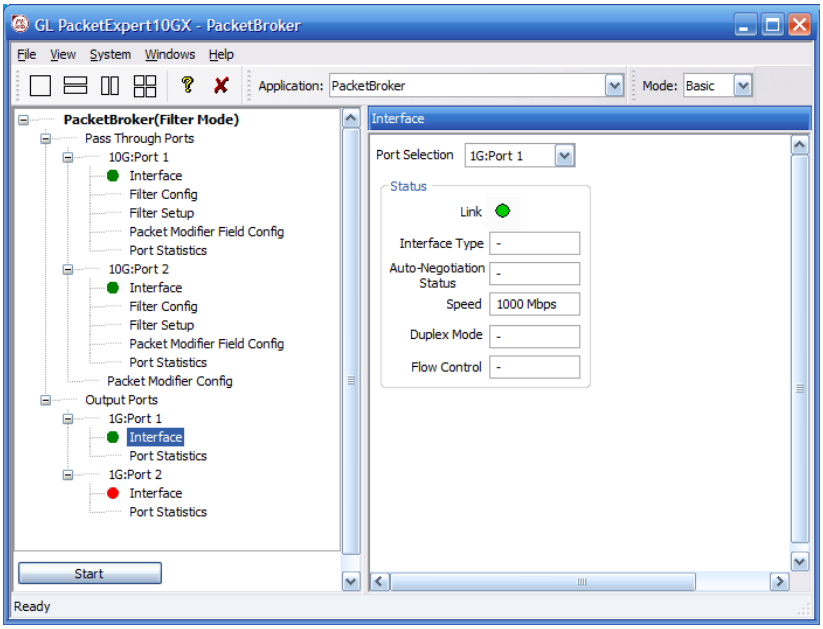
Note: If the LED shows Red, then link is down. Refer to the next section on how to get the links up.

Step 4: Configure Interface parameters

For 1G Electrical (Output Port) connections,

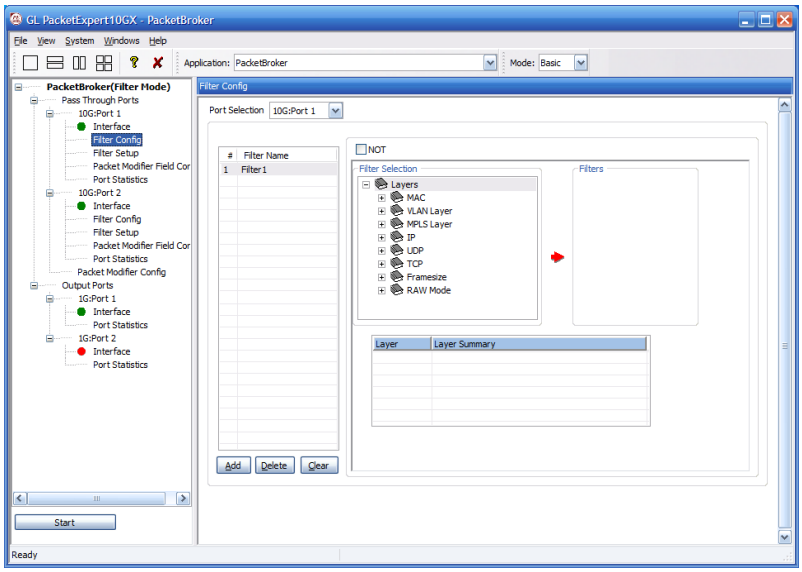
- Make sure that the Ethernet cable is connected between 1G: Port1 to PC3 Ethernet port.
- On the RHS side, in the **Interface** pane, select the ports from the **Port Selection** drop-down list and do the following for **1G:Port1**
- Observe that the link is UP, which will indicate Green LED and also verify that Speed = 1000 Mbps

Note: If the link LED still shows Red, then link is down. Refer to PacketExpert 10GX Quick Installation Guide for **Troubleshooting** steps to get the links UP.



