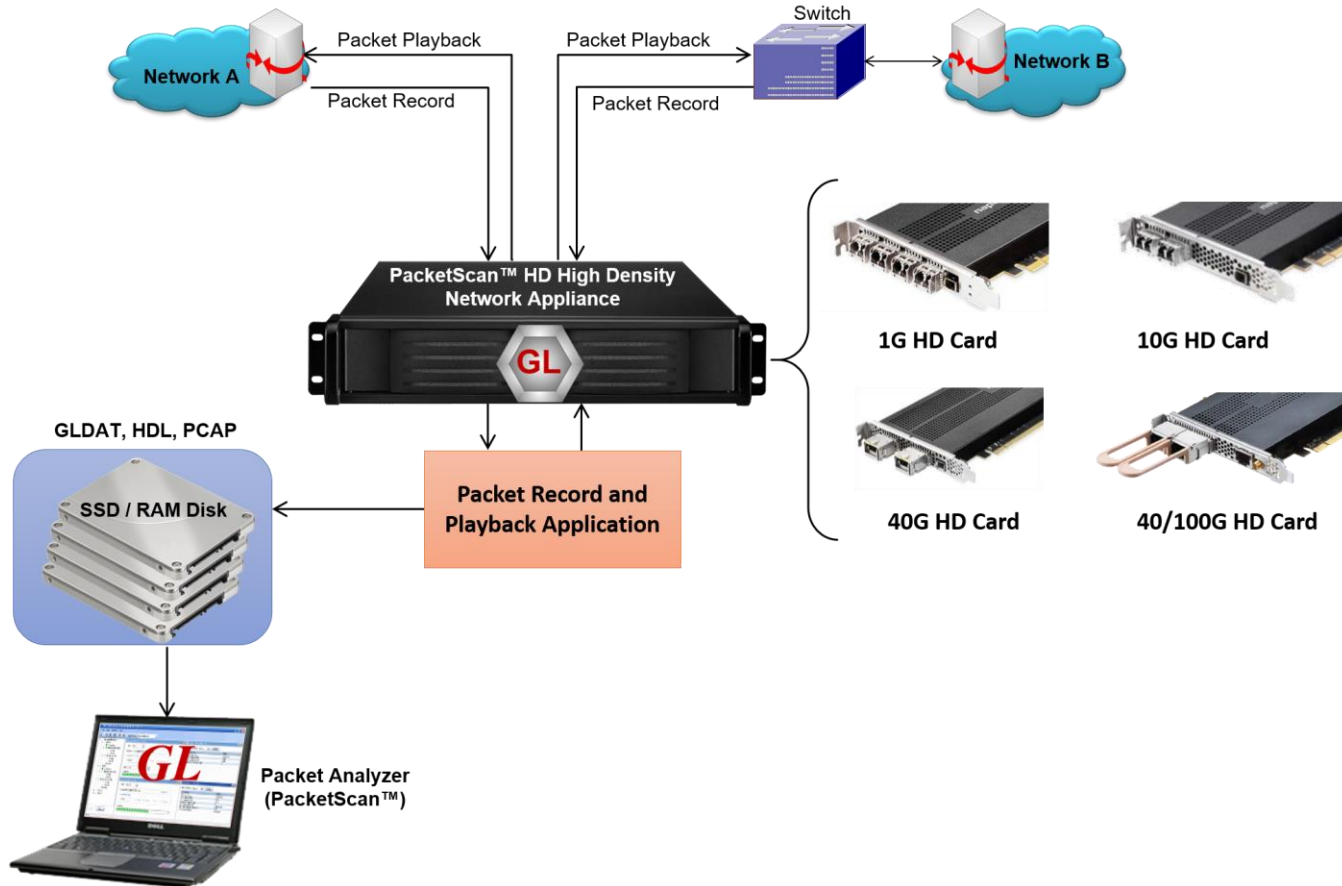

PacketRecorder™ and PlayBack™ for Capture and Replay of Network Traffic



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Overview



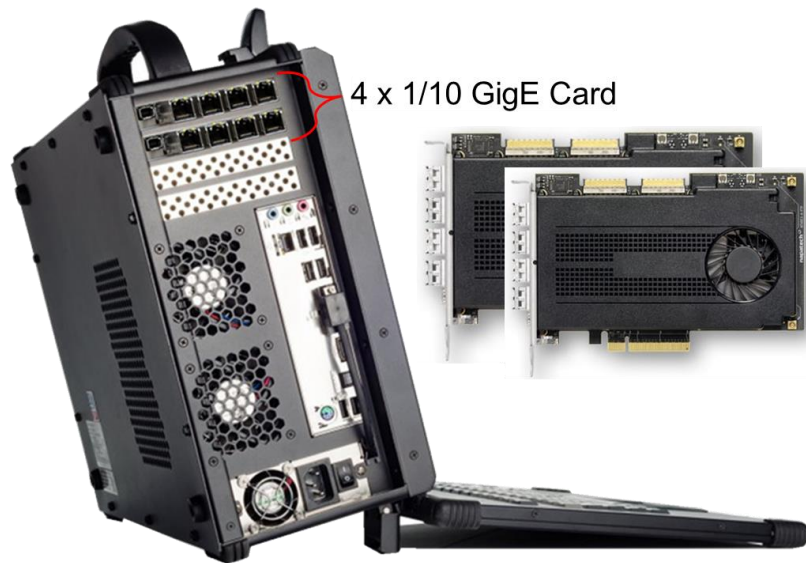
Introducing PacketScan™ HD

(4x1 GigE, 2x1/10 GigE, 2x25 GigE, 8x10 GigE, and 2x40/100 GigE)



** Also available as a rack mounted unit

PacketScan™ HD, PacketRecorder™ & PlayBack™ 2 (4 x 1/10 GigE)



PacketScan™ HD - Lunch Box



Lunchbox specs are:

- Intel Xeon Silver 4210
- 64GB RAM
- 500GB SSD for OS
- 4x 3.84TB NVME SSD



What the software does?

- Record feature includes a powerful Hardware Filter that allows user to filter out unwanted traffic, and continuously capture the traffic of interest up to the limits of the hard disk size and the disk write speed
- The previously recorded traffic is replayed on selected network interface cards and can be analyzed using GL's PacketScan™ and Wireshark® application

Main Features

PacketRecorder™

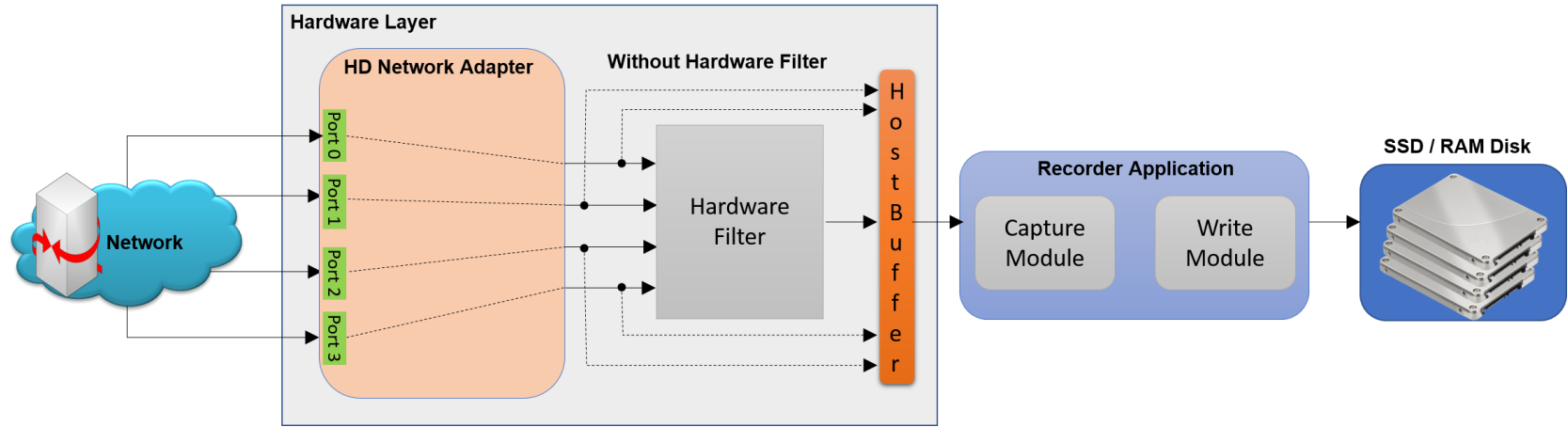
- Captures 100% packet data on high-speed lines (maximum of 5 Gbps data rate)
- Capture packets non-intrusively over Ethernet (Electrical) and Optical ports at Nano-second precision
- Recording can be done on single port or combination of one or more ports. Multiple instances of recorder can run simultaneously
- Flexible options to record traffic continuously based on File size, File count, Frame count and Duration
- Record only traffic-of-interest by applying efficient hardware filters based on MAC, 802.1Q (VLANs), IPv4/IPv6, Tunnel Traffic (Tunnel 1 and Tunnel 2), TCP, UDP, SCTP, SIP, and RTP parameters
- Filtering of inner layer of GTP, GRE, and VXLAN tunnel traffic such as inner IPv4/IPv6 addresses and Transport Protocols (UDP, TCP and SCTP) port numbers
- User can create their own filters using custom filter option which provides flexibility to check the fields and use the logical AND, OR conditions more efficiently
- Option to view the historical graph of overall rate, frames/sec, per-port rate, per-port frames/sec, and Port Down status from the record start time to end time
- Supports both IPv4 and IPv6
- Provides statistics of captured frame count, dropped frame count, recorded frame count capture rate, frame rate, recorded files count, and more

