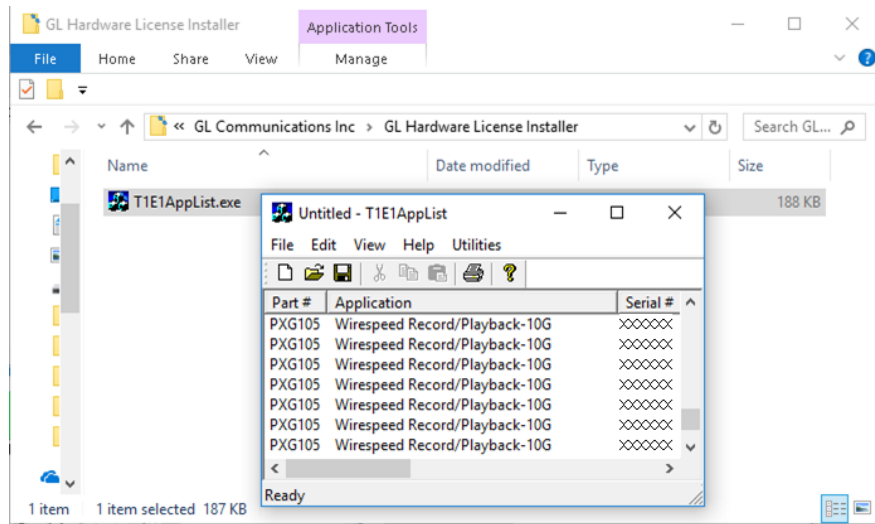


*If this is your First-Time-Use of PacketExpert™ 10G unit, then we recommend you follow all the steps explained in PacketExpert-10G-Quick-Install-Guide before proceeding with the steps below.*

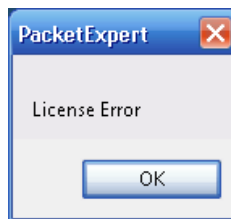
**Normal Instructions – Follow these precisely**

**REFER TO PACKETEXPERT™ 10G QUICK INSTALL GUIDE FOR SOFTWARE AND HARDWARE INSTALLATION PROCEDURE.**

- ‘Record Only’, ‘Playback Only’ and ‘Record and Playback’ are optional applications 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.
- 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 **Wirespeed Record /Playback-10G** licenses (**PXG105**) is listed against the hardware purchased.



**Note:** When the application is started, if the following ‘License Error’ is prompted, then you may have not installed the Hardware licenses. You can do so as explained in section above at any time after installing the software.



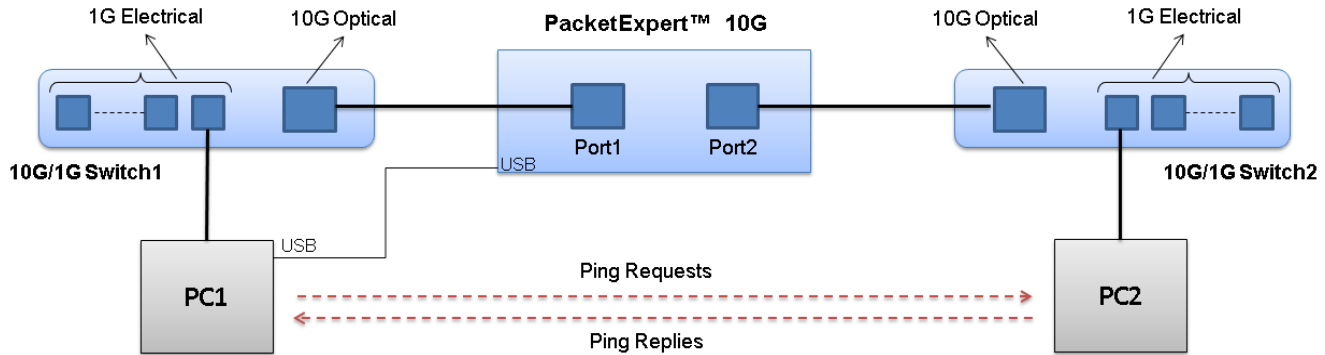
**Quick Verification**

*The following verification is performed in 3 steps: first, we will verify 'Record Only', by capturing Ping traffic to a file. Secondly, we will use the same captured file to verify 'Playback Only', by playing back the same file and capturing using Wireshark. Thirdly, we will verify 'Record and Playback' by playing back the Ping traffic file, and at the same time recording ARP traffic to a file.*

**For ‘Record Only’, ‘Playback Only’ and 'Record and Playback' functional verification, self-test can be performed using a single PacketExpert™ 10G unit.**

Test Setup:

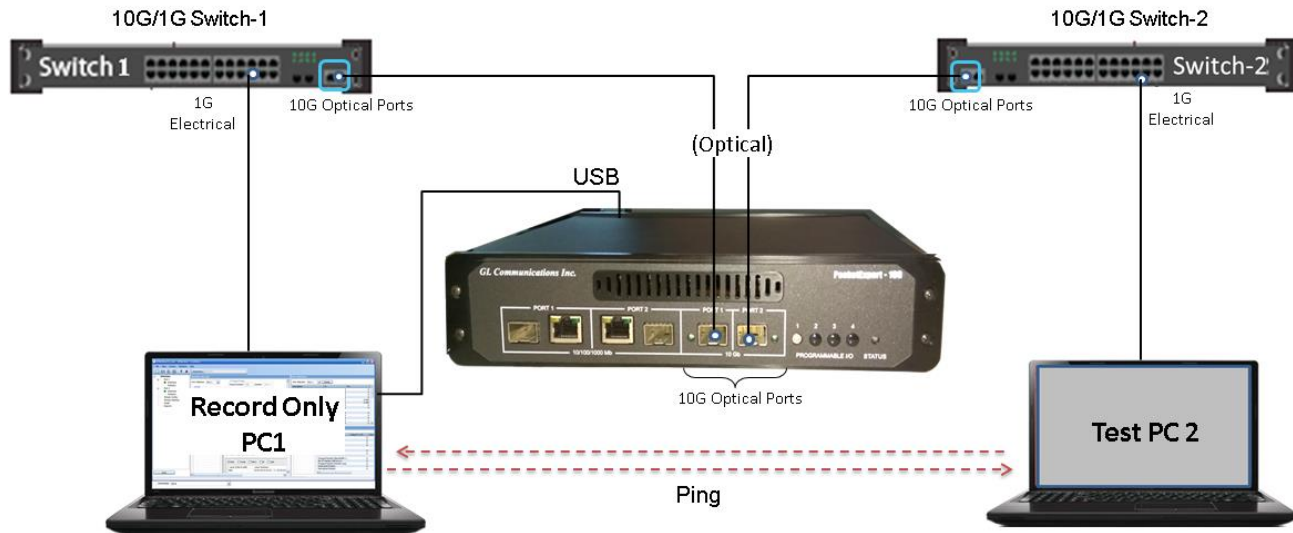
The setup requires two switches with at least one 10G port and one 1G port. We will connect the two switches using the 10G ports, and connect PacketExpert™ 10G Hardware unit in between the two 10G ports, so that the traffic between the two switches passes through PacketExpert™ 10G ports. We will connect 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 located in different switches, Ping traffic passes through the 10G ports of PacketExpert™. We can then record this traffic to verify the Record functionality, and playback the recorded traffic to verify the Playback functionality.



In this example, we are using the PC connected to PacketExpert™ 10G unit 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 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.

The following test requires '**Record and Playback**' application (PXG105) licenses to be installed on PC1. It also requires Wireshark to be installed on both PC1 and PC2. If you do not have Wireshark, please download from here – <https://www.wireshark.org/download.html>. After successful Software installation, plug in the PacketExpert™ 10G Hardware unit to USB port of PC1.



**Note:** For Optical Interface test, use SFP Transceivers and LC optical cables. In this case test also requires NIC cards with optical ports on the PC.

**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:

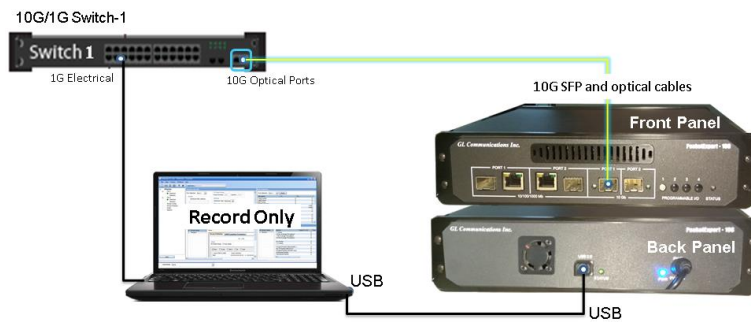
- PC1 – 192.168.1.60
- PC2 – 192.168.1.120

**Note:** Make sure that the PC-1 and PC-2 IP addresses are in the same subnet series.

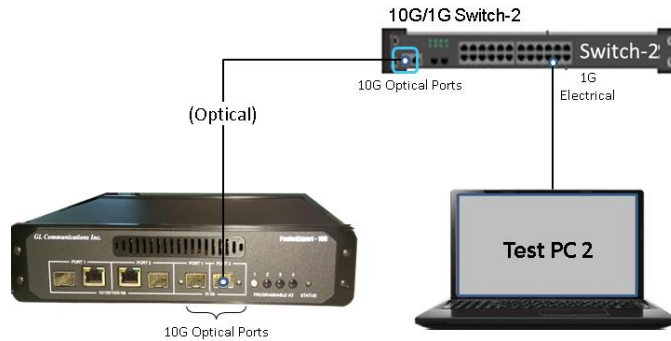
**Step 2: Connect the cables**

**Hardware unit → Switch → PC connection:**


- Connect the PC1 NIC card to the 1G port of Switch1 using Ethernet cable, and connect the USB cable to the hardware unit USB port and the other end of the cable to USB port on PC1, as shown in the figure below:

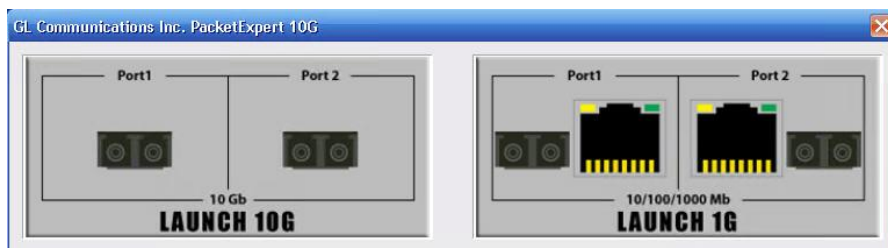


- Similarly, connect PC2 NIC card to the 1G port of Switch2 using Ethernet cable, and Switch2 10G port to PacketExpert™ 10G Port2, using 10G SFP and optical cables, as shown below:



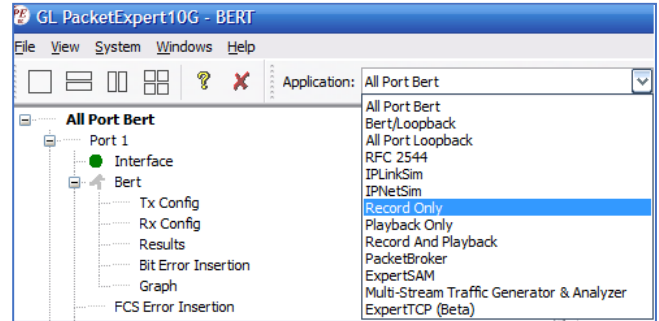
**Step 3: Launch PacketExpert™ 10G Application**

- On PC1, right-click on the PacketExpert™ 10G shortcut icon  on the desktop and select "**Run as Administrator**" to launch PacketExpert™ 10G application.
- The Launcher screen should invoke without any errors and display the screen as shown below. Click on **Launch 10G** option, to invoke the application with 10G ports as shown in the screen below.



