PacketExpert™ – PacketBroker™

(Wire-speed Ethernet Tap)

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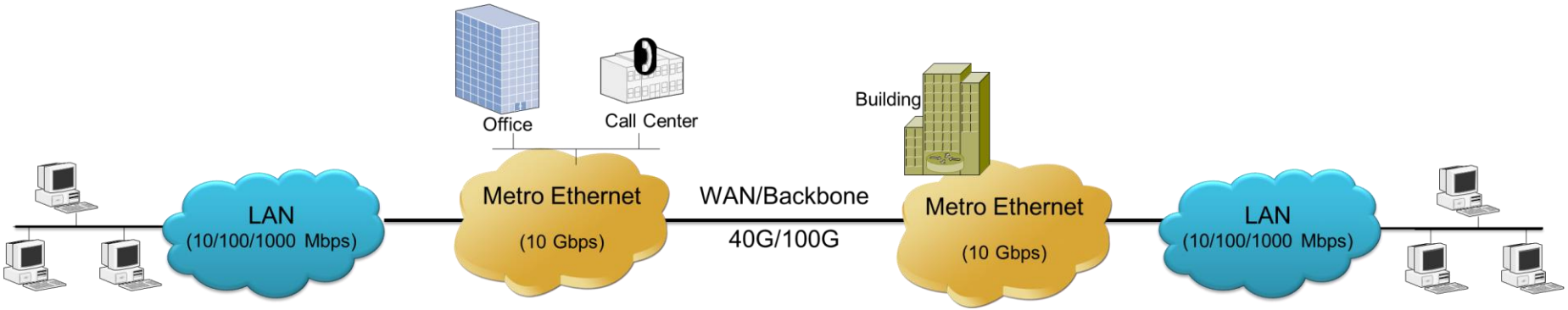
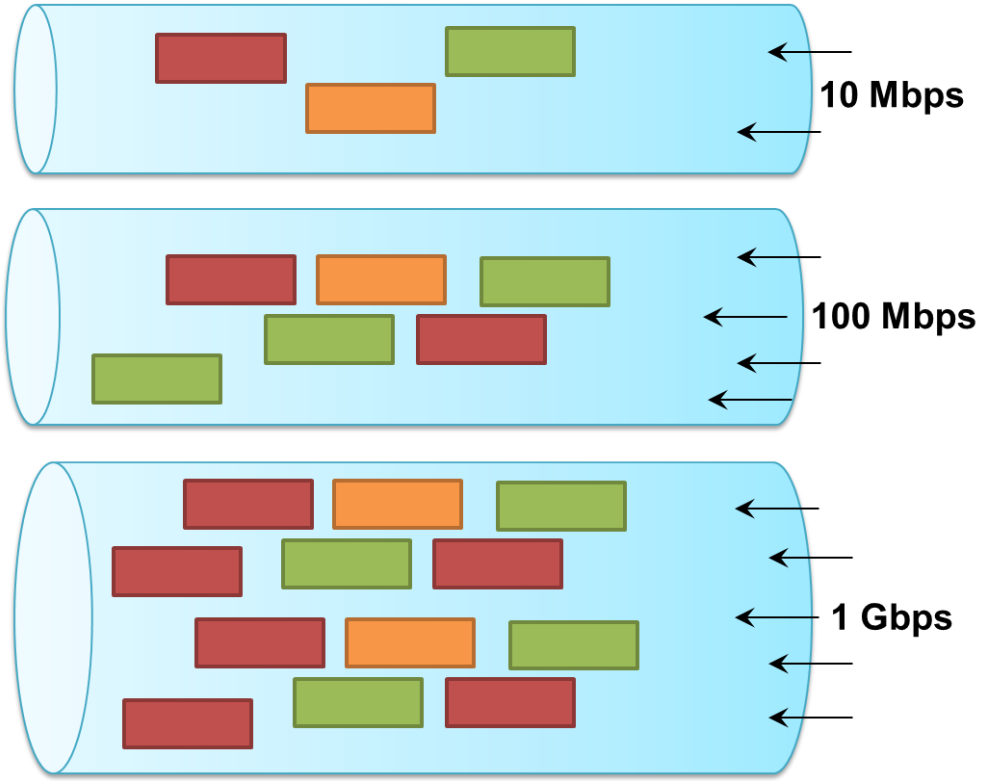
Ethernet Technology

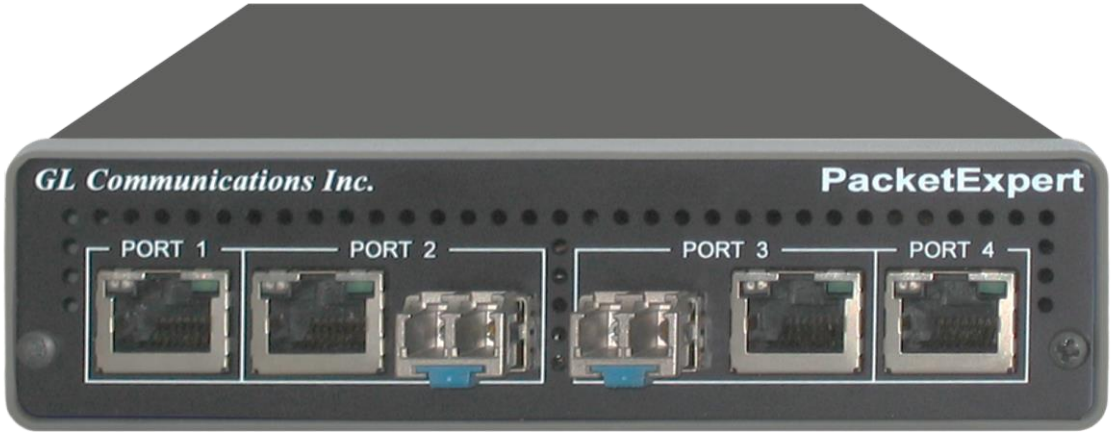


- Ethernet has become ubiquitous in both Local Area Networks and Wide Area Networks
- Network engineers require the ability to capture the traffic at different locations in the network

Just bigger Pipes, but same Ethernet packets



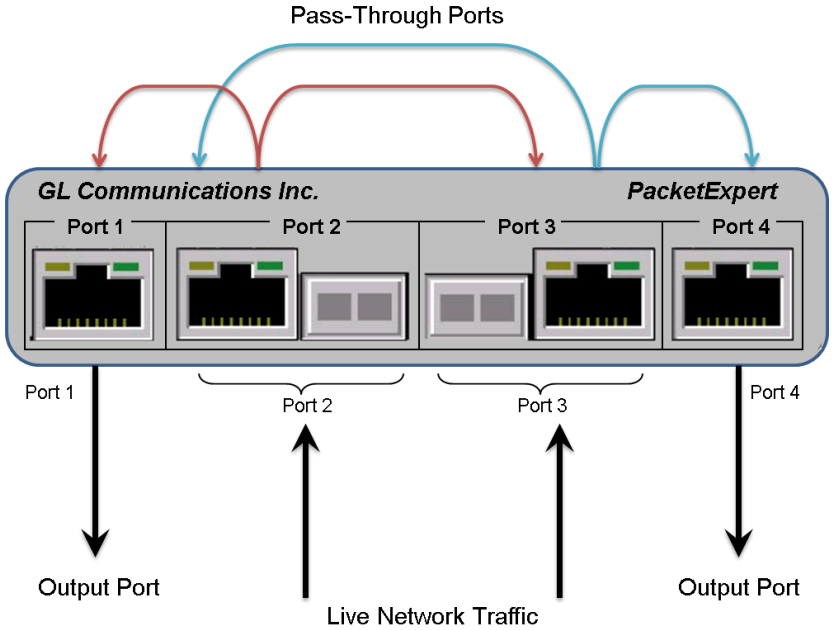
PacketExpert™ 1G



- Bit Error Rate Testing
- RFC 2544
- Smart Loopback Functionality
- ITU-T Y.1564 (verify service level agreements)