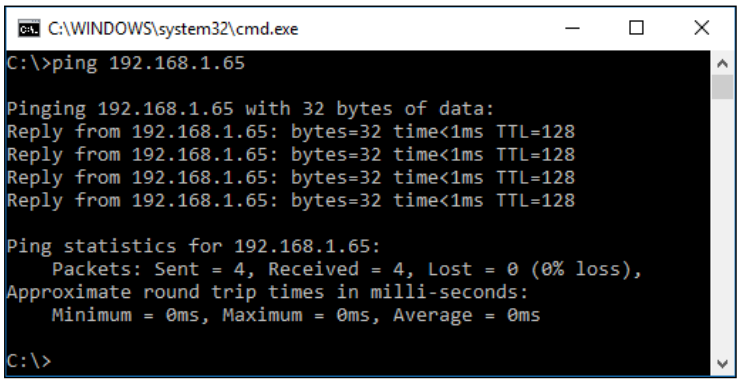
Step 5: Start 'PacketBroker' (without Filters)

- From function tree, double click on **Filter Config** under 10G:Port1 to see the filters. Initially Filters are not set, and the screen appears as shown below.
- Similarly, check for Port2, by selecting **10G:Port2** from the Port Selection drop down.
- Click **Start** to start the 'PacketBroker' application.



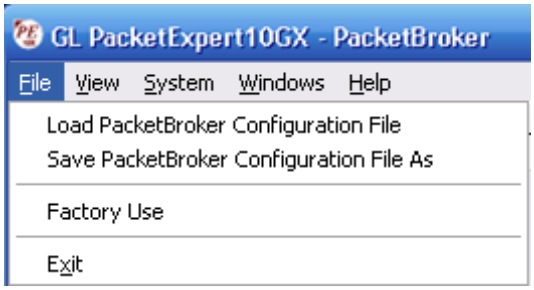
Step 6: Conduct Ping Test (without Filters)

- On PC1 (Test PC), invoke the command prompt, and Ping PC2's (PacketBroker PC) IP Address, as shown in the screenshot below.
- Verify that Ping works fine. Observe that all 4 Ping trials have succeeded, with no frame loss.