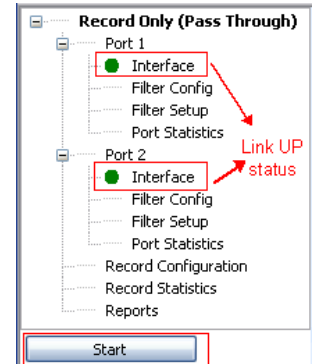
**Note:** The application may take some time to get started due to hardware and software initializations.

- By default, PacketExpert is invoked displaying **All Port Bert** application. Load **Record Only** from the **Applications** drop-down list as shown in the figure.



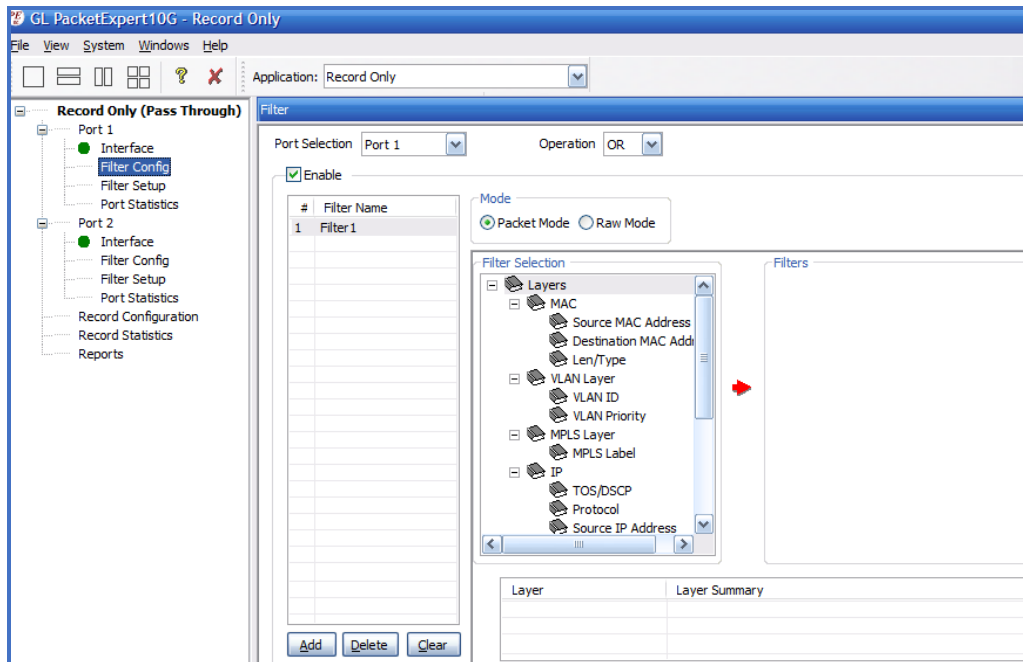
- Verify that the Link Status is **UP** on both ports, that is, the function tree should display Port 1 and Port 2 with green LEDs link status (refer to figure). If not check connections again.

**Note:** If the LED shows red, then link is down. Refer to [PacketExpert-10G-Quick-Install-Guide](#) for **Troubleshooting** steps to get the links **UP**.



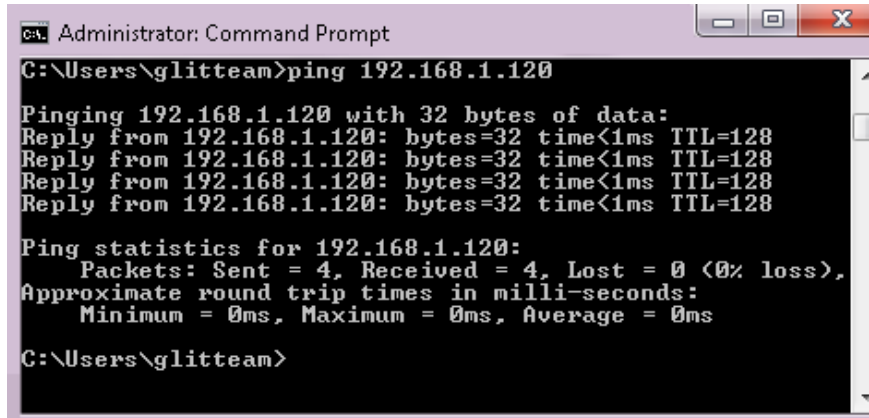
**Step 4: Start 'Record Only' (without Filters)**

- From function tree, double click on **Filter config** under Port 1 to see the filters. Initially Filters are not set, and the screen appears as shown below.
- Similarly check it for Port 2, by selecting Port 2 from the **Port Selection** drop down.
- Click **Start** to start the 'Record Only' application.



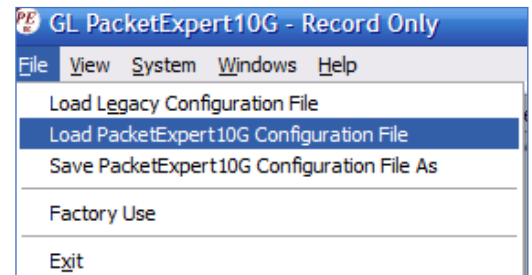
**Step 5: Conduct Ping Test (without Filters)**

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

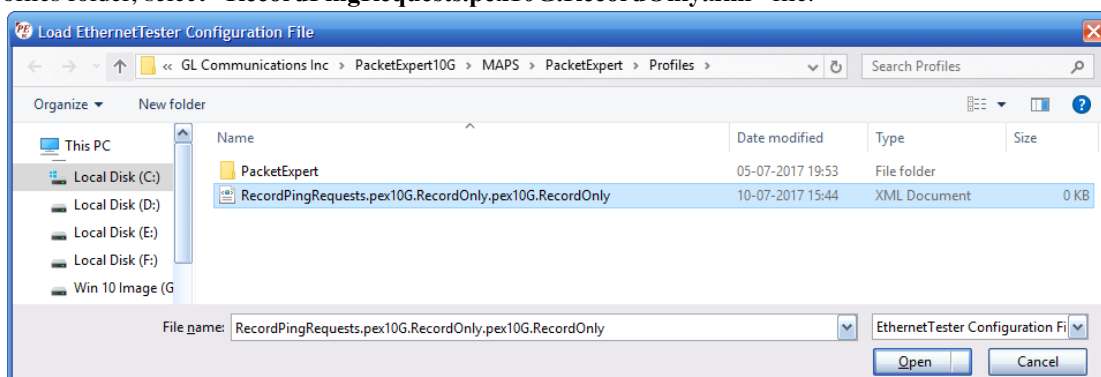


**Step 6: Configure Filters**

- Stop ‘Record Only’ application by clicking on the **Stop** button.
- Record Only Filter and Capture features allow you to conduct the Ping test (both directions) with filtering. Follow the steps below.



- From **File** → select **Load PacketExpert 10GConfiguration File** option.
- Navigate to the PacketExpert 10GInstallation folder, and within that folder go to MAPS\PacketExpert\Profiles folder,  
**Eg:** "C:\Program Files (x86)\GL Communications Inc\PacketExpert10G\MAPS\PacketExpert\Profiles" folder.
- From \Profiles folder, select **“RecordPingRequests.pex10G.RecordOnly.xml”** file.

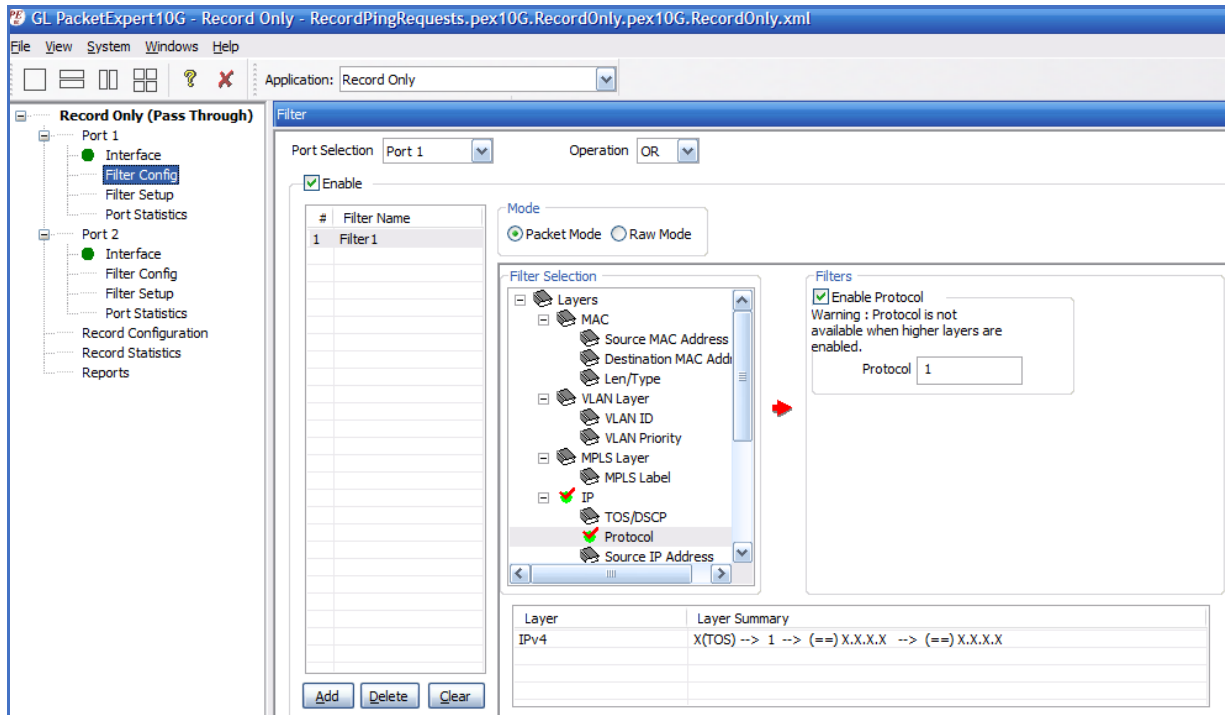


- In the function tree, under Port1, double click on **“Filter Config”** to open in one of the RHS panes. The filters within this file have been setup to filter on **ICMP Request** (Ping Request) packets flowing from PC1 to PC2:

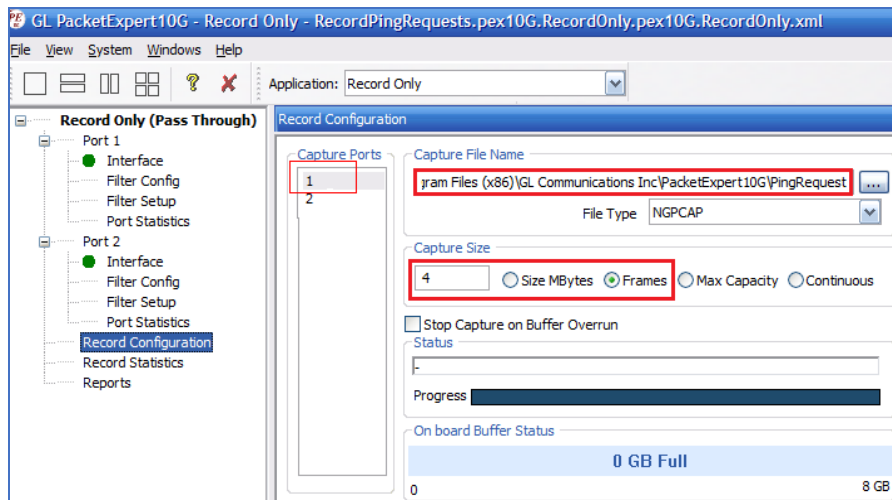
**Filter IP Protocol Type** field=0x01 (ICMP).