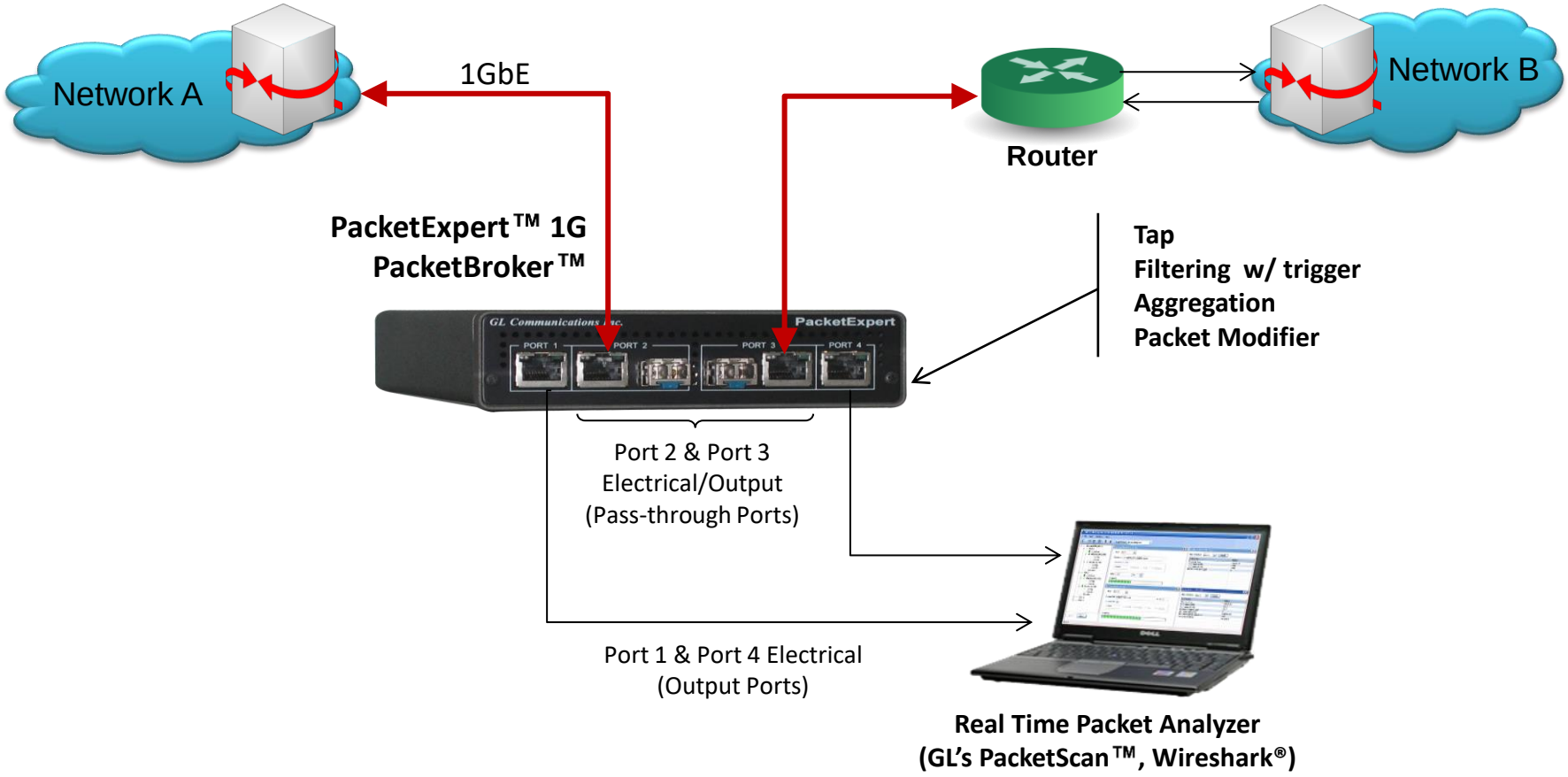
- Wirespeed Record/Playback Capability
- Multi-Stream Traffic Generator
- **PacketBroker**
- RFC 6349 (TCP Testing)

Active Network Tap

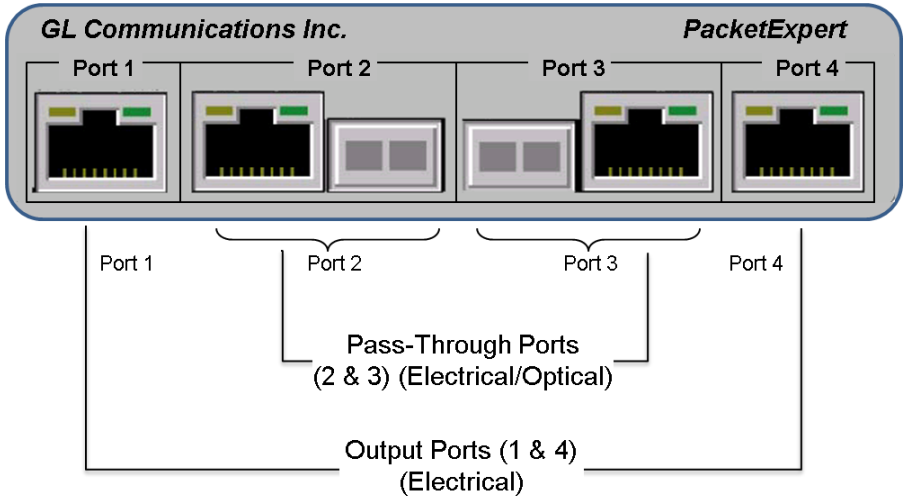


- Dedicated hardware device - FPGA based processing means full 100% wirespeed capability to pass through traffic no drops, no delays, and also to make two separate copies - Tx and Rx side
- Hardware filters means wirespeed filtering

PacketBroker™ in Network



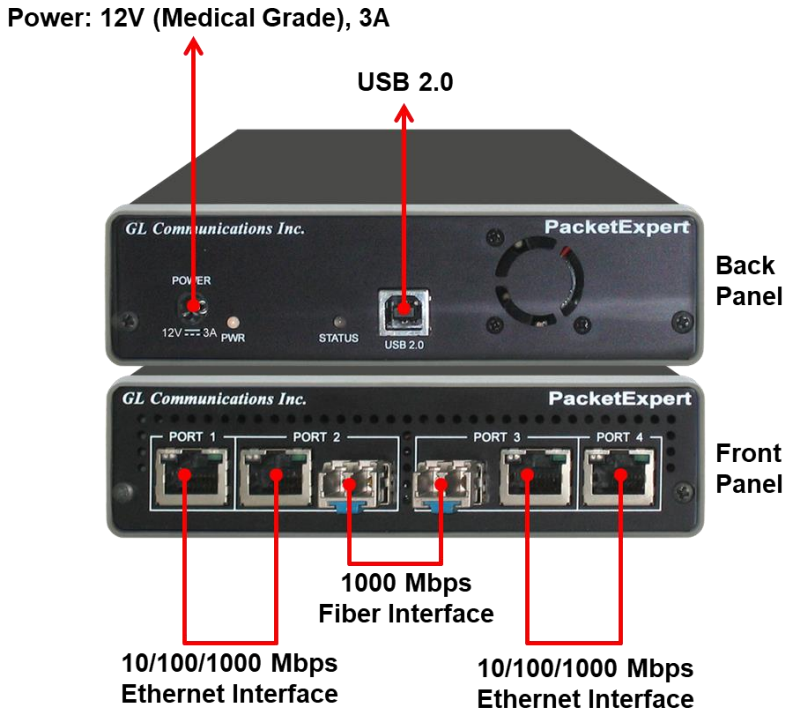
Features



- A network tap like application, with additional advanced features such as:
  - Active network tap - capable of handling bidirectional 100% wirespeed traffic upto 1 Gb/s
  - Wirespeed Filtering - powerful and easy to use
  - Packet Modification to convey useful information such as Timestamp inband
  - Output aggregation - both direction traffic multiplexed on the same output Based on PacketExpert™ hardware platform
- Ports 2 and 3 act as the Active/Pass through ports
- Ports 1 and 4 act as the Output ports

PacketExpert™ 1G Portable Unit

- Interfaces
  - 2 x 10/100/1000 Base-T Electrical only
  - 2 x 1000 Base-X Optical OR 10/100/1000 Base-T Electrical
  - Single Mode or Multi Mode Fiber SFP support with LC connector
  - Optional 4-Port SMA Jack Trigger Board (TTL Input/Output)
- Protocols:
  - RFC 2544 compliance
  - ITU-T Y.1564 (ExpertSAM)
- Power:
  - +12 volts (Medical Grade), 3 Amps
- Bus Interface:
  - USB 2.0



PacketExpert™ mTOP™ Probe

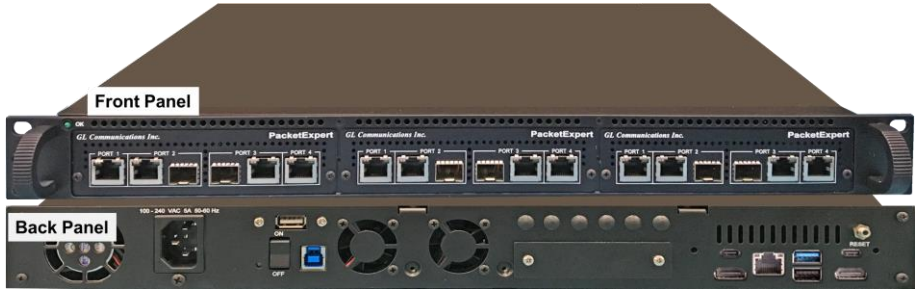
Front Panel View

Rear Panel View

- Portable Quad Port Ethernet/VLAN/MPLS/IP/UDP Tester with 4 Electrical Ethernet Ports (10/100/1000 Mbps) and 2 Optical Ports (100/1000 Mbps). Embedded with Single Board Computer (SBC).
- **SBC Specs**: Intel Core i3 or optional i7 NUC Equivalent, Windows® 11 64-bit Pro Operating System, USB 3.0 and USB 2.0 Ports, 12V/3A Power Supply, USB Type C Ports, Ethernet 2.5GigE port, 256 GB Hard drive, 8G Memory (Min), Two HDMI ports
- Each GigE port provides independent Ethernet/VLAN/MPLS/IP/UDP testing at wire speed for applications such as BERT, RFC 2544, and Loopback. BERT is implemented for all layers.
- RFC 2544 is applicable for Layers 2, 2.5, and 3, and Loopback is applicable for Layers 2, 3, and 4

PacketExpert™ High Density 12/24 GigE Ports mTOP™ Rack

PacketExpert™ SA (PXE112)



PacketExpert™ SA (PXE112) is a 12-Port PacketExpert™ w/ Embedded Single Board Computer (SBC).