Main Features (Contd.)

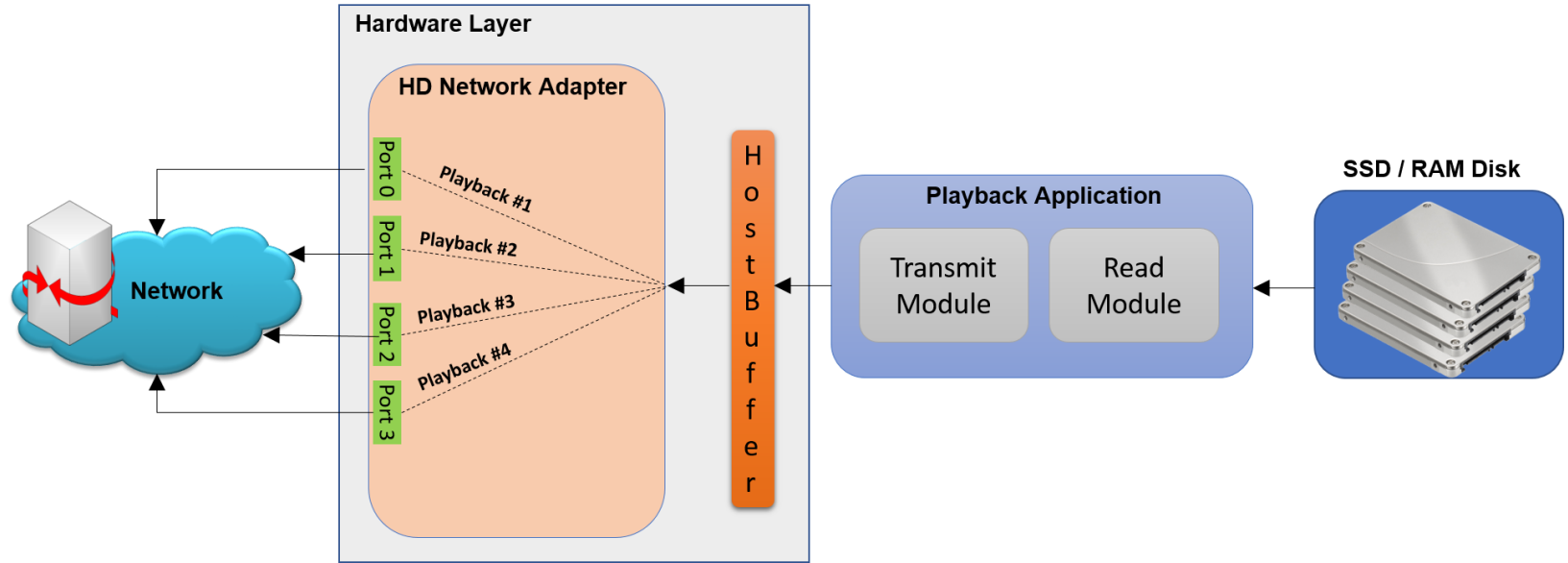
PlayBack™:

- Replay the pre-recorded traffic files at the same rate at which it is captured (maximum of 5 Gbps data rate)
- Provides options to playback single file or multiple sequential files
- Provides statistics of total frames transmitted, under sized frames count, oversized frames count, and different sized frame count etc.