- By Default, Protocol 1 is enabled to filter ICMP Packets for Port1 and Port 2



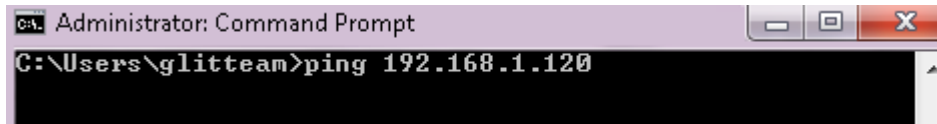
- Similarly, Port2 is also configured to filter ICMP packets. This will capture **ICMP Reply** (Ping Reply) packets flowing from PC2 to PC1. This can be verified by opening the “Filter Config” dialog for Port2.
- In the function tree, double click “**Record Configuration**” to open the dialog in one of the RHS panes:
- Verify that only Port1 is set to capture (we will capture only Ping Requests on Port1 first)
- Verify that the number of frames to be captured is set to 4 → 4 Ping Requests.
- Verify that the file type is set to “**NGPCAP**”, and the capture file name is “**PingRequest.ntar**” in the PacketExpert installation folder path.



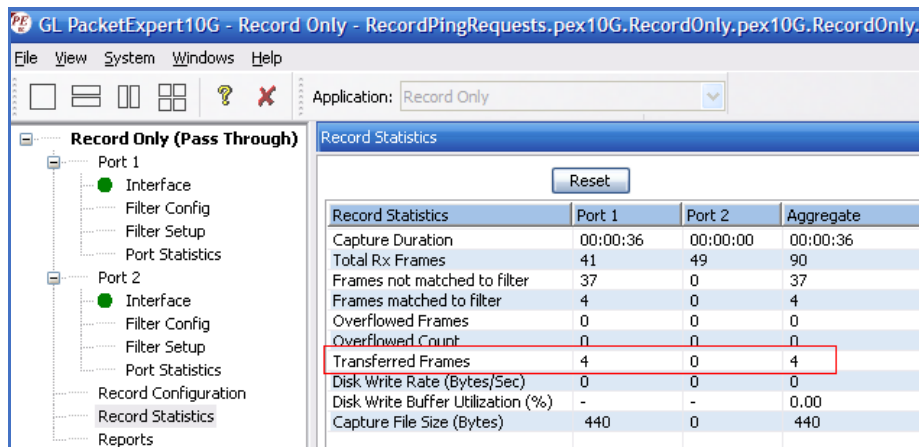
- Start ‘Record Only’ application by clicking on **Start** button.

**Step 7: Conduct Ping Test (with Filters) and capture Ping Requests on Port1**

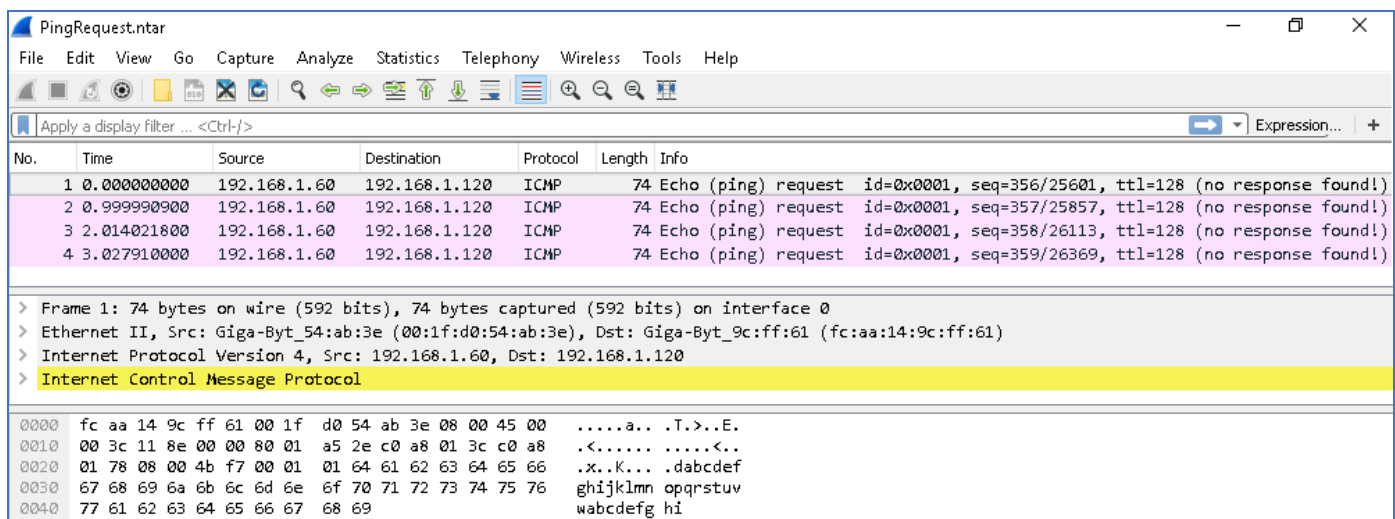
- On PC1, invoke the command prompt, and Ping PC2's IP Address, as shown in the figure below.



- In the 'Record Only' application, from the function tree, click on "Record Statistics" and the Statistics dialog opens in one of the RHS panes as shown in the figure below:
- Verify that the "Transferred Frames" count is 4 for Port1, 0 for Port2 Aggregated to 4

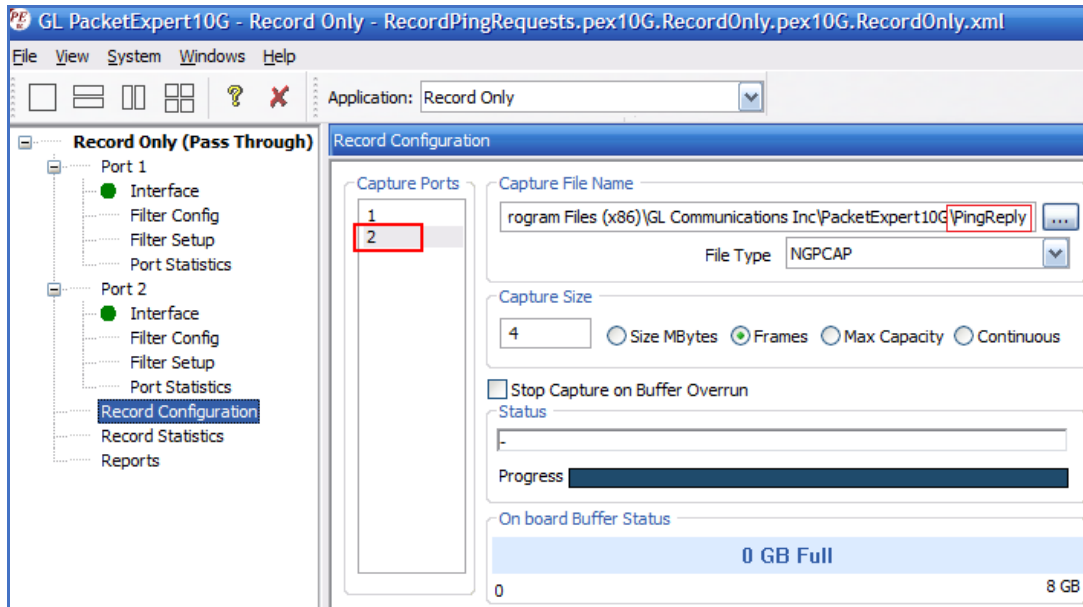


- Stop 'Record Only' application by clicking on Stop button.
- Go to the PacketExpert installation directory, and find the "PingRequest.ntar" captured file created in the folder.
- Open the "PingRequest.ntar" file in Wireshark, which will be displayed as shown in the figure below.
- Verify that the file has 4 frames, all 4 are ICMP Ping Requests.

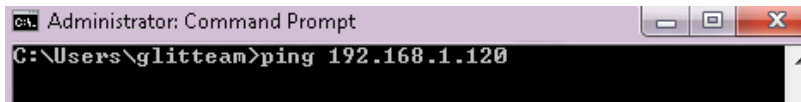


**Step 8: Repeat Ping Test (with Filters) and capture Ping Reply on Port2**

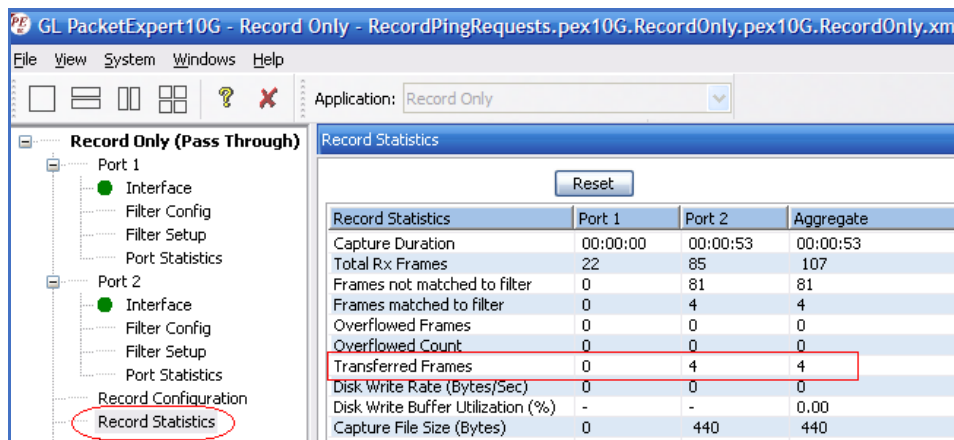
- In the ‘Record Only’ application, from the function tree, click on “**Record Configuration**” and the dialog opens in one of the RHS panes, and change the settings as below:
  - Change the capture filename to “**PingReply**” (retain the path)
  - Change the Capture Ports selection to **Port2** as shown in the figure below



- Start ‘Record Only’ application by clicking on **Start** button.
- On PC1, Ping PC2's IP Address again, as shown in the figure below.