SBC Specs: Intel Core i3 or optional i7 NUC Equivalent, Windows® 11 64-bit Pro Operating System, USB 3.0 and USB 2.0 Ports, ATX Power Supply, USB Type C Ports, Ethernet 2.5GigE port, 256 GB Hard drive, 8G Memory (Min), Two HDMI ports

19" 1U Rackmount Enclosure (If options, then x 3).

PacketExpert™ SA (PXE124)

PacketExpert™ SA (PXE124) is a 24-Port PacketExpert™ w/ Embedded Single Board Computer (SBC).

SBC Specs: Intel Core i3 or optional i7 NUC Equivalent, Windows® 11 64-bit Pro Operating System, USB 3.0 and USB 2.0 Ports, ATX Power Supply, USB Type C Ports, Ethernet 2.5GigE port, 256 GB Hard drive, 8G Memory (Min), Two HDMI ports

19" stacked 1U Rackmount Enclosure (If options, then x 6).

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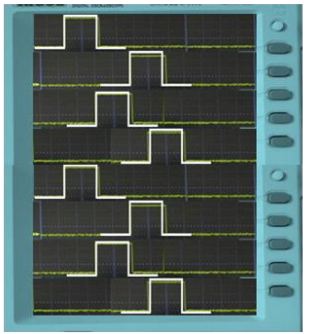
MTOP™ PacketBroker™ Rack Unit w/ 4 TTL Triggers

TTL Signals

Oscilloscope



Pulse generated on TTL I/O and is carried over SMA cable to the oscilloscope

- PacketBroker™ can trigger pulses through TTL ports based on specified Ethernet traffic
- TTL pulses can be received on an oscilloscope for visual analysis of Ethernet traffic

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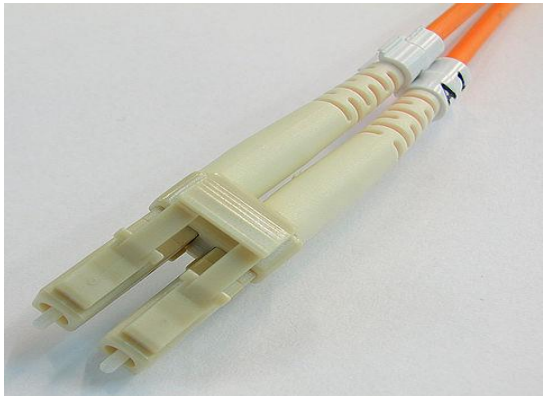
Optical Connectors and SFP Transceivers