PacketRecorder™ Architecture

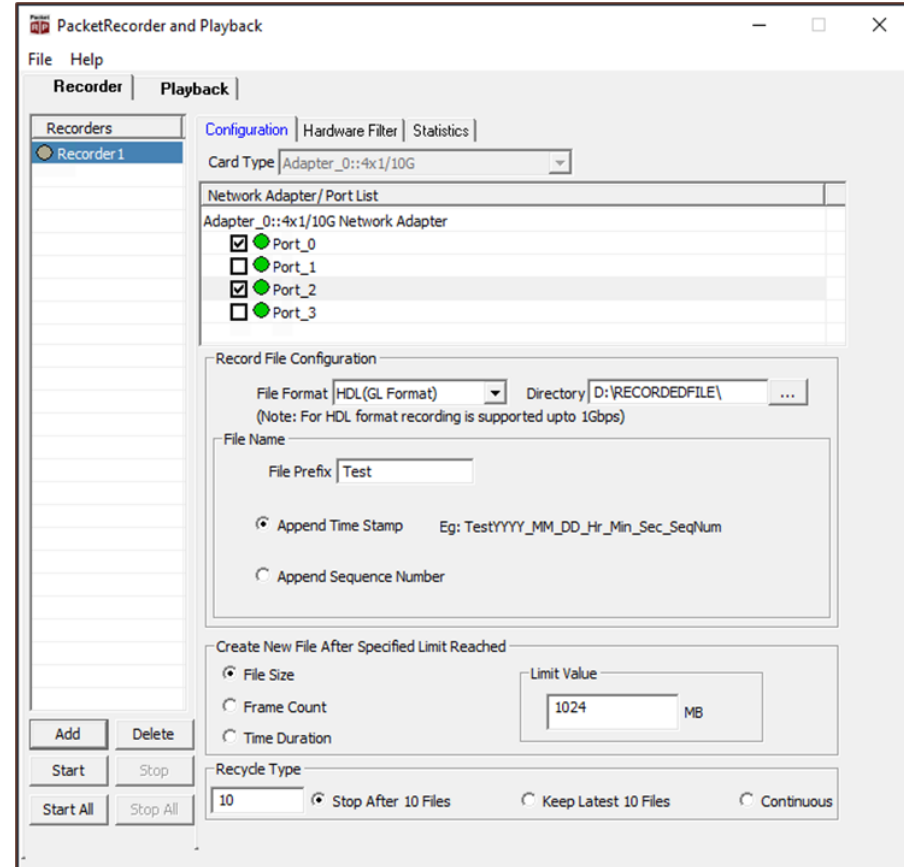


PlayBack™ Architecture



PacketRecorder™ Operations

- In Record mode, high speed real-time traffic can be recorded with precise hardware time stamping
- The Record feature includes a powerful Hardware Filter that allows user to filter out unwanted traffic, and continuously capture the traffic of interest



Hardware Filters

- Hardware filters options are useful to capture traffic based on user interest

The screenshot displays the 'PacketRecorder and Playback' application interface. The 'Hardware Filter' tab is active, showing a list of filters on the left and a configuration table in the center. The table has columns for Field ID, Protocol, Field Name, Operator, Value, and Condition. Two filters are defined: F1 (SIP, SIP Port, ==, 5060) and F2 (RTP, RTP Packets, ==, TRUE). Below the table are buttons for 'Add', 'Insert', 'Delete', and 'Clear All'. A 'Custom Expression' section is checked, showing a complex logical expression for F1|F2. The 'Selected Filter Expression' and 'Final Applied Expressions' sections show the resulting expressions for the selected and final filters, respectively. The 'Value (Boolean)' section shows a dropdown set to 'TRUE' with examples: 'TRUE: Capture RTP Packets' and 'FALSE: Discard RTP Packets'. At the bottom left, there are buttons for 'Add', 'Delete', 'Start', 'Stop', 'Start All', and 'Stop All'.