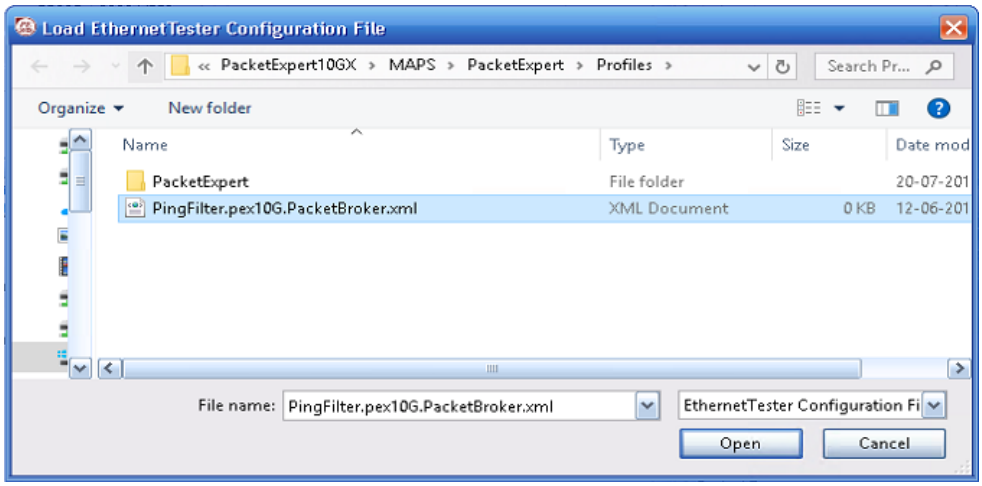


Step 7: Configure Filters on PC2

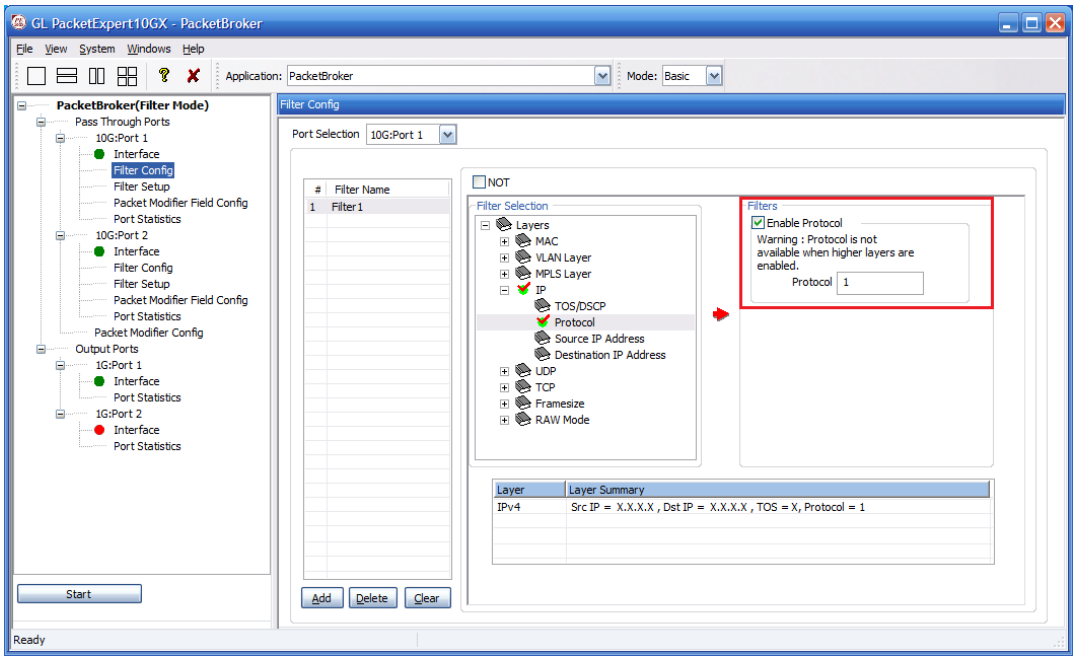
- Stop **'PacketBroker'** application by clicking on the **Stop** button.



- To conduct the Ping test along with filtering, follow the steps below:
  - From **File Menu** → select **Load PacketBroker Configuration File** option
  - Navigate to the PacketExpert Installation folder, and within that folder go to MAPS\PacketExpert\Profiles folder,
    E.g: "C:\Program Files\GL Communications Inc\PacketExpert10GX\MAPS\PacketExpert\Profiles" folder.
  - From Profiles folder → select **"PingFilter.pex10G.PacketBroker"** file.



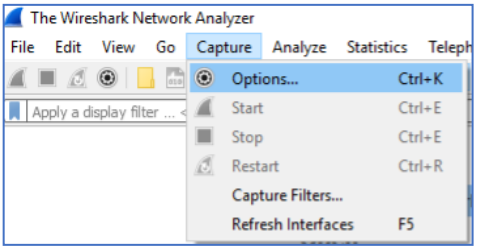
- In the function tree, under **10G: Port 1**, double click "**Filter Config**" to open in one of the RHS panes. The filters within this file have been setup to capture **ICMP Request** (Ping Request) packets flowing from PC1 to PC2.
  Filter is set to **Filter IP Protocol Type field=0x01(ICMP).**
- By default, **Protocol 1** is enabled to filter ICMP Packets for **Port 1** and **Port 2**



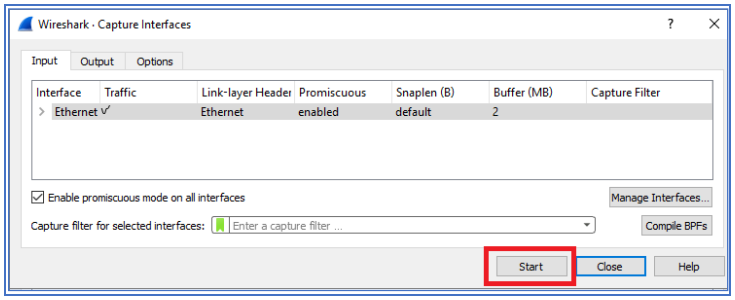
- Similarly, **10G: Port 2** is also configured to filter **ICMP** packets. This will capture **ICMP Reply** (Ping Reply) packets flowing from PC2 to PC1. This can be verified by opening the "Filter Config" dialog for Port2.