LC Connectors

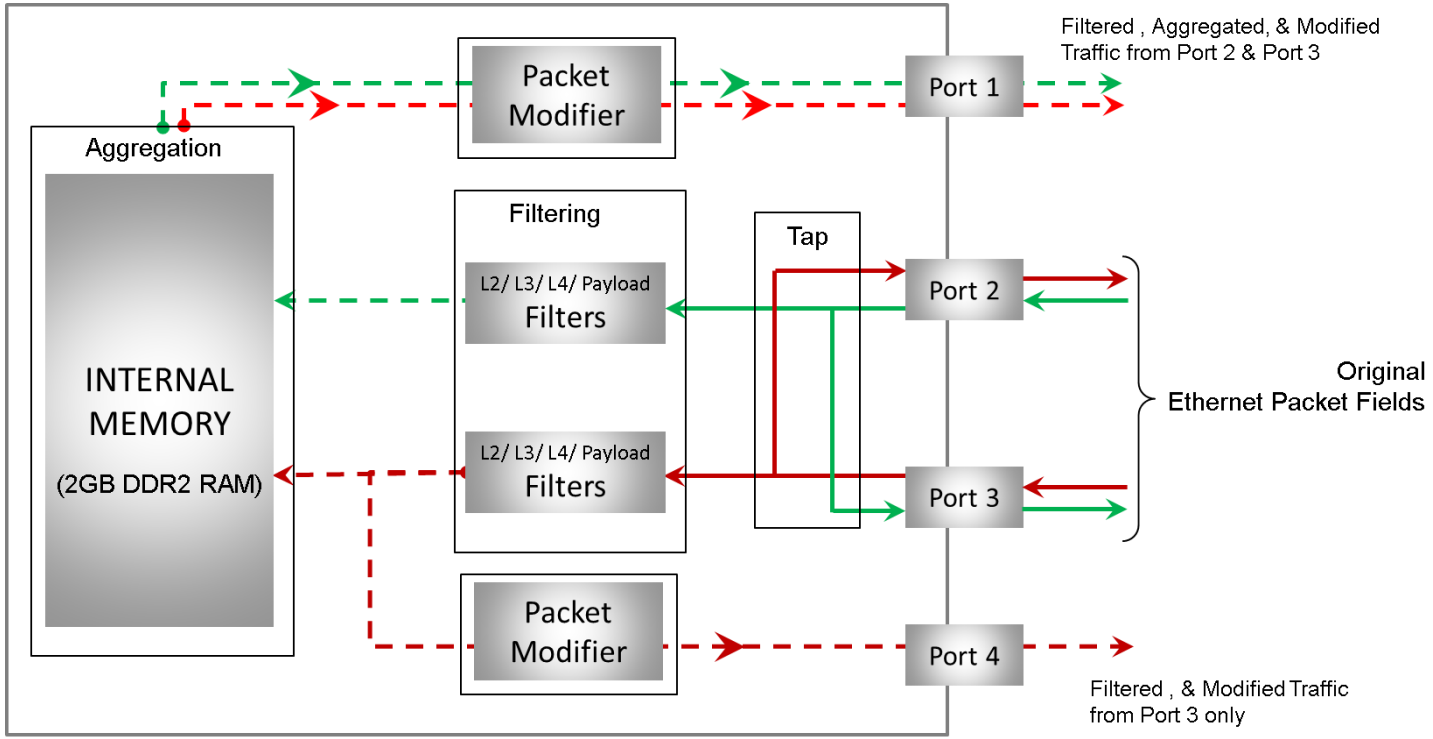


850/1310 nm SFP Module

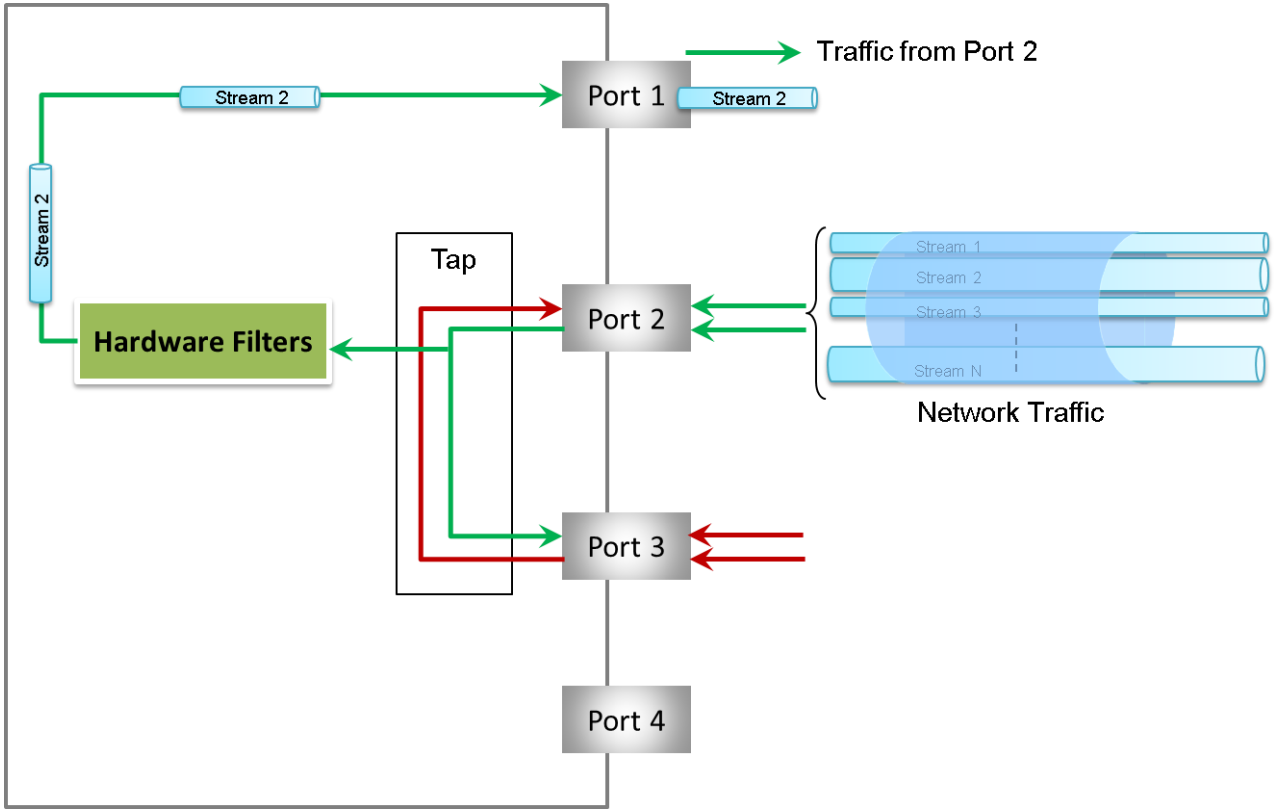
- PacketExpert™ supports LC connectors and 850/1310 nm Small Factor Pluggable (SFP) modules

Note: In case customer have different type of connectors, then we need converters like LC-to-SC, LC-to-FC and vice-versa

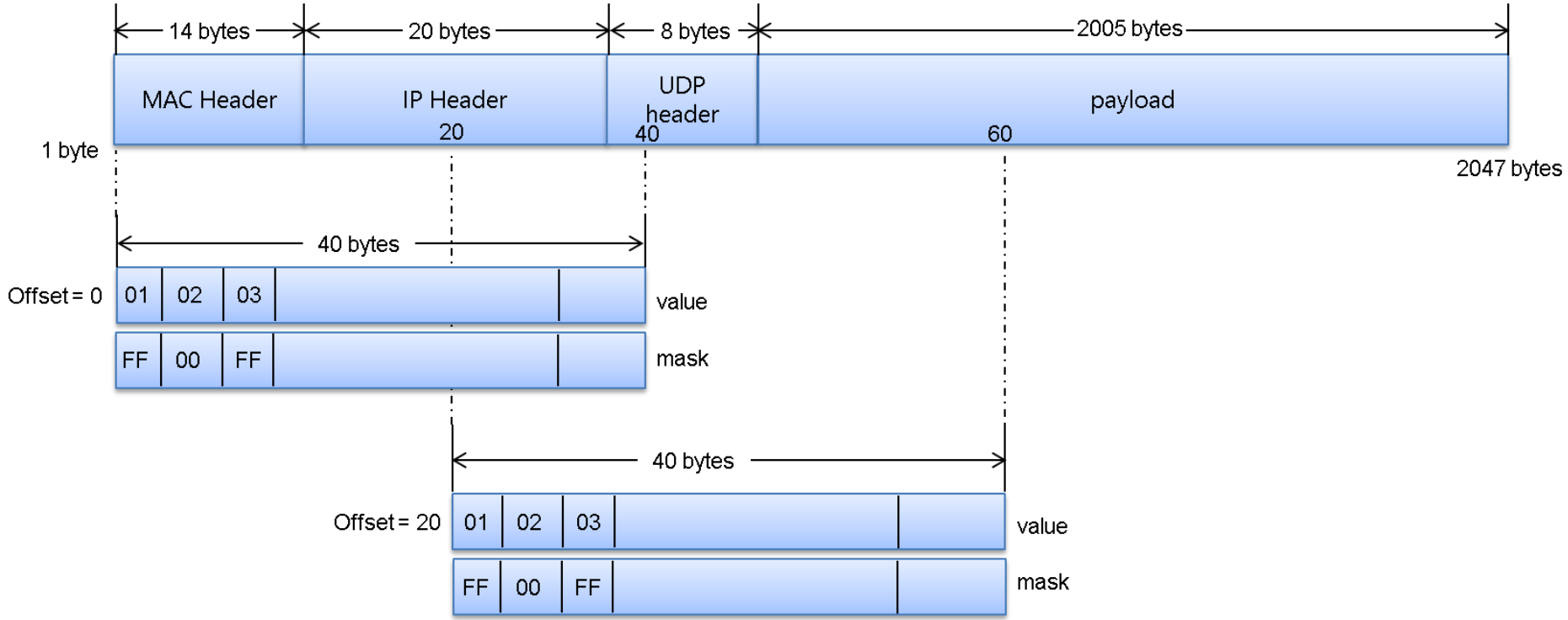
Packet Tap, Filter, Aggregation, Modification, and Output



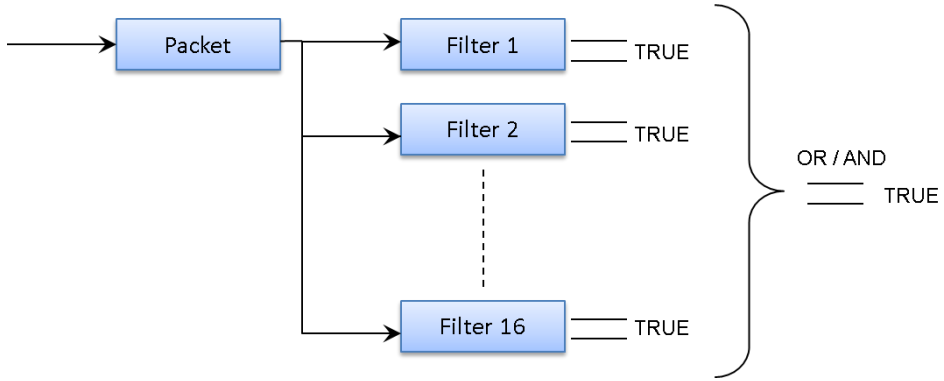
Capture Traffic of Interest

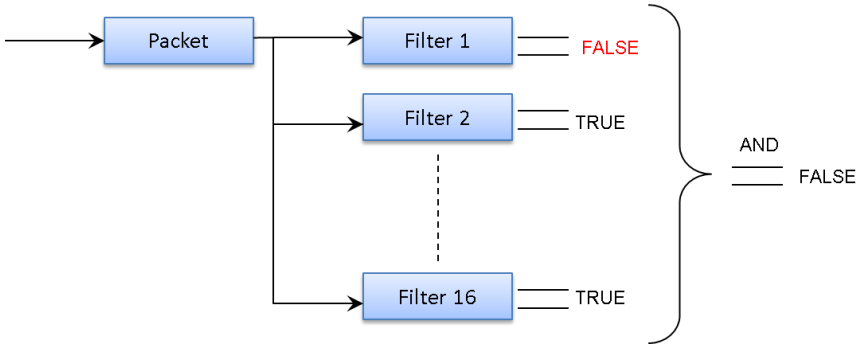


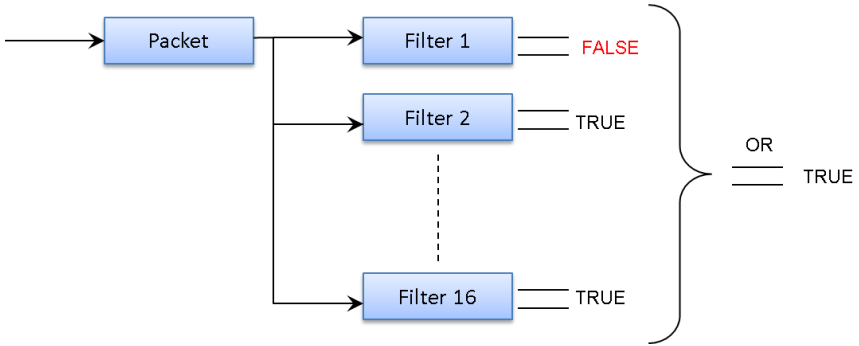
Header


14 bytes
20 bytes
8 bytes
2005 bytes
MAC Header
IP Header
UDP header
payload
1 byte
20
40
60
2047 bytes
40 bytes
Offset = 0
01
02
03
value
FF
00
FF
mask
40 bytes
Offset = 20
01
02
03
value
FF
00
FF
mask