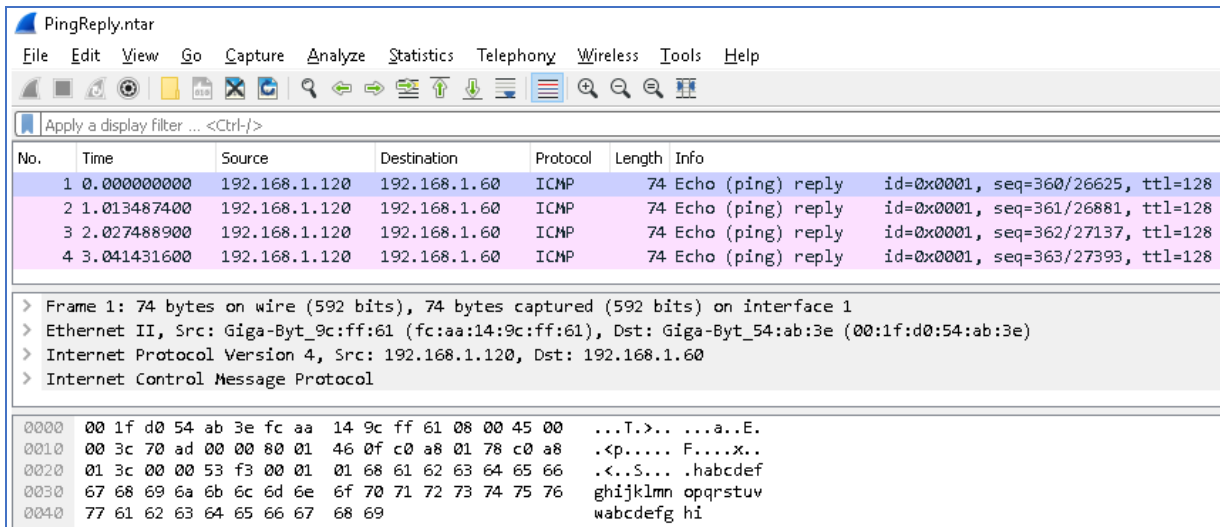


- In the ‘Record Only’ application, from the function tree, click on “**Record Statistics**” and the Statistics dialog opens in one of the RHS panes as shown in the figure below:
- Verify that the “**Transferred Frames**” count is **4** for Port2, **0** for Port1 Aggregated to **4**





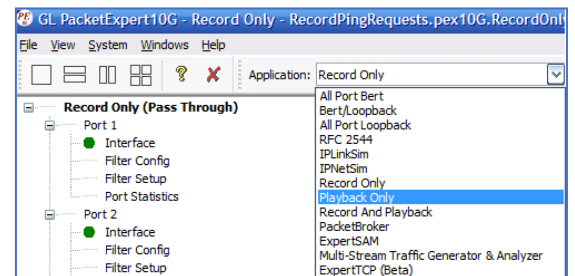
- Go to the PacketExpert installation directory, and find the “PingReply.ntar” captured file created in the folder.
- Open the “PingReply.ntar” file in Wireshark, which will be displayed as shown in the figure below.
- Verify that the file has 4 frames, all 4 are ICMP Reply messages.



- This concludes 'Record Only' verification. Now, we will proceed to 'Playback Only' verification.

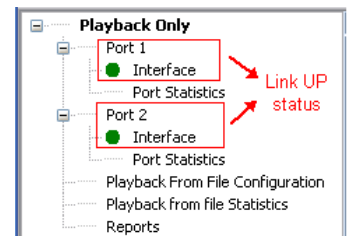
**Step 9: Launch ‘Playback Only’ Application**

- Load **Playback Only** from the **Applications** drop-down list as shown in the figure.



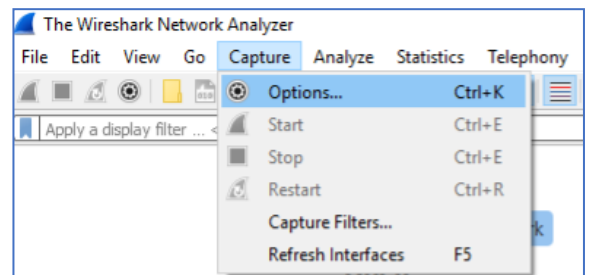
- Verify that the Link Status is **UP** on both ports, that is, the function tree should display Port 1 and Port 2 with green LEDs link status (refer to figure).

**Note:** If the LED shows red, then link is down. Refer to [PacketExpert 10G Quick Install Guide](#) for Troubleshooting steps to get the links UP.

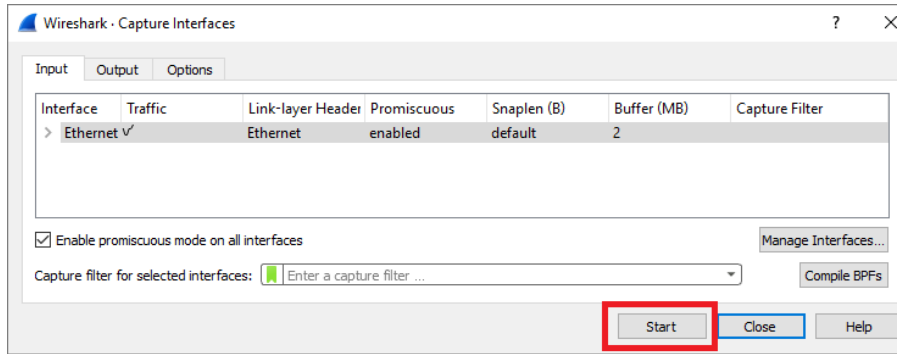


**Step 10: Start Wireshark capture on PC1 and PC2**

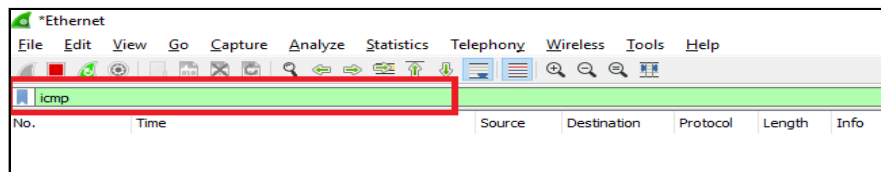
- On PC1, open **Wireshark**, from main menu, select **Capture → Options**



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



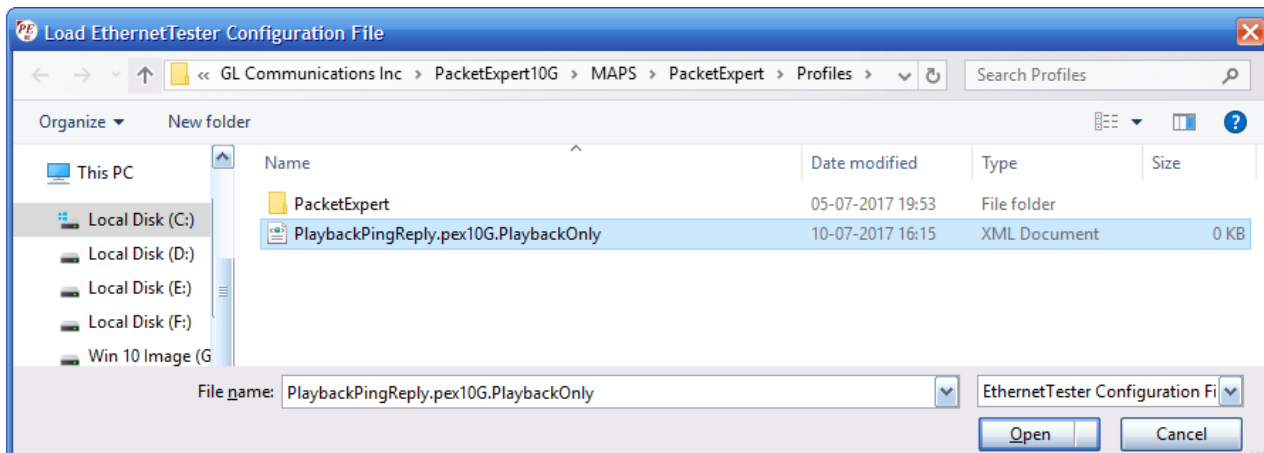
- Enter “**icmp**” in the Filter box and press **Enter** – this will make Wireshark to filter only ICMP (Ping) packets.



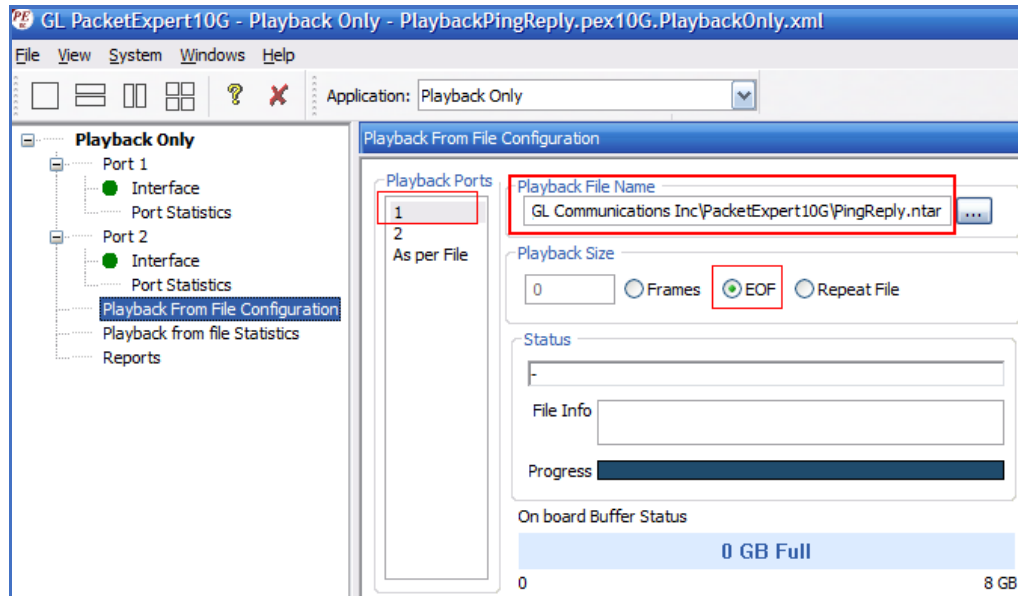
- Repeat the above steps on PC2 also, so that PC2 also captures ICMP packets only.

**Step 11: Start ‘Playback Only’ (with the previously captured file) on Port1**

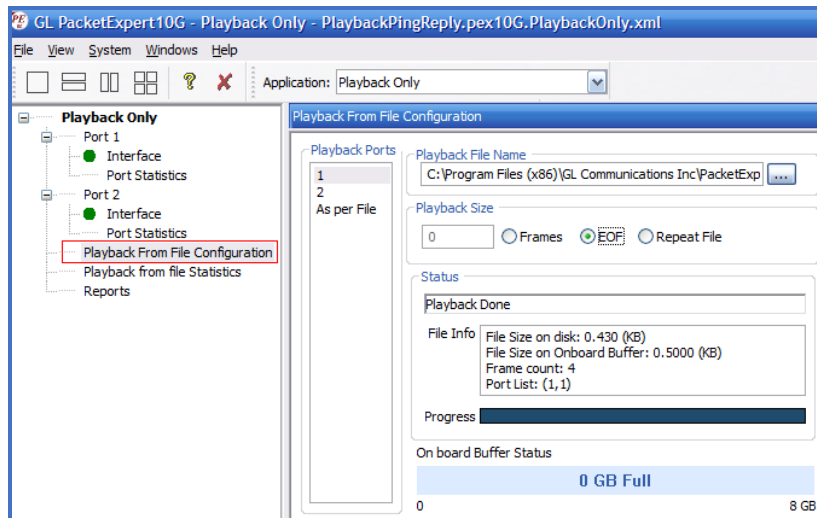
- On PC1, from PacketExpert **File** menu → select **Load PacketExpert 10G Configuration File** option.
- Navigate to the PacketExpert Installation folder, and within that folder go to MAPS\PacketExpert\Profiles folder, **Eg:** "C:\Program Files (x86)\GL Communications Inc\PacketExpert10G\MAPS\PacketExpert\Profiles" folder.
- From \Profiles folder, select “**PlaybackPingReply.pex10G.PlaybackOnly.xml**” file



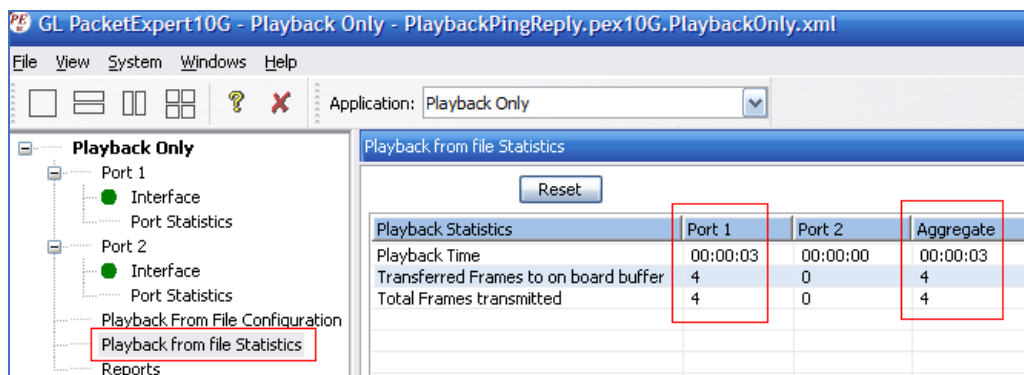
- In the function tree, double click on “**Playback From File Configuration**” to open in one of the RHS panes:
- In the **Playback File Name** path, verify that the filename selected is “**PingReply.ntar**” in the PacketExpert10G installation folder (this file is same as the previously captured file)
- Verify that in Playback Ports, only Port1 is selected so that traffic is sent out on Port1 only.
- Verify that Playback Size is “**EOF**” (or “End of File”) so that all 4 packets (Ping Reply) in the file are transmitted just once.