Field ID	Protocol	Field Name	Operator	Value	Condition
F1	SIP	SIP Port	==	5060	
F2	RTP	RTP Packets	==	TRUE	

```
HashMask[mHashMaskSrcPort = 0xFFFF; mHashMaskDstPort = 0xFFFF] = HashSTuple
Assign[StreamId = 10] = (((Layer4Protocol == UDP) AND (mSrcPort == 5060 OR mDestPort == 5060)) OR ((mUdpSrcPort != (0..1023)) AND (mRtpVersion == 2)))
```

```
HashMask[mHashMaskSrcPort = 0xFFFF; mHashMaskDstPort = 0xFFFF] = HashSTuple
Assign[StreamId = 10] = (((Layer4Protocol == UDP) AND (mSrcPort == 5060 OR mDestPort == 5060)) OR ((mUdpSrcPort != (0..1023)) AND (mRtpVersion == 2)))
```

Recorder Statistics

PacketRecorder and Playback

File Help

Recorder Playback

Recorders Recorder 1

Configuration Hardware Filter Statistics

View List View Reset

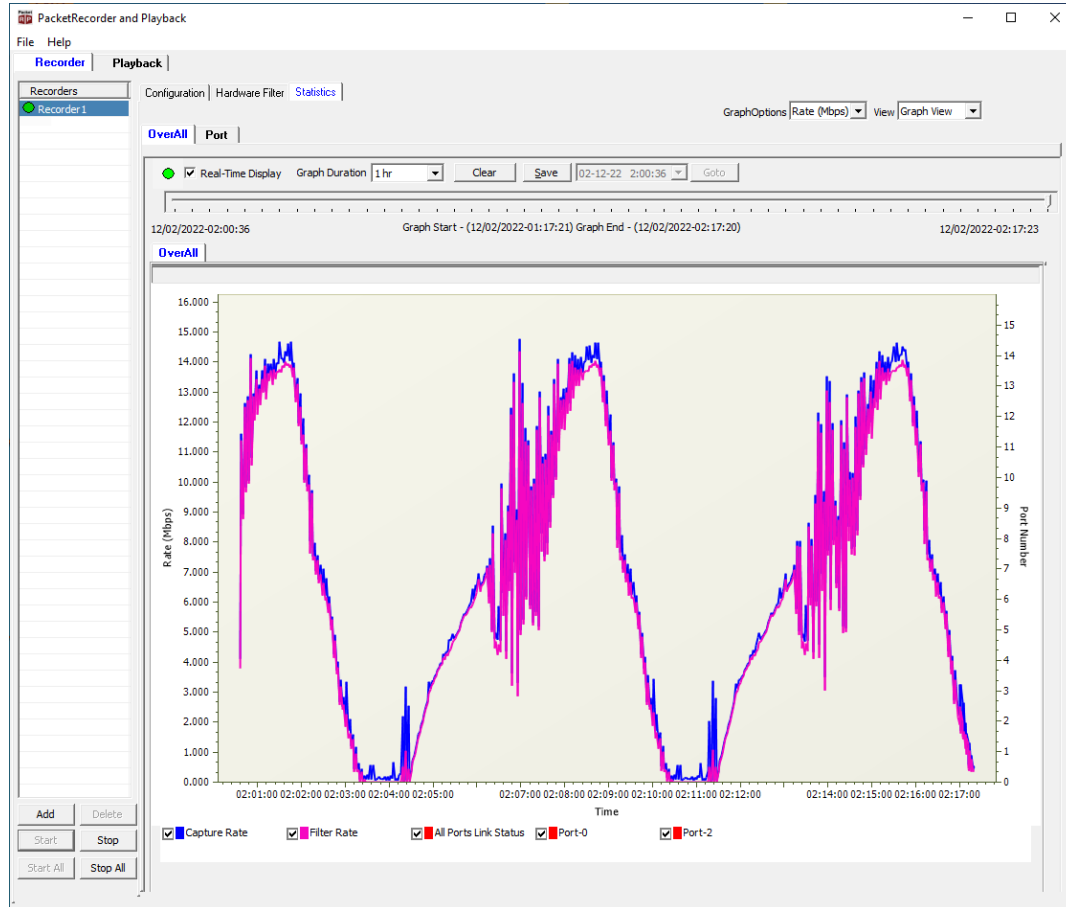
Statistics	Value
Filter Match Frames	4 265 974
Filter Not Match Frames	61 466
Total Frames	4 327 440
Filter Match Frames %	98.58
Dropped Frames (Due to Buffer Overflow)	0
Recorded Frames	4 266 726
Recorded Bytes(Gbytes)	0.4598
Dropped Bytes	0
Capture Rate(Mbps)	5.29
Filtered Rate (Mbps)	5.12
Filtered Bytes %	96.61
Capture Frame Rate (Frames/Sec)	5 489
Filtered Frame Rate (Frames/sec)	5 408
Filtered Frames %	98.52
Recorded Files	5
Record Duration(hr:min:sec)	00:09:07
Current Recording FileName	Test04.hdl
Bytes Written To Current File	74 279 147
Available Host Buffer Size (Kbytes)	2 621 440
Utilized Host Buffer Size (Kbytes)	3
Available OnBoardMemory Size(Mbytes)	1 922
Utilized OnBoardMemory Size(%)	0%
Utilized OnBoardMemory Size(Mbytes)	0
Drive Write Rate(Bytes/sec)	640