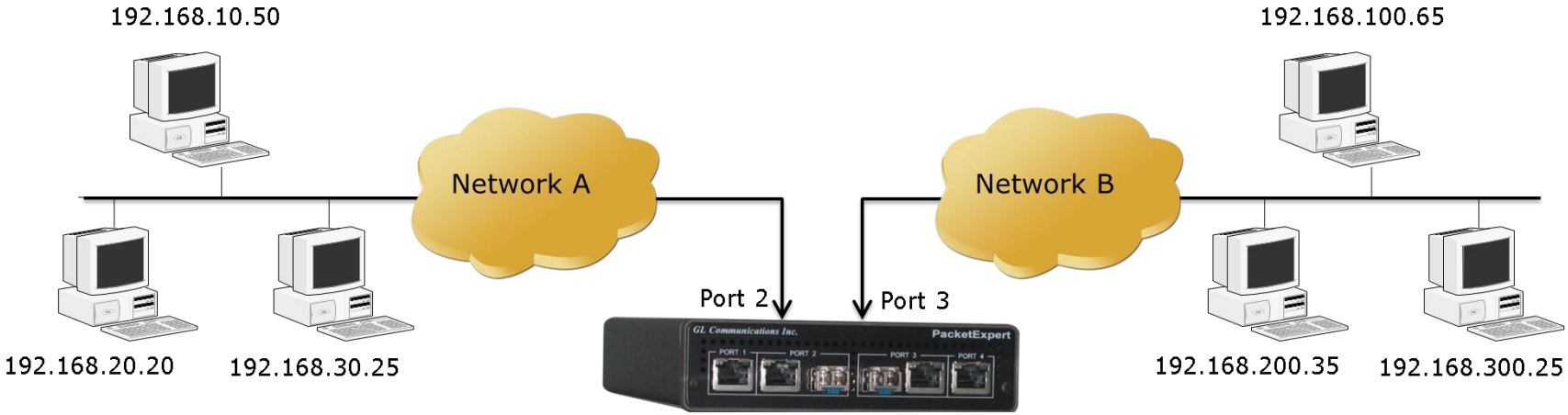
Filter Combination







Filter Example



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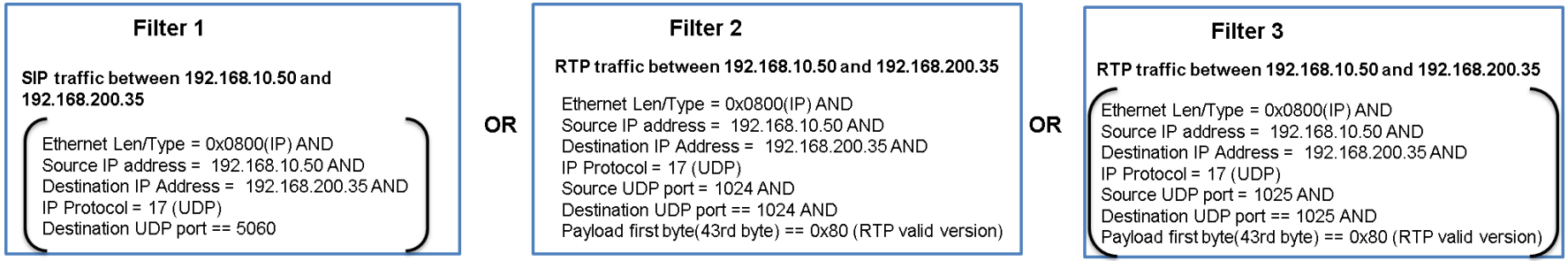
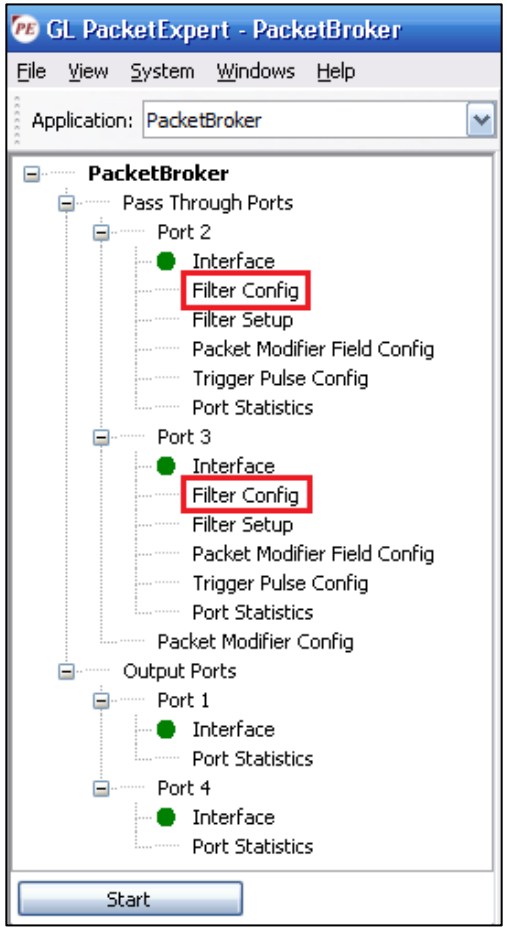
Filter Example (Contd.)

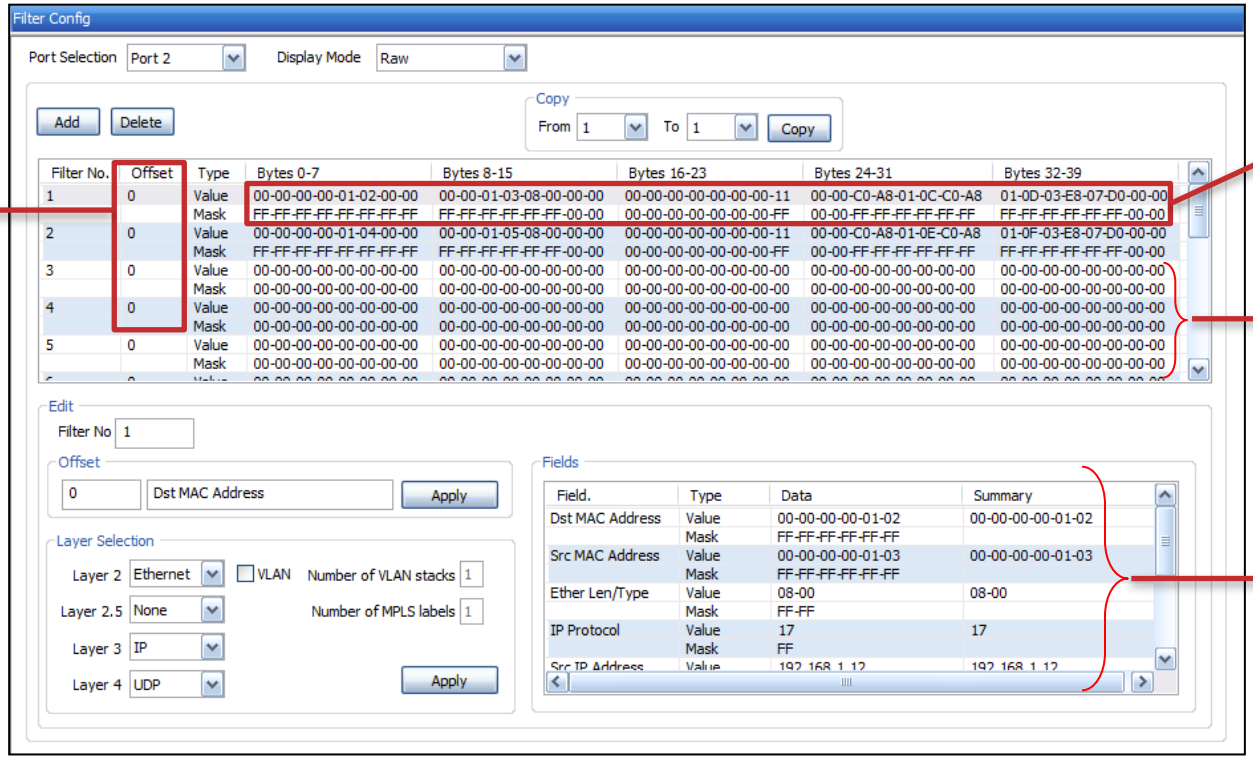
SIP and RTP between 192.168.10.50 192.168.300.25 unidirectional (192.168.10.50 --> 192.168.300.25)