- Click **Start** to start Playback. Wait till playback is over. After playback is done, verify that the “**Playback from File Configuration**” screen looks as shown in the figure:

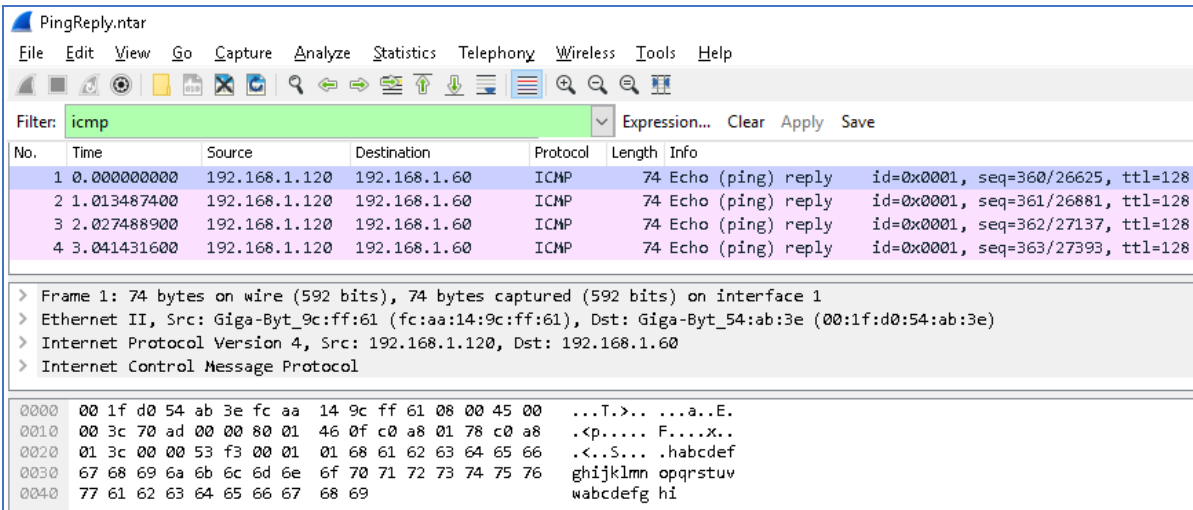


- In the LHS tree, double click “**Playback from File Statistics**” to open the Statistics window in one of the RHS panes.
- Verify that Port1 has transmitted 4 frames, totalling to 4 frames aggregate



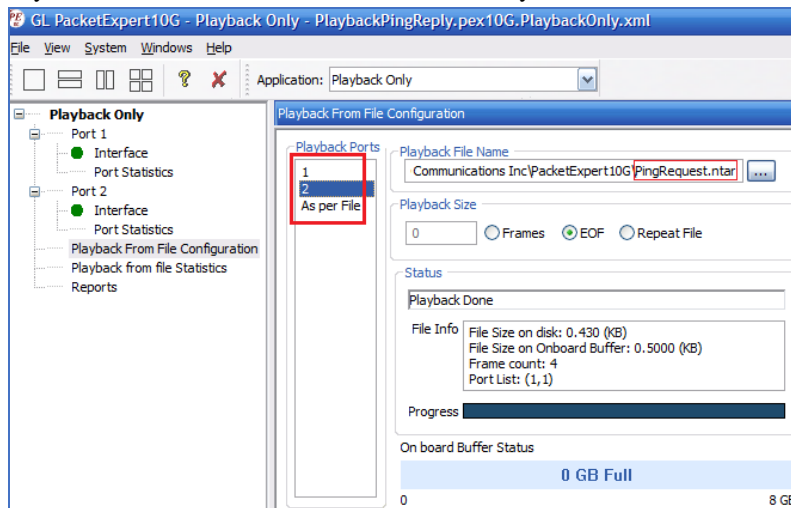
**Step 13: Verify Wireshark capture files**

- On PC1, stop capture, and verify that 4 Ping Reply messages are captured as shown below:

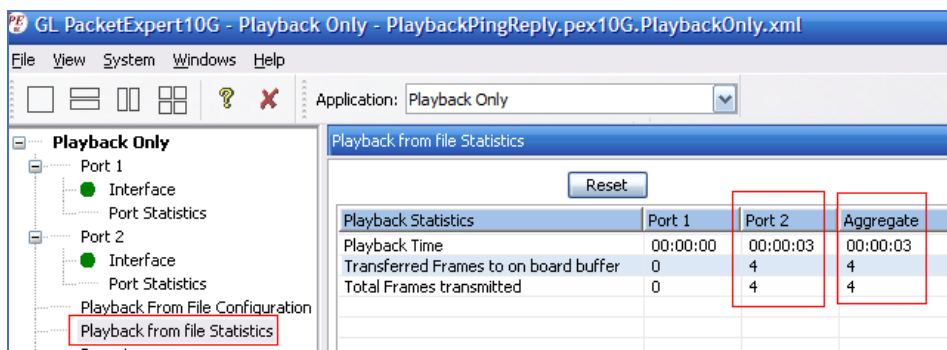


**Step 14: Start 'Playback Only' (with the previously captured file) on Port2**

- In the function tree, double click on “**Playback From File Configuration**” to open in one of the RHS panes:
- In the **Playback File Name** path, change the filename selected to “**PingRequest.ntar**” and retain the filepath as before
- In Playback ports, select only **Port2** so that traffic is sent out on Port2 only.

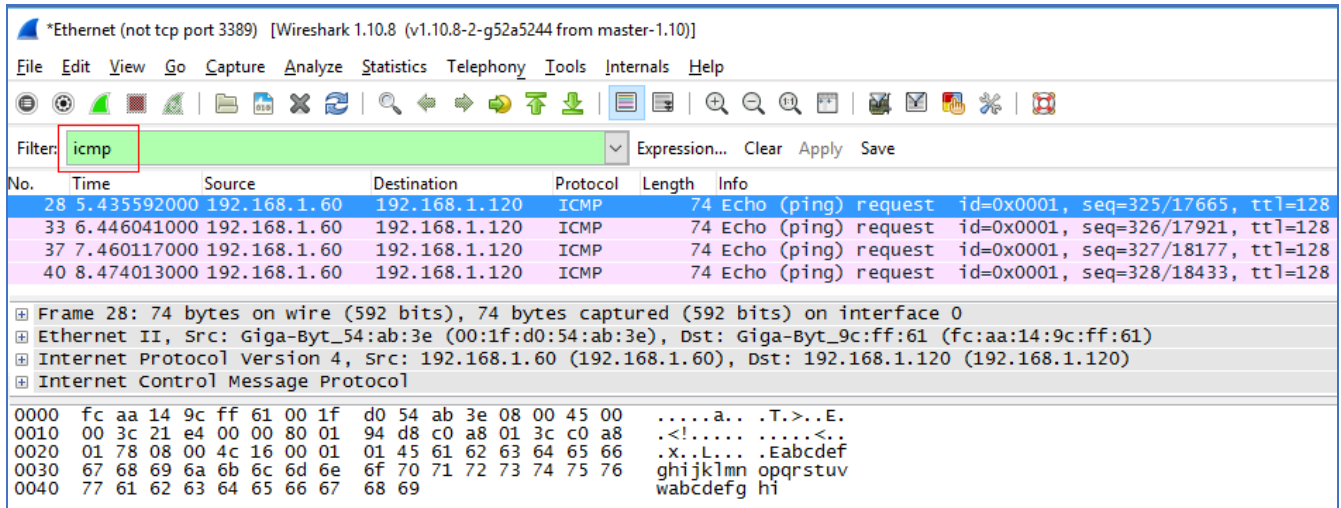


- Click **Start** to start Playback. Wait till playback is done. Verify that Playback from file statistics shows 4 frames being sent out on Port2, aggregated to 4 frames as shown below:



**Step 15: Verify Wireshark capture files**

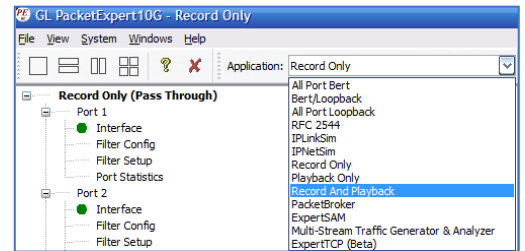
- On PC2, stop capture, and verify that 4 Ping Requests are captured as shown below:



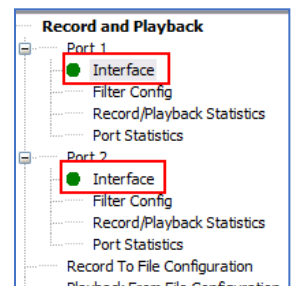
- This concludes 'Playback Only' verification. Now we will proceed to 'Record and Playback' verification.

**Step 16: Launch 'Record and Playback' Application**

- Load 'Record and Playback' from the Applications drop-down list as shown in the figure.

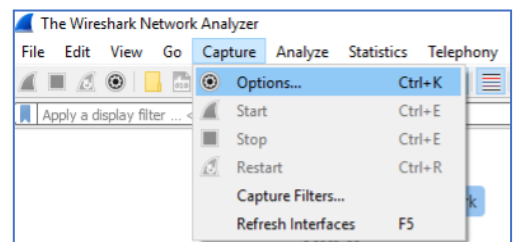


- Verify that the Link Status is UP on both ports, that is, the function tree should display Port 1 and Port 2 with green LEDs link status (refer to figure).