Recorder Statistics (Contd.)

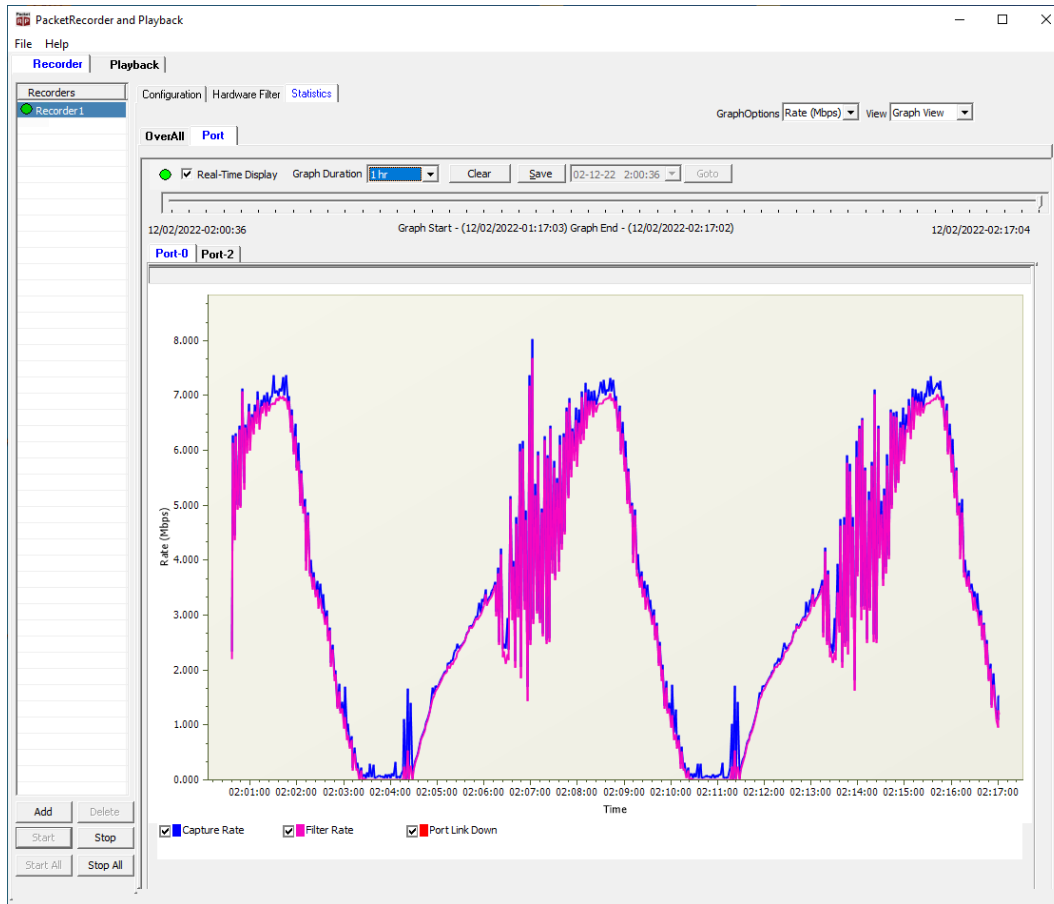
Port Statistics	Aggregate	Port-0 (10G)	Port-2 (10G)
Filter Match Frames	4 339 245	2 169 765	2 169 480
Filter Not Match Frames	63 945	31 974	31 971
Total Frames	4 403 190	2 201 739	2 201 451
Filter Match Frames %	98.55	98.55	98.55
Dropped Frames (Due To Port Buffer OverFlow)	0	0	0
64 Byte Length Frames	0	0	0
65-127 Byte Length Frames	3 475 066	1 737 691	1 737 375
128-255 Byte Length Frames	812 216	406 093	406 123
256-511 Byte Length Frames	105 908	52 954	52 954
512-1023 Byte Length Frames	5 908	2 955	2 953
1024-1518 Byte Length Frames	4 084	2 042	2 042
1519-2047 Byte Length Frames	0	0	0
2048-4095 Byte Length Frames	8	4	4
4096-8191 Byte Length Frames	0	0	0
8192-Max Byte Length Frames	0	0	0
Undersized Frames	0	0	0
Oversized Frames	0	0	0
VLAN Frames	0	0	0
MPLS Frames	0	0	0
CRC/Align Error	0	0	0
Temperature(C)	-	42.2	45.6
Port Link Status	-	Up	Up
Port Link Down Count	-	0	0