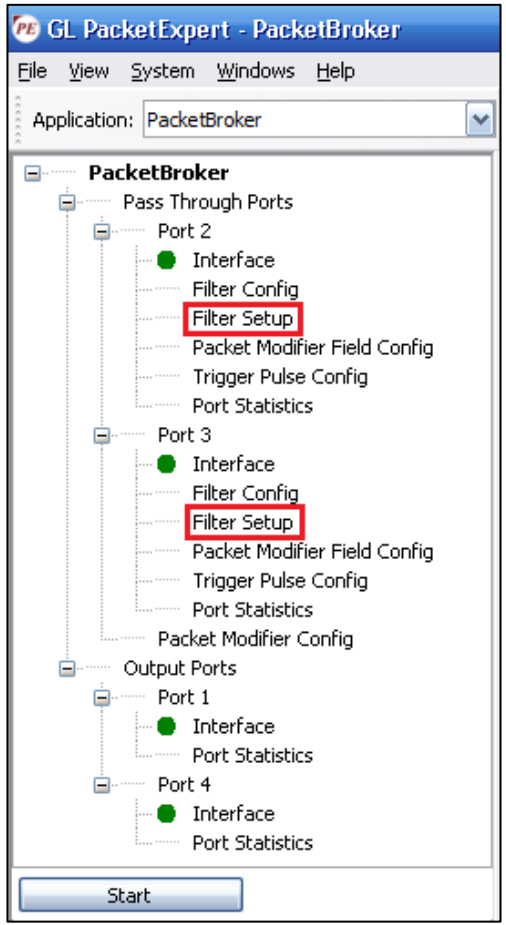
Filter Configuration Menu



Filter Configuration Options

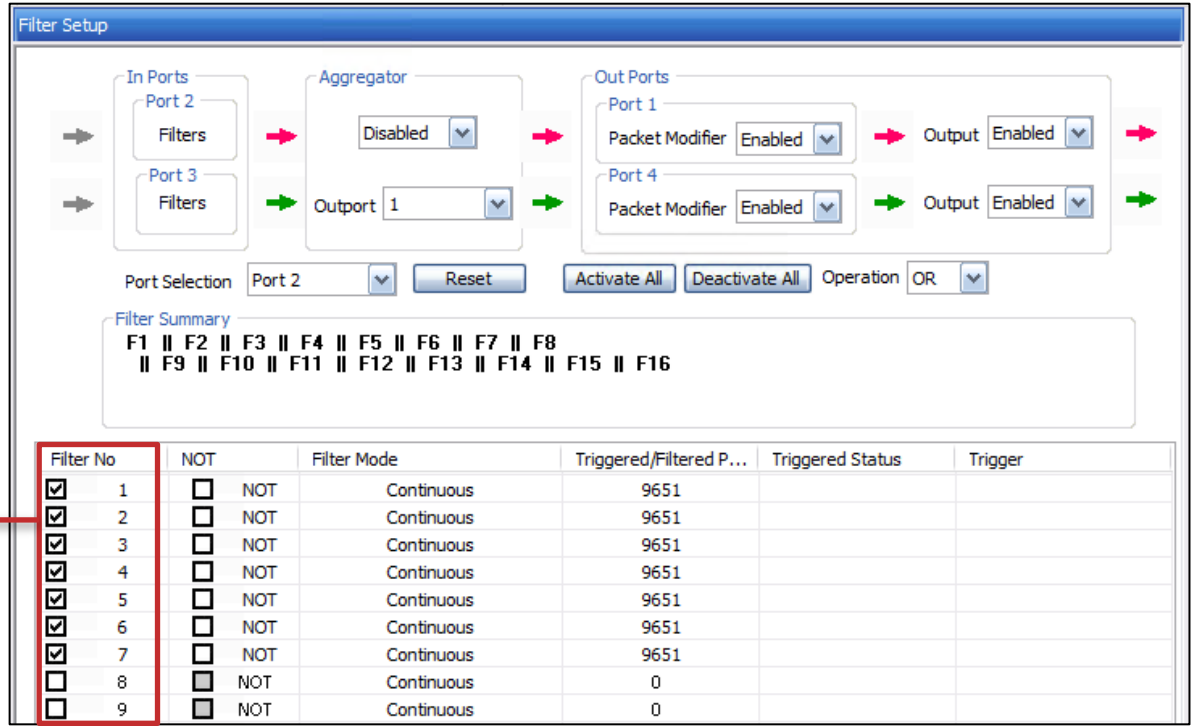


Dynamically Enable/Disable Filters

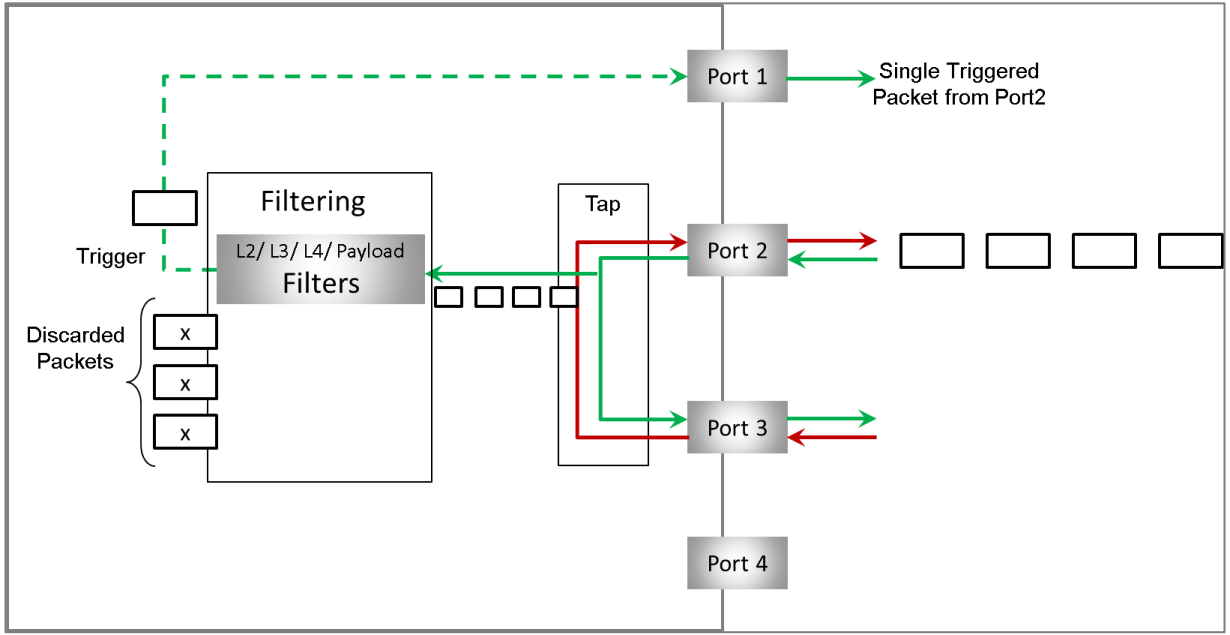


Dynamically Enable/Disable Filters

Dynamically Enable/Disable Filters, even at run-time

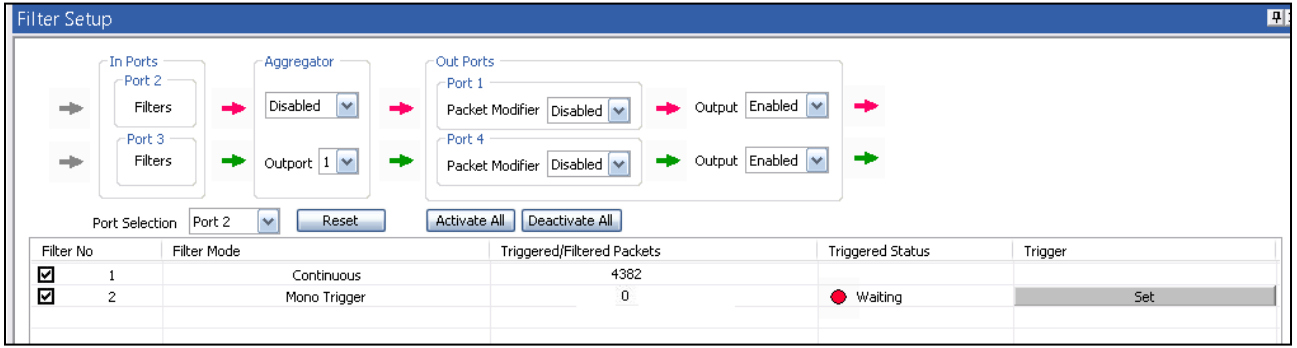


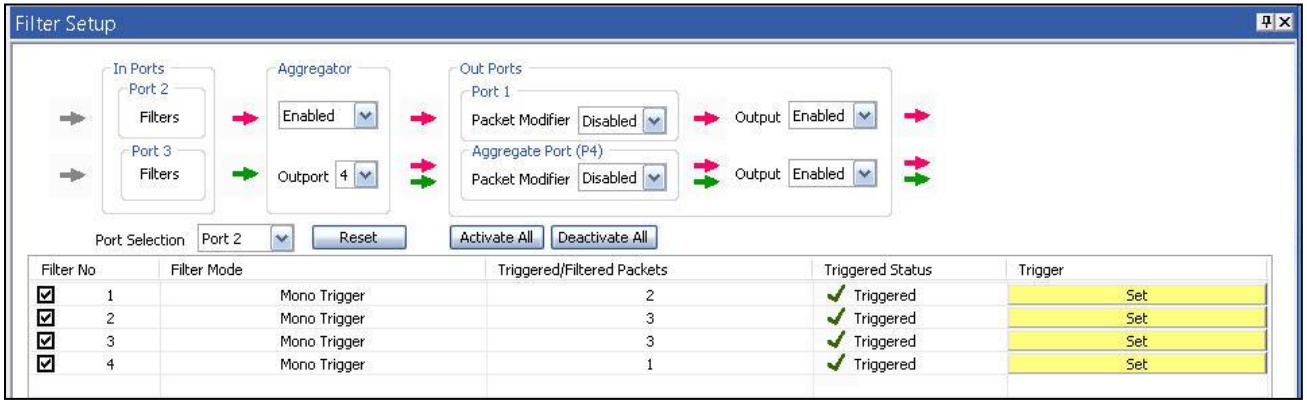
Trigger Mode



- PacketBroker™ helps achieve this using the Trigger mode for filters
- In this user can start the filter in Trigger mode, where it starts to look for packet matching the user defined value
- As soon as the first packet matches the filter, the filter is set to be triggered, and stops further capture