Step 8: Start Wireshark on PC3

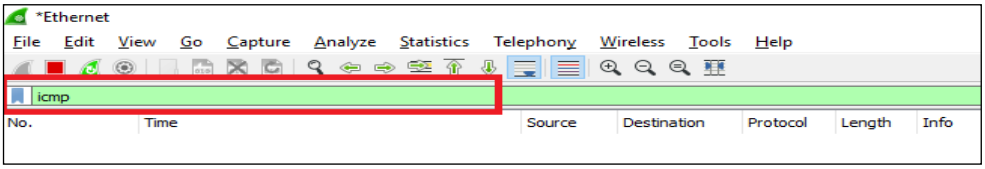
- On PC3, invoke **Wireshark** application, from main menu, select **Capture → Options**



- Select the Interface connected to Port1 and click **Start**

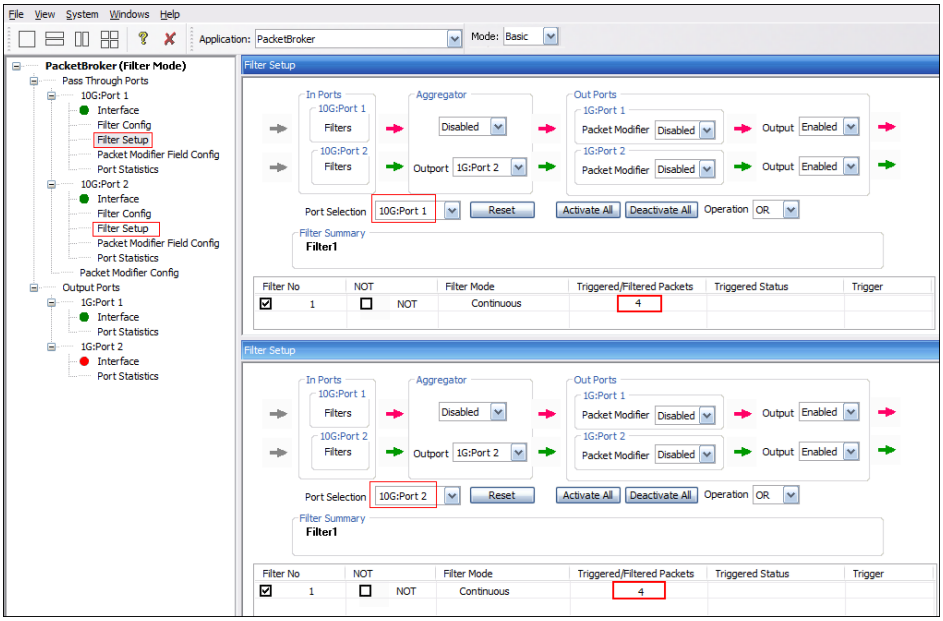


- Enter **"icmp"** in the Filter box and press **Enter** – this will make Wireshark to filter only ICMP (Ping) packets.

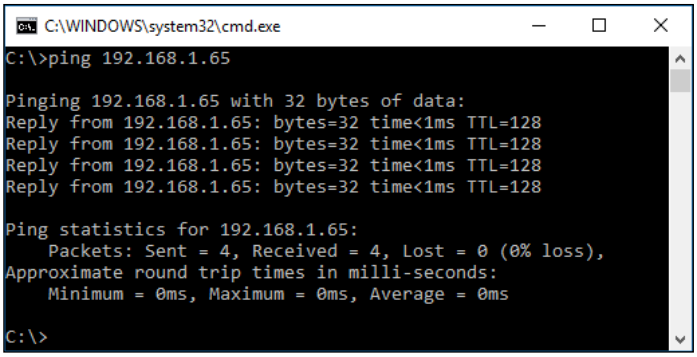


Step 9: Conduct Ping Test (with Filters) and Capture PC1 → PC2 traffic (Ping Requests), Using Capture on Port1

- In the function tree, double click on **"Filter Setup"** to open in one of the RHS panes as shown in the screenshot below:



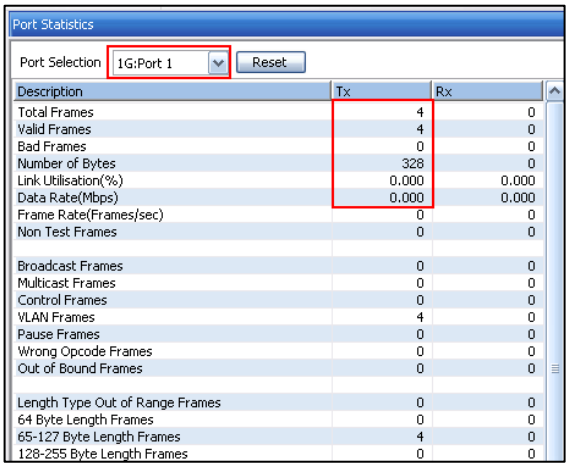
- On PC2, start 'PacketBroker' application by clicking on **Start** button.
- On PC1 (Test PC), invoke the command prompt, and Ping PC2's (PacketBroker PC) IP Address, as shown in the screenshot below.