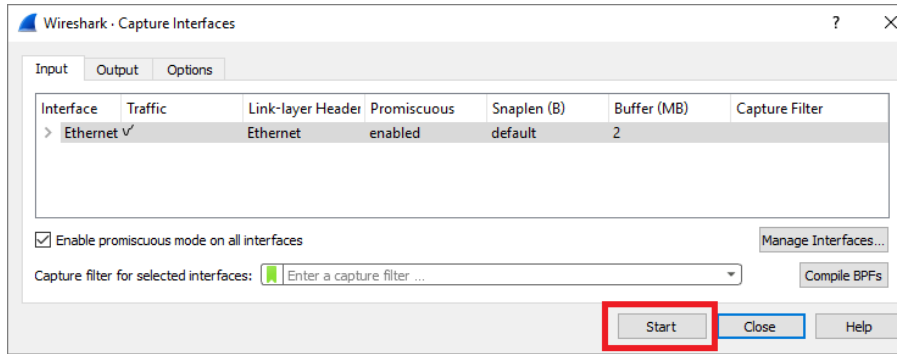
**Step 17: Start Wireshark capture on PC1 and PC2**

- On PC1, open Wireshark, from main menu, select **Capture → Options**

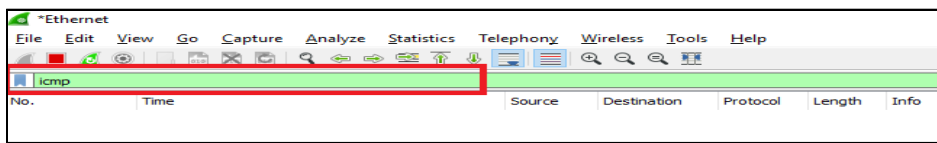




- Select the Interface connected to Port1 and click **Start**



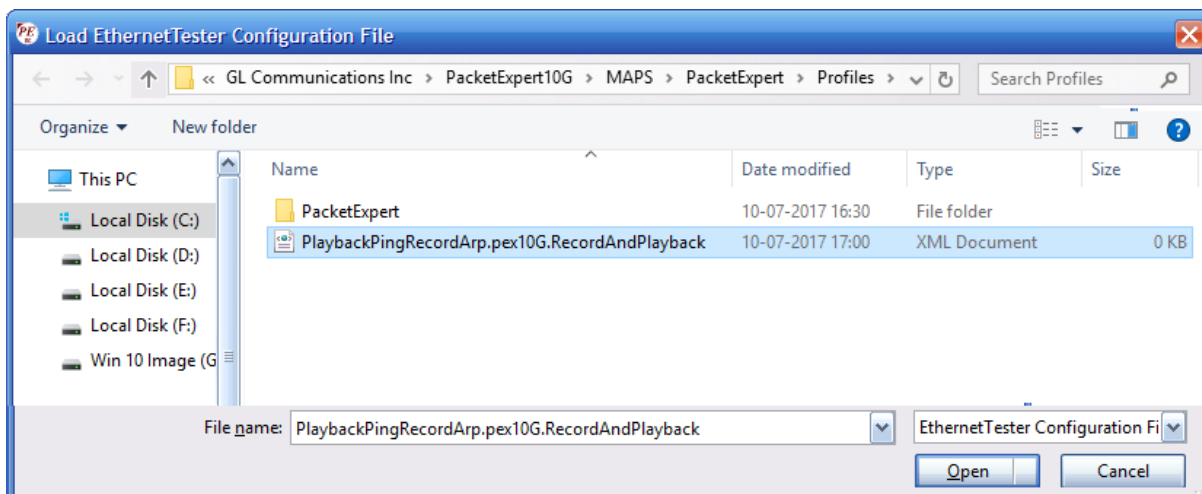
- Enter “**icmp**” in the Filter box and press **Enter** – this will make Wireshark to filter only ICMP (Ping) packets.



- Repeat the above steps on PC2 also, so that PC2 also captures ICMP packets only.

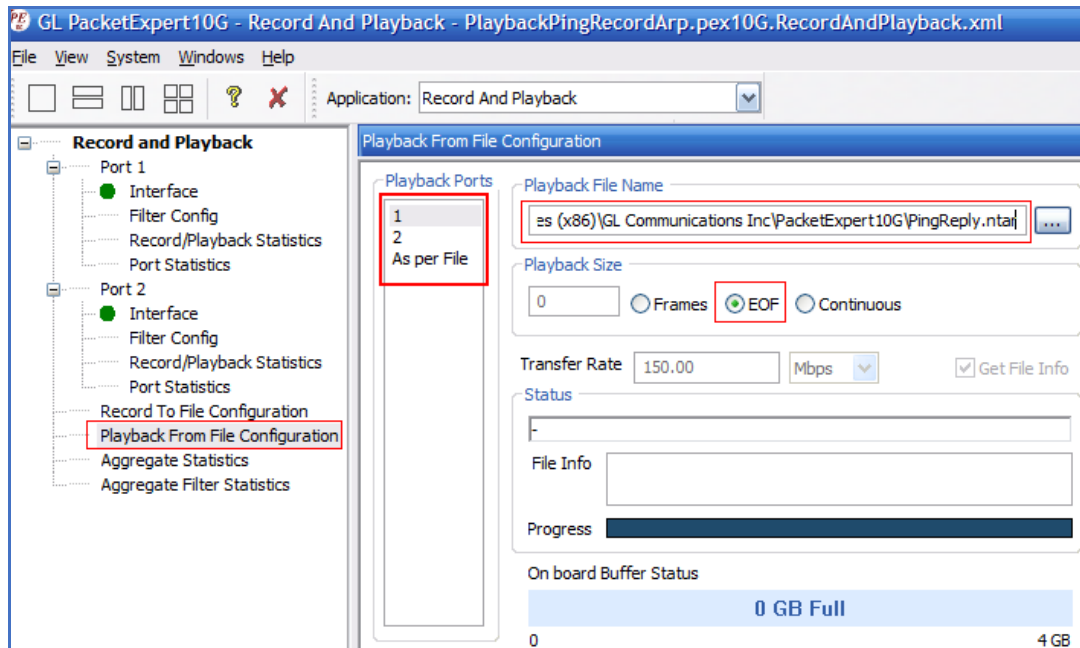
**Step 18: Start Record on both ports and Playback on Port1 (with the previously captured file)**

- On PC1, from PacketExpert **File** menu → select **Load PacketExpert 10G Configuration File** option.
- Navigate to the PacketExpert Installation folder, and within that folder go to MAPS\PacketExpert\Profiles folder, **Eg:** "C:\Program Files (x86)\GL Communications Inc\PacketExpert10G\MAPS\PacketExpert\Profiles" folder.
- From \Profiles folder, select “**PlaybackPingRecordArp.pex10G.RecordAndPlayback.xml**” file

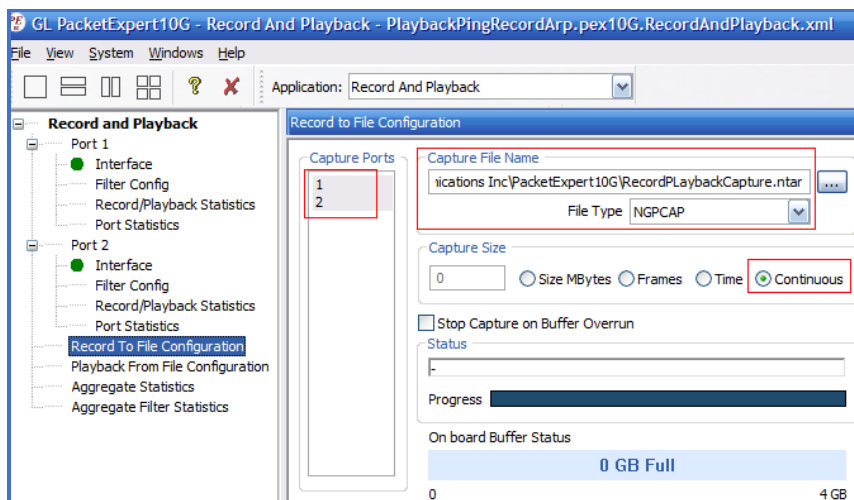


- In the function tree, double click on “**Playback From File Configuration**” to open in one of the RHS panes:
- In the Playback File Name path, verify that the filename selected is “**PingReply.ntar**” in the PacketExpert10G installation folder (this file is same as the previously captured file)
- Verify that Playback port is set to Port1, so that traffic is sent out on only Port1.

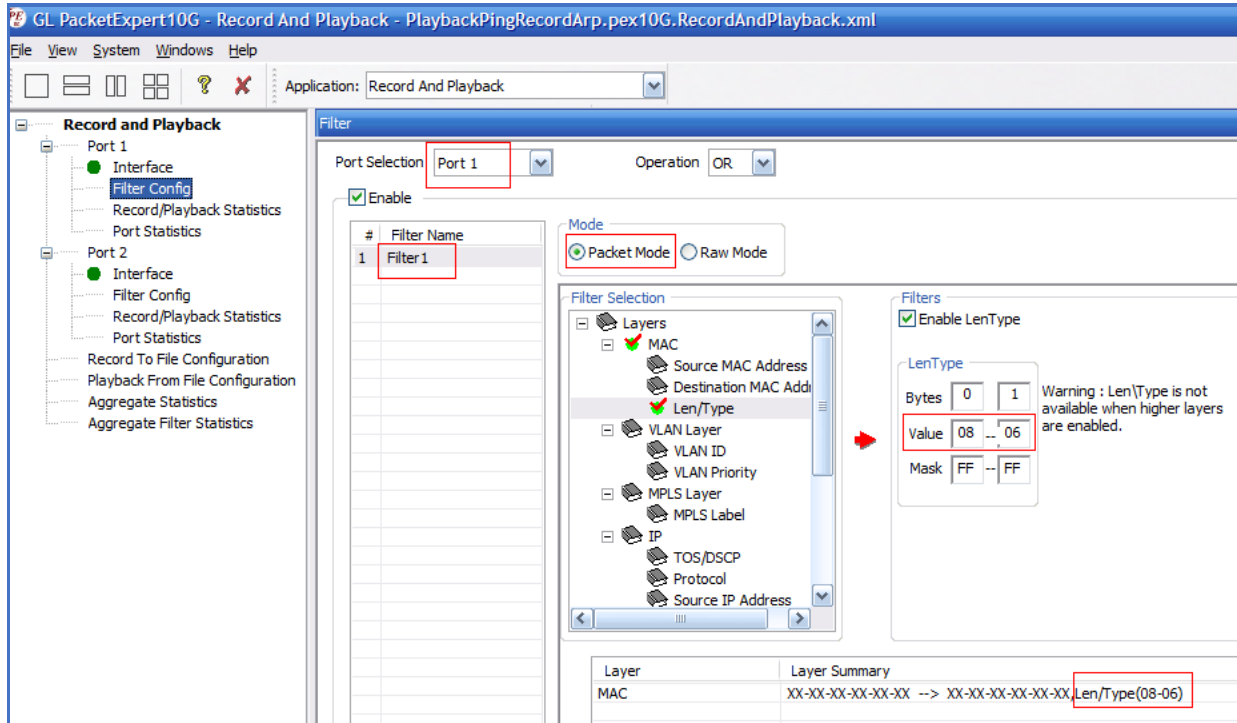
- Verify that Playback Size is “EOF” (or “End of File”) so that all 4 packets (Ping Reply messages) in the file are transmitted just once.



- In the function tree, double click on “Record to File Configuration” to open in one of the RHS panes:
- In the **Capture File Name** path, verify that the filename is “RecordPlaybackCapture.ntar” in the PacketExpert10G installation folder
- Verify that the **Capture Size** is set to **Continuous**, as we do not know the exact number of ARP frames we will be receiving



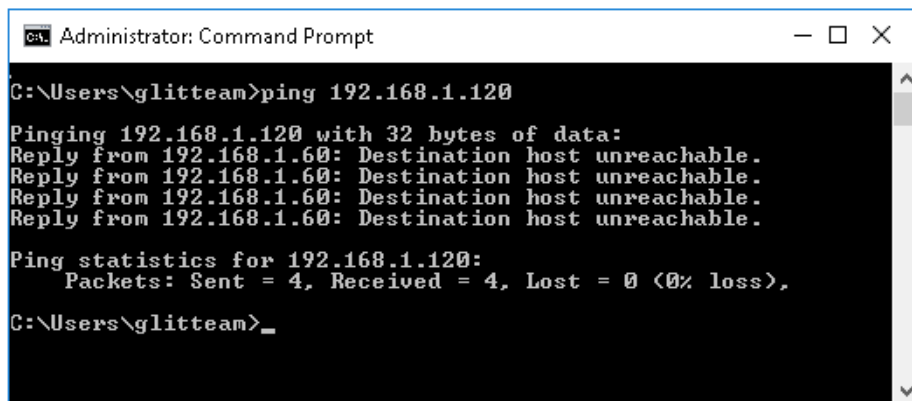
- In the function tree, double click on “Filter Config” under Port1 to open in one of the RHS panes:
- Verify that the filter is set to MAC Layer, Len/Type field and it is set to capture ARP packets (Len/Type field = 08-06) as shown in the figure.