Trigger Mode





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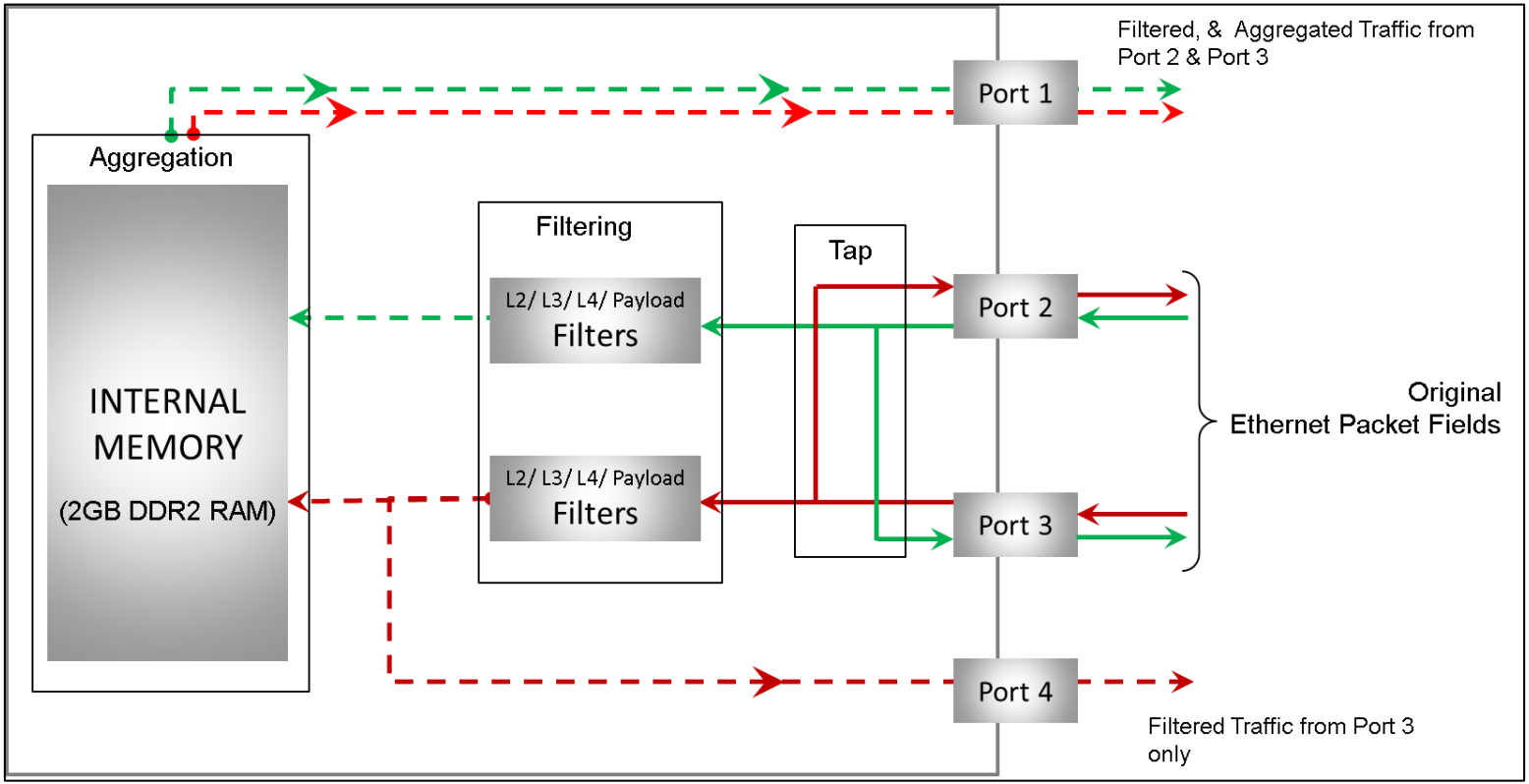
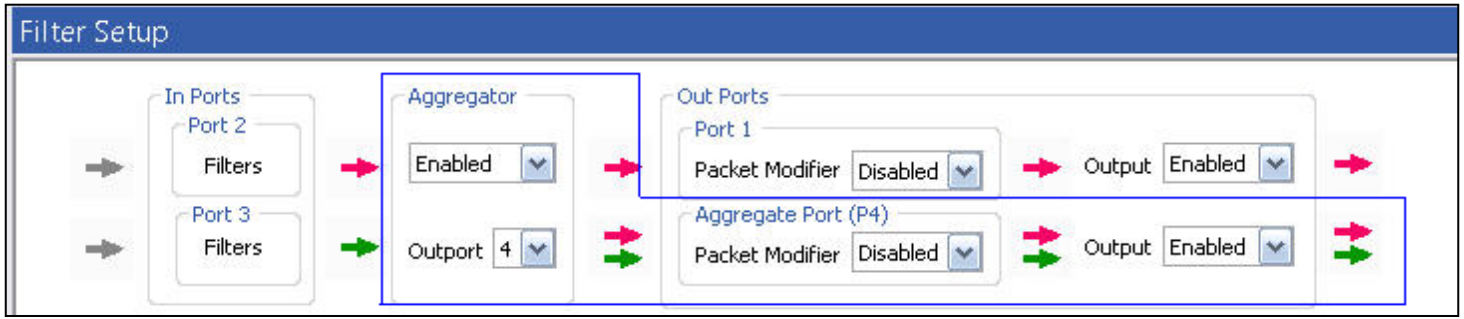
Packet Aggregation (Contd.)

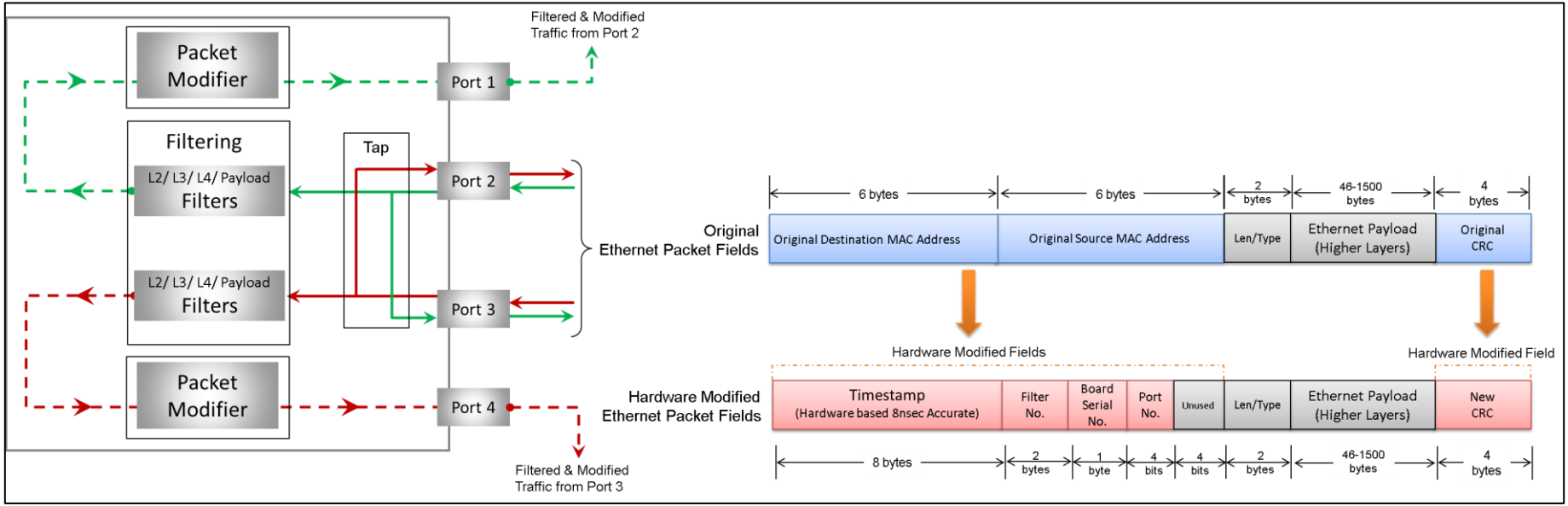


Packet Aggregation User Interface



- The filtered traffic is combined and sent out through a single output port
- If the combined bandwidth exceeds the wirespeed of the output port, may cause packet loss
- Hence, the onboard memory (2 GB DR2 RAM) is used as a temporary buffer to store the traffic before sent out at wirespeed. Thus, upto 2 GB of traffic can be buffered