- Verify that 4 packets (which are actually 4 Ping Request packets) are filtered on **10G: Port1** and 4 packets are filtered on **10G: Port2** (which are actually 4 Ping reply packets).

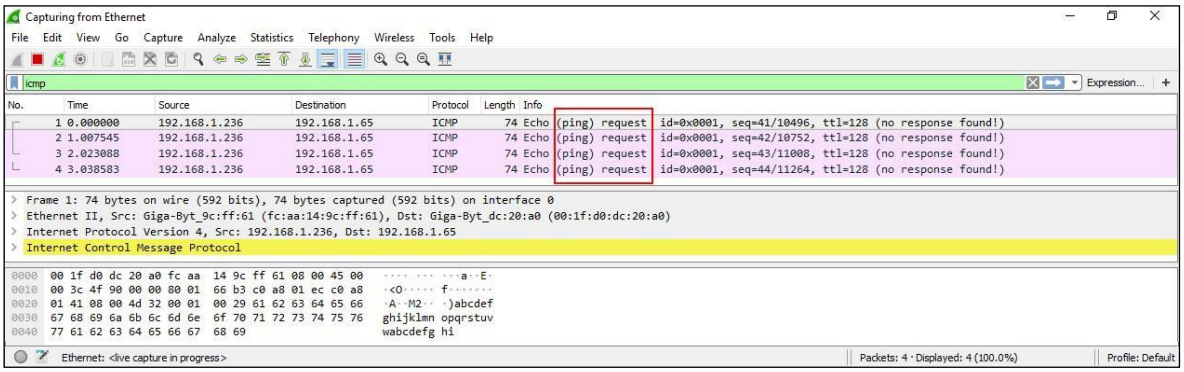
- From **Function** tree → under **Output Ports** → click on **Port Statistics** to open in RHS pane

- Verify **1G: Port1** is forwarding request packets as shown in the Port Statistics screenshot below. Verify that:
  - Port1 Tx Statistics, Total Frames = 4, 65-127 Byte Length Frames = 4



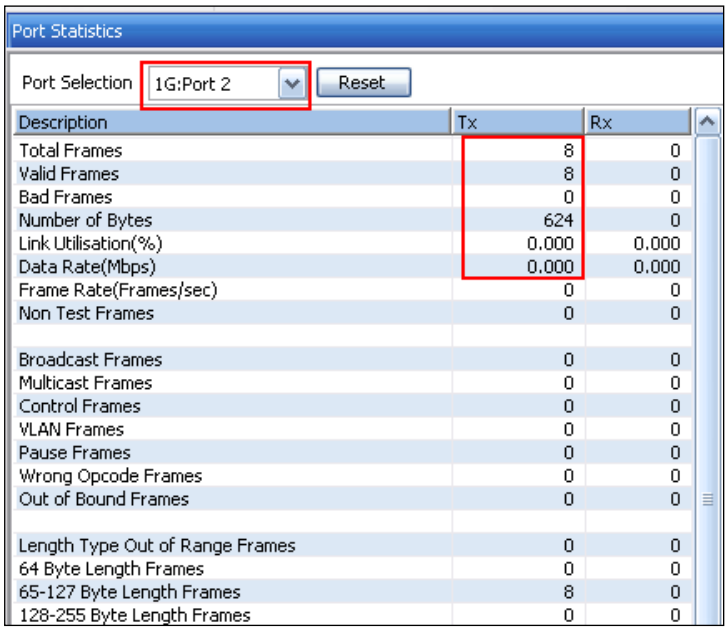
Description	Tx	Rx
Total Frames	4	0
Valid Frames	4	0
Bad Frames	0	0
Number of Bytes	328	0
Link Utilisation(%)	0.000	0.000
Data Rate(Mbps)	0.000	0.000
Frame Rate(Frames/sec)	0	0
Non Test Frames	0	0
Broadcast Frames	0	0
Multicast Frames	0	0
Control Frames	0	0
VLAN Frames	4	0
Pause Frames	0	0
Wrong Opcode Frames	0	0
Out of Bound Frames	0	0
Length Type Out of Range Frames	0	0
64 Byte Length Frames	0	0
65-127 Byte Length Frames	4	0
128-255 Byte Length Frames	0	0