Add	Delete
Start	Stop
Start All	Stop All

Graphs – Overall View

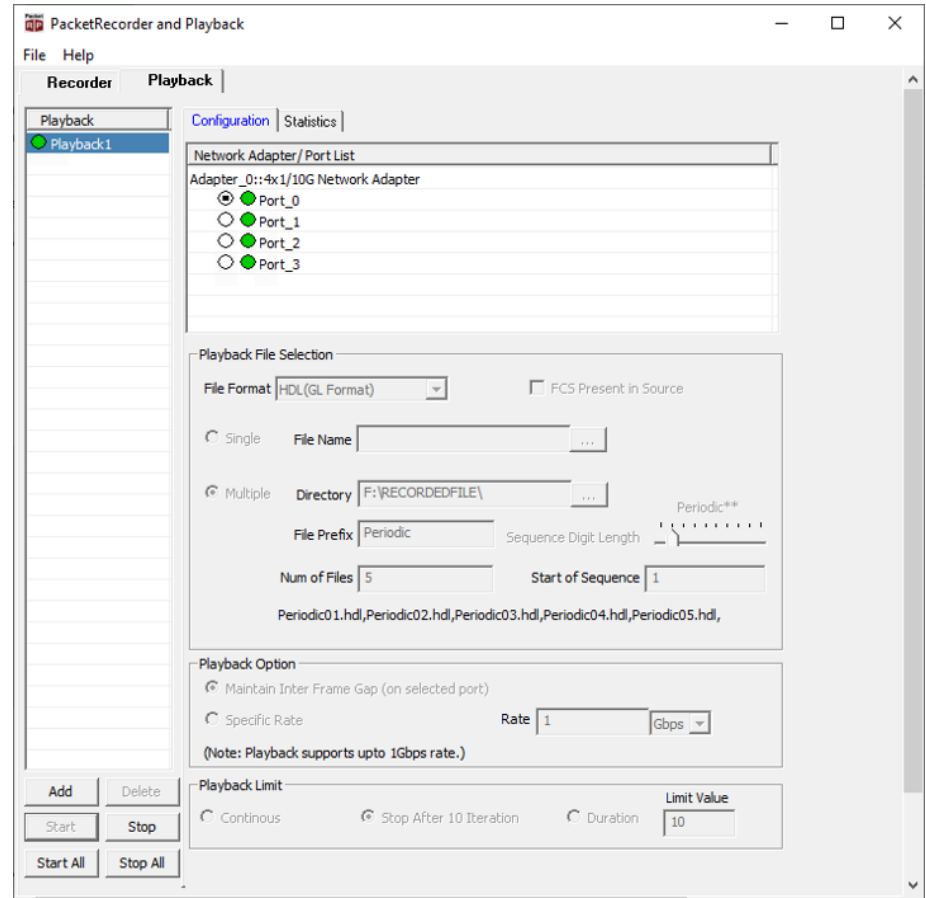


Graphs – Per Port View



Playback™ (PacketReplay™)