Packet Modification



- Need to convey very useful information such as the timestamp, port number, filter number etc. to the analysis tool
- May not have the flexibility to convey it outband – may need to do it inband
- PacketBroker™ provides this functionality by conveying it in the MAC header of the output packets

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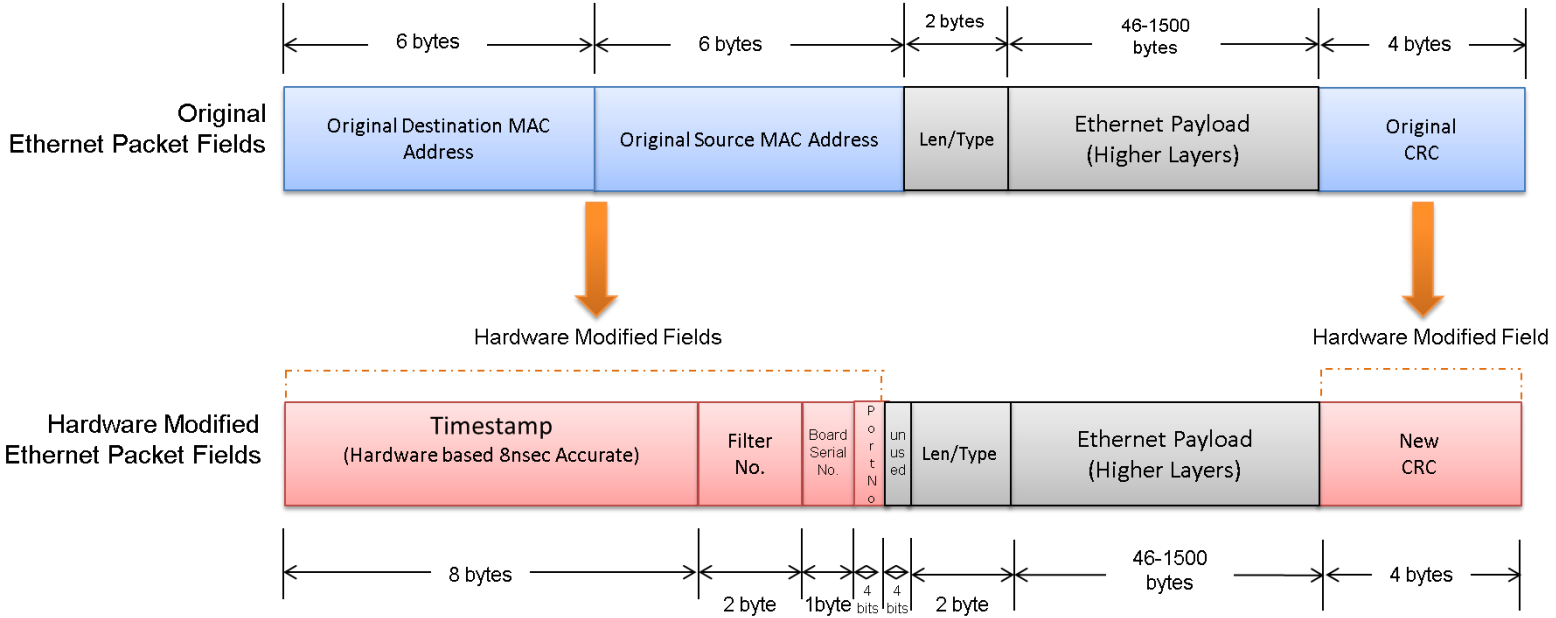
Packet Modification



- Timestamp, Filter Number, Board Serial Number and Port Number fields are written on top of the Src MAC address and Dst MAC Address fields
- Ethernet CRC is recalculated
- Original MAC header will be lost, but many times, this may be fine if interest is only in higher layers (IP, TCP/UDP etc.)

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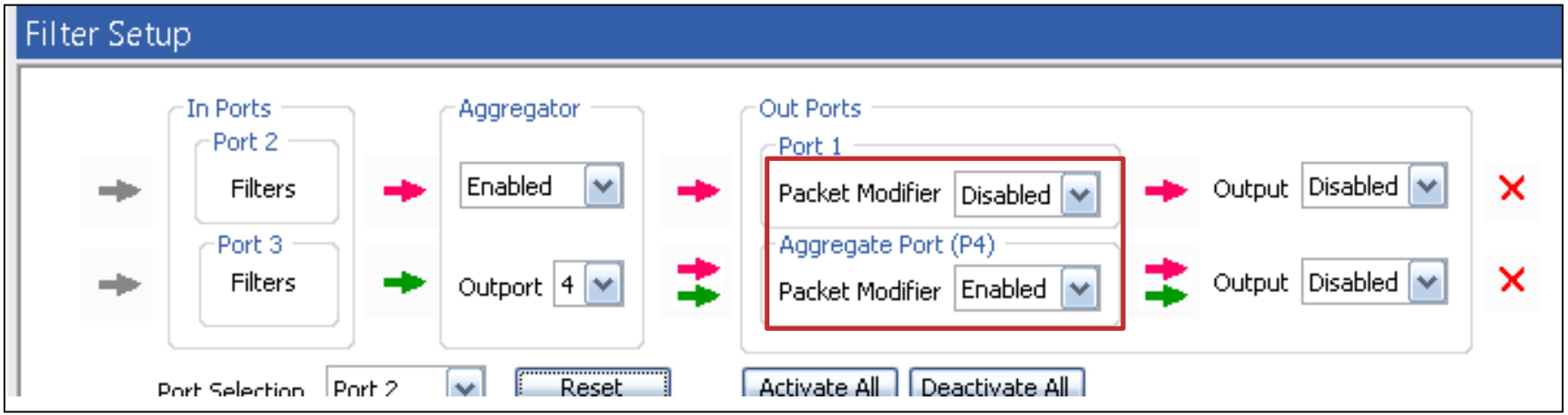
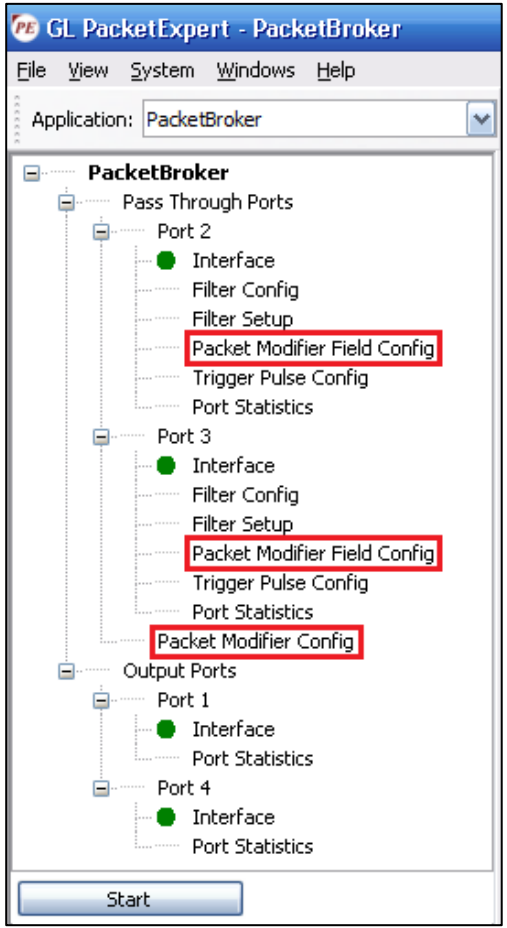
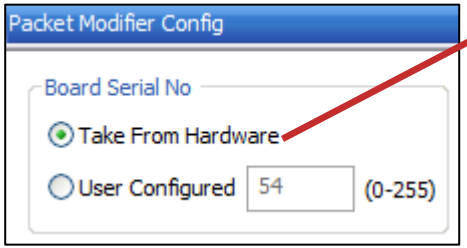
Packet Modifier Enable/Disable