- On **PC3** observe the Ping Request is being captured on **Port1** in Wireshark as shown below.



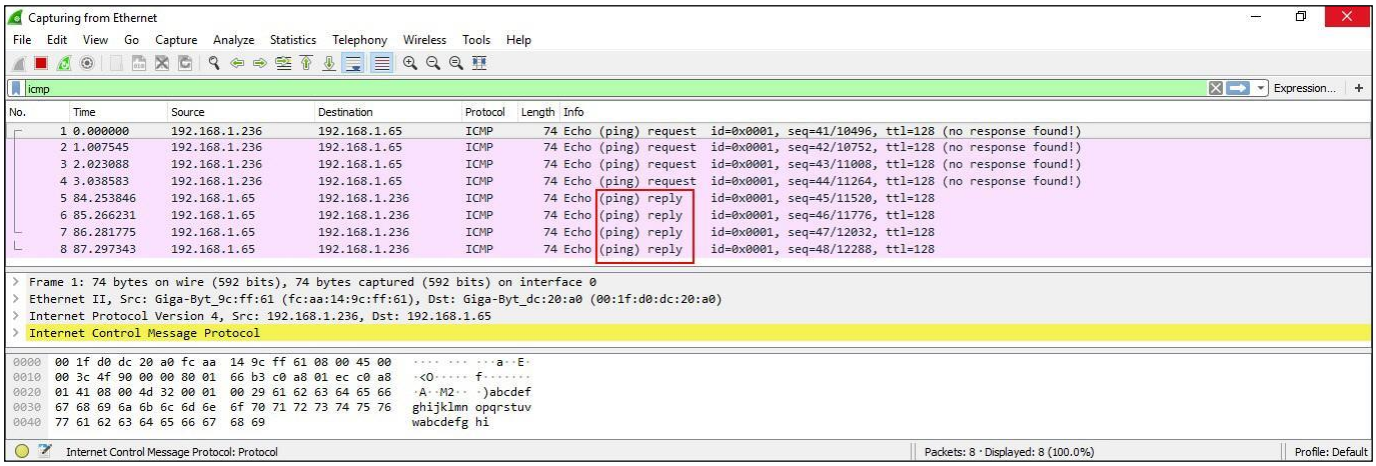
Step 10: Conduct Ping Test (with Filters) and Capture PC1 → PC2 traffic (Ping Requests), Using Capture on Port2

- Now, remove Ethernet Cable from **Port1** and connect to **Port2**.
- Again, on PC1 (Test PC), invoke the command prompt, and Ping PC2's (PacketBroker PC) IP Address and verify **1G: Port2** is forwarding reply packets.
  - Port2 Tx Statistics, Total Frames = 8, 65-127 Byte Length Frames = 8



Description	Tx	Rx
Total Frames	8	0
Valid Frames	8	0
Bad Frames	0	0
Number of Bytes	624	0
Link Utilisation(%)	0.000	0.000
Data Rate(Mbps)	0.000	0.000
Frame Rate(Frames/sec)	0	0
Non Test Frames	0	0
Broadcast Frames	0	0
Multicast Frames	0	0
Control Frames	0	0
VLAN Frames	0	0
Pause Frames	0	0
Wrong Opcode Frames	0	0
Out of Bound Frames	0	0
Length Type Out of Range Frames	0	0
64 Byte Length Frames	0	0
65-127 Byte Length Frames	8	0
128-255 Byte Length Frames	0	0

- On **PC3** observe the **Ping Reply** is being captured on Port2 in Wireshark as shown below.



- Click on **Stop** on the Packet Broker application
- Similarly, repeat the test for device 2 or device 3 while working with multidevice appliance.