- Similarly, verify the same filter is set on Port2 also
- Click **Start** to start Record and Playback

### Step 19: Try to Ping from PC1 to PC2

- On PC1, open command prompt and try to ping PC2 as shown below:

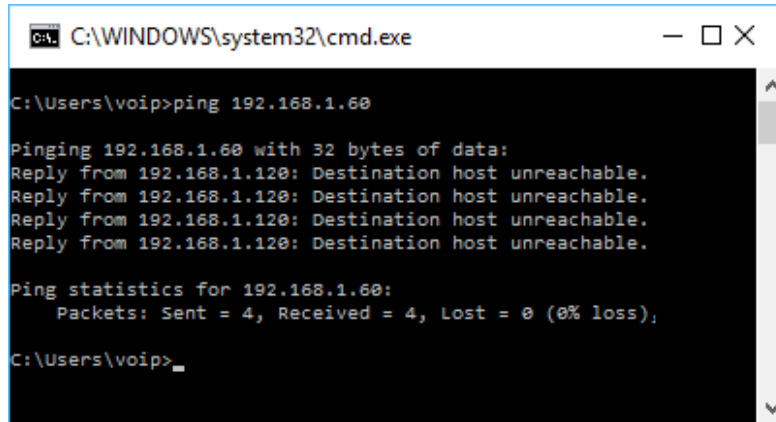


- Verify that all 4 pings fail. This is because Record and Playback application does not work in Passthrough mode, so packets are not forwarded between Port1 and Port2.

**Note:** Before sending out a Ping packet (ICMP Request packet), PC1 tries to resolve the IP address of PC2, using the ARP protocol. So, Port1 will receive ARP Request frames trying to resolve PC2's IP Address to its MAC address. Since these ARP frames are also blocked by Port1, it will never reach PC2. So, PC1 will repeatedly try to send ARP packets trying to resolve PC2 IP address. So, in this test, instead of capturing ICMP packets, we will try to capture these ARP packets and verify if capture works fine.

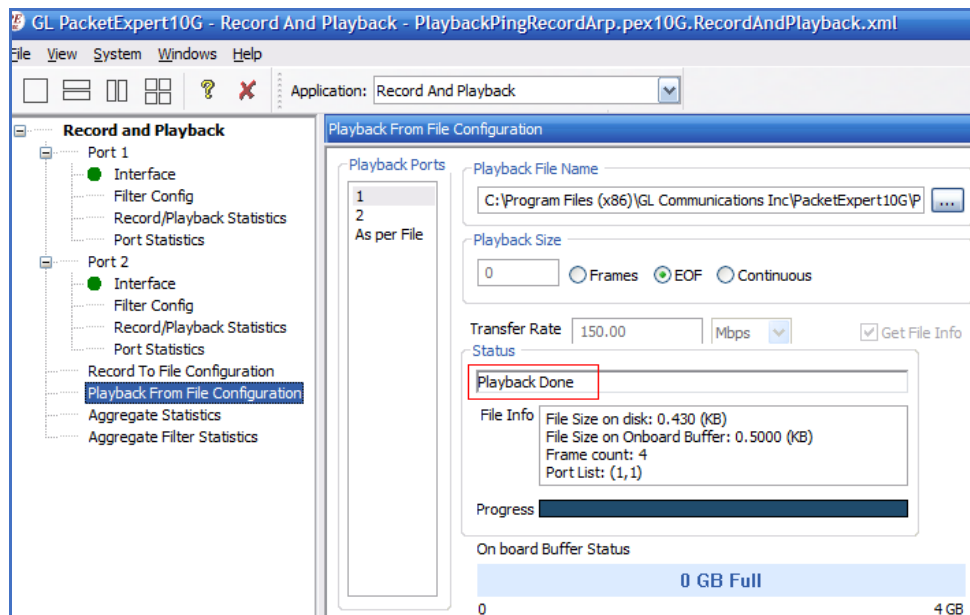
**Step 20: Try to Ping from PC2 to PC1**

- Similar to the previous step, on PC2, try to ping PC1 so that we can capture some ARP packets on Port2 also. Verify that all 4 Ping attempts fail.



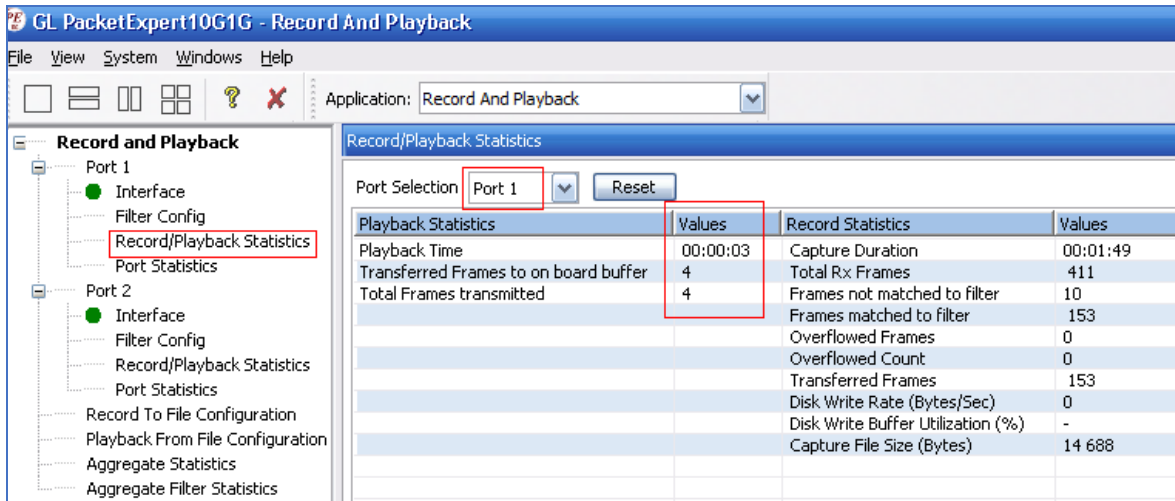
**Step 21: Verify Results**

- Wait till playback is over. After playback is done, verify that the “Playback from File Configuration” screen looks as shown in the figure:



- In the LHS tree, double click “Record/Playback Statistics” under each port (Port1 and Port2) to open the Statistics window in two of the RHS panes.
- Verify that Port1 has transmitted 4 frames.
- Verify that each Port – Port1 and Port2 have captured and transferred some frames.

**Note:** There can be variable number of ARP frames captured, because PC1 and PC2 may keep sending other ARP frames (i.e. ARP frames for other IP addresses other than PC1 and PC2, Ex: for Default Gateway). So, it's not guaranteed that specific number of ARP frames are captured.



GL PacketExpert10G1G - Record And Playback

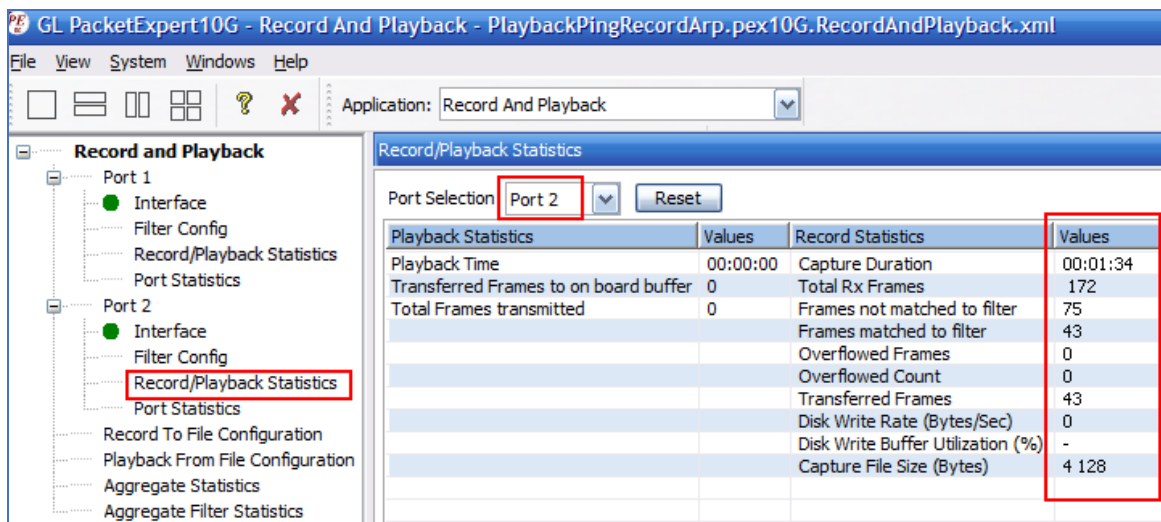
Application: Record And Playback

Record and Playback

Record/Playback Statistics

Port Selection: Port 1

Playback Statistics	Values	Record Statistics	Values
Playback Time	00:00:03	Capture Duration	00:01:49
Transferred Frames to on board buffer	4	Total Rx Frames	411
Total Frames transmitted	4	Frames not matched to filter	10
		Frames matched to filter	153
		Overflowed Frames	0
		Overflowed Count	0
		Transferred Frames	153
		Disk Write Rate (Bytes/Sec)	0
		Disk Write Buffer Utilization (%)	-
		Capture File Size (Bytes)	14 688



GL PacketExpert10G - Record And Playback - PlaybackPingRecordArp.pex10G.RecordAndPlayback.xml

Application: Record And Playback

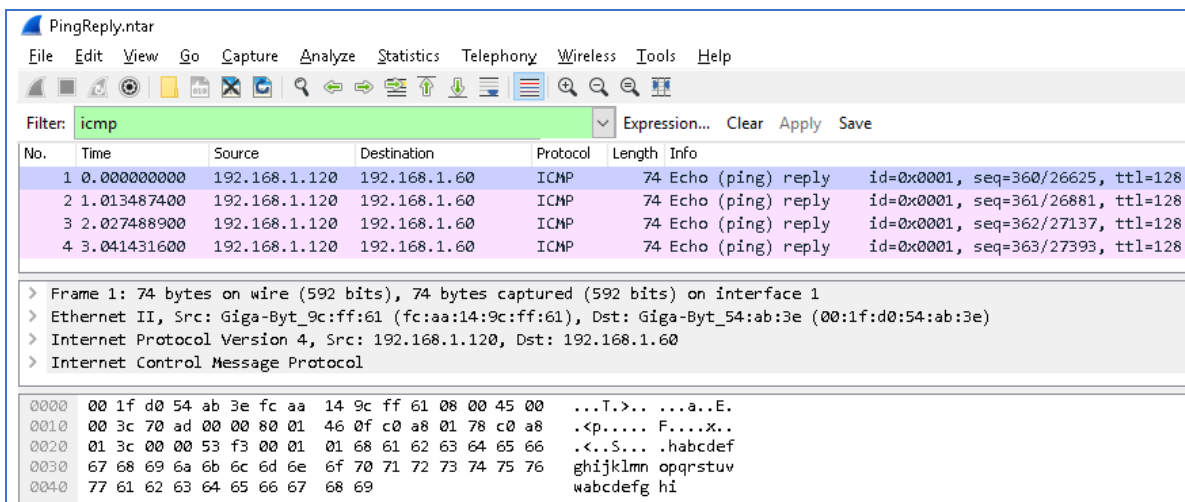
Record and Playback

Record/Playback Statistics

Port Selection: Port 2

Playback Statistics	Values	Record Statistics	Values
Playback Time	00:00:00	Capture Duration	00:01:34
Transferred Frames to on board buffer	0	Total Rx Frames	172
Total Frames transmitted	0	Frames not matched to filter	75
		Frames matched to filter	43
		Overflowed Frames	0
		Overflowed Count	0
		Transferred Frames	43
		Disk Write Rate (Bytes/Sec)	0
		Disk Write Buffer Utilization (%)	-
		Capture File Size (Bytes)	4 128