- In Playback™ mode, the configuration window allows to playback single or multiple recorded files on the selected HD NIC interface port



Playback™ Statistics

PacketRecorder and Playback

File Help

Recorder Playback

Playback

Playback1

Configuration Statistics

Reset

Statistics	Value
Transmitted Frames	93 376 856
Transmitted Octets	27 503 920 412
Transmit Rate(Mbps)	1848.80
Frame Rate(Frames/sec)	794 795
Current Iteration	5
Playing Back FileName	Periodic02.hdl
PlayBack Duration(hr:min:sec)	00:02:01

Port Statistics	Aggregate	Port-0
Total Frames	93 376 856	93 376 856
64 Byte Length Frames	0	0
65-127 Byte Length Frames	0	0
128-255 Byte Length Frames	127 134	127 134
256-511 Byte Length Frames	93 138 478	93 138 478
512-1023 Byte Length Frames	79 460	79 460
1024-1518 Byte Length Frames	31 784	31 784
1519-2047 Byte Length Frames	0	0
2048-4095 Byte Length Frames	0	0
4096-8191 Byte Length Frames	0	0
8192-Max Byte Length Frames	0	0
Undersized Frames	0	0
Oversized Frames	0	0
CRC/Align Error	0	0
Temperature(C)	-	39.5

Add Delete

Start Stop

Start All Stop All

Analysis of Recorded Traffic using PacketScan™ Application

- User can verify the **Nanosecond** timestamp, **SIP / RTP data** packets, and **SIP Layer** decode information as shown

The screenshot displays the PacketScan (IpProt) 64-bit application interface. The top section shows a table of captured packets with columns for Frame#, TIME (Relative), Length (Bytes), Error, Length/Protocol Type MAC, Packet Type MAC, Source IP Address IP, Destination IP Address IP, Source Port UDP, Destination Port UDP, and SIP Method SIP. The table lists 12 frames, with the first frame (Frame# 0) highlighted in blue. The TIME (Relative) column for the first frame is 00:00:00.000000000, and the Packet Type MAC is SIP. The SIP Method SIP is REGISTER. Below the table, the detailed decode for the selected packet is shown. The SIP Layer section is highlighted with a red box and contains the following information:

```
===== SIP Layer =====
HDR = REGISTER sip:[fe80::64da:3cd4:cff1:9e96] SIP/2.0
HDR = Via: SIP/2.0/UDP [fe80::10f8:316d:9afd:4398]:5060;branch=z9hG4bK-9-702972404-8066-14144
HDR = Max-Forwards: 70
HDR = Allow: INVITE, BYE, CANCEL, ACK, INFO, PRACK, COMET, OPTIONS, SUBSCRIBE, NOTIFY, REGISTER, UPDATE
HDR = From: 3012041631 <sip:001013012041631@[fe80::64da:3cd4:cff1:9e96]>;tag=FromTag-7-702972388-806
HDR = To: sip:001013012041631@[fe80::64da:3cd4:cff1:9e96]
HDR = Call-ID: GL-HAFS-6-702972388-8063-14144@[fe80::10f8:316d:9afd:4398]
HDR = CSeq: 1 REGISTER
HDR = Authorization: Digest username="001013012041631@[fe80::64da:3cd4:cff1:9e96]", realm="[fe80::64da:3cd4:cff1:9e96]"
HDR = Expires: 360000
HDR = Contact: 3012041631 <sip:001013012041631@[fe80::10f8:316d:9afd:4398]>;+g.3gpp.smsip
HDR = P-Preferred-Identity: UE <sip:UE@gl.com>
HDR = P-Access-Network-Info: 3GPP-UTRAN-TDD; utran_call_id=3gpp-00000000
HDR =
```

Thank you