- Click **Stop** button to stop Record and Playback.
- On PC1, stop capture, and verify that 4 Ping Reply messages are captured as shown below:



PingReply.ntar

Filter: icmp

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	192.168.1.120	192.168.1.60	ICMP	74	Echo (ping) reply id=0x0001, seq=360/26625, ttl=128
2	1.013487400	192.168.1.120	192.168.1.60	ICMP	74	Echo (ping) reply id=0x0001, seq=361/26881, ttl=128
3	2.027488900	192.168.1.120	192.168.1.60	ICMP	74	Echo (ping) reply id=0x0001, seq=362/27137, ttl=128
4	3.041431600	192.168.1.120	192.168.1.60	ICMP	74	Echo (ping) reply id=0x0001, seq=363/27393, ttl=128

> Frame 1: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface 1  
 > Ethernet II, Src: Giga-Byt\_9c:ff:61 (fc:aa:14:9c:ff:61), Dst: Giga-Byt\_54:ab:3e (00:1f:d0:54:ab:3e)  
 > Internet Protocol Version 4, Src: 192.168.1.120, Dst: 192.168.1.60  
 > Internet Control Message Protocol

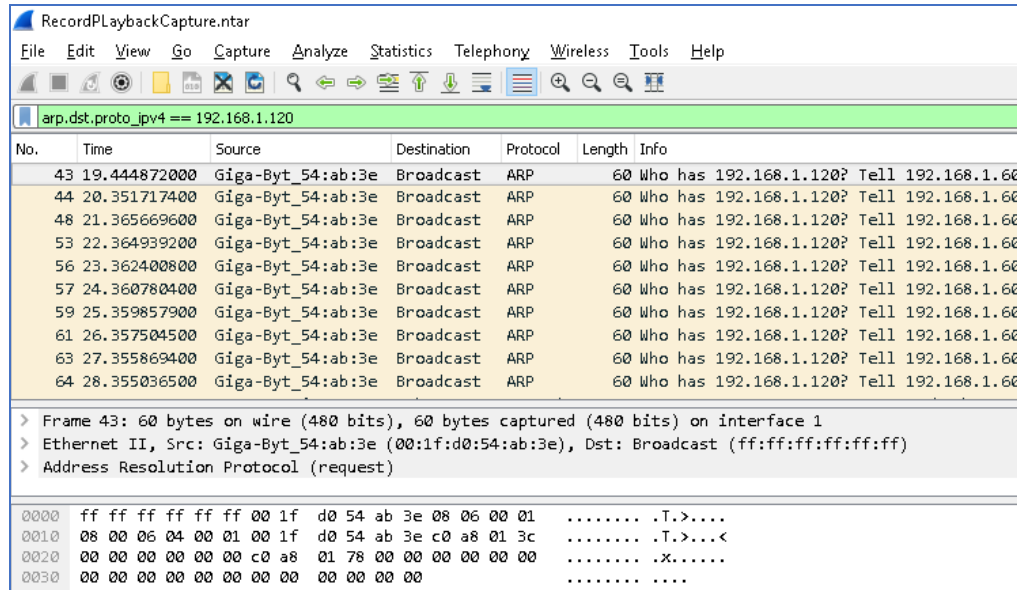
```

0000  00 1f d0 54 ab 3e fc aa 14 9c ff 61 08 00 45 00  ...T.>.. ...a.E.
0010  00 3c 70 ad 00 00 80 01 46 0f c0 a8 01 78 c0 a8  .<p..... F....x..
0020  01 3c 00 00 53 f3 00 01 01 68 61 62 63 64 65 66  .<..S... .habcdef
0030  67 68 69 6a 6b 6c 6d 6e 6f 70 71 72 73 74 75 76  ghijklmnoqrstuv
0040  77 61 62 63 64 65 66 67 68 69                    wabcdefg hi
  
```

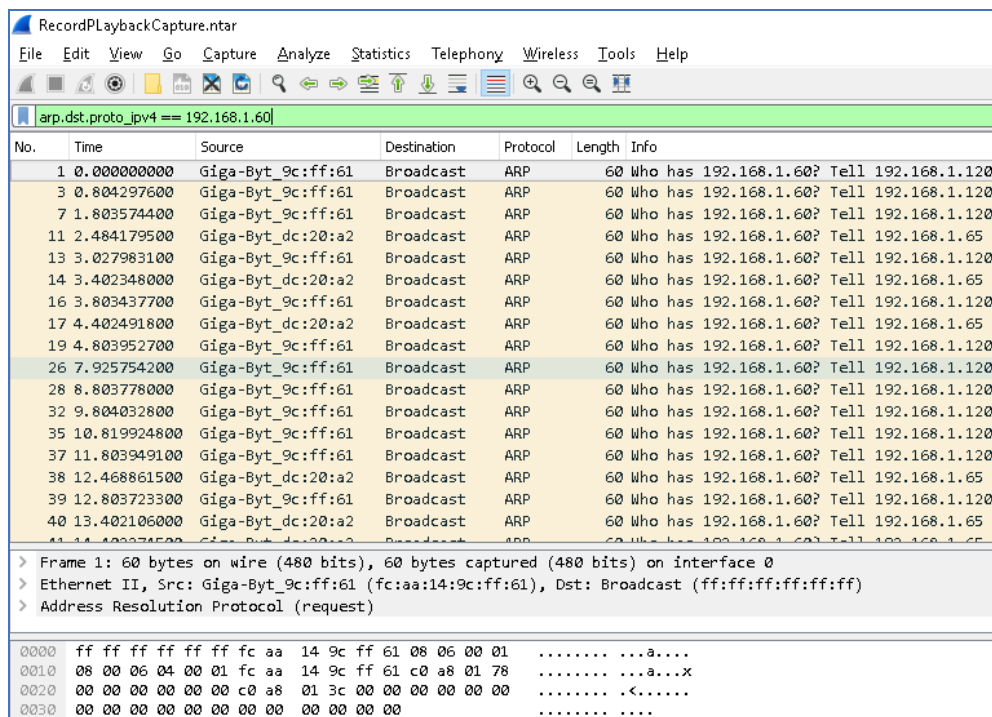


- On PC1, go to the PacketExpert10G installation folder, and open 'RecordPlaybackCapture.ntar' file with Wireshark. In the filter window, apply filter to check **ARP packets** meant for PC2's IP address, in this case **192.168.1.120**, as shown in the figure below:

Enter filter text like this: **“arp.dst.proto\_ipv4 == 192.168.1.120”** to check ARP frames meant for PC2. Verify that some ARP frames are displayed.

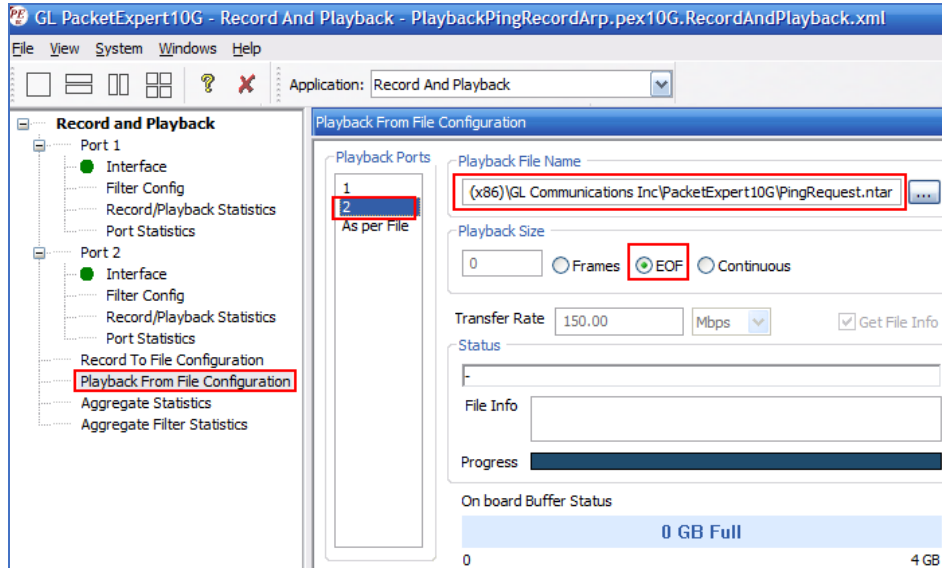


- Verify that some ARP frames are captured as shown in the figure.
- Clear the filter, and enter filter text to filter ARP frames meant for PC1 (from PC2), in this case 192.168.1.60. Enter filter text like this: **“arp.dst.proto\_ipv4 == 192.168.1.60”**, to verify that some ARP frames are displayed, as shown in figure below:

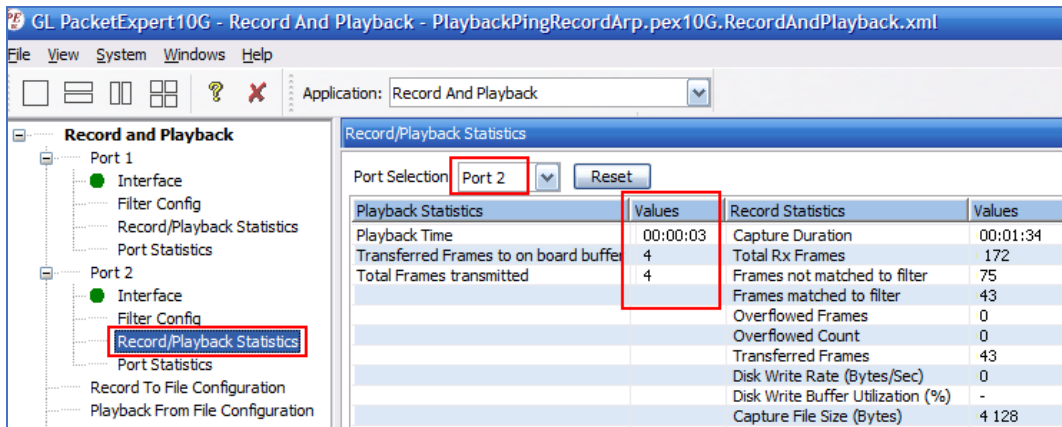


**Step 22: Start Playback on Port2 (with the previously captured file) and verify results**

- In the function tree, double click on **“Playback from File Configuration”** to open in one of the RHS panes:
- In the Playback File Name path, change the filename to **“PingRequest.ntar”**, while retaining the path
- Change the **Playback Ports** to **Port2** so that traffic is sent out on only Port2.



- Click **Start** to start Record and Playback
- Wait till Playback is done. Verify that **Port2** has sent out **4 frames**



- On PC2, in Wireshark, stop capture and verify that 4 Ping Requests are captured in Wireshark as shown below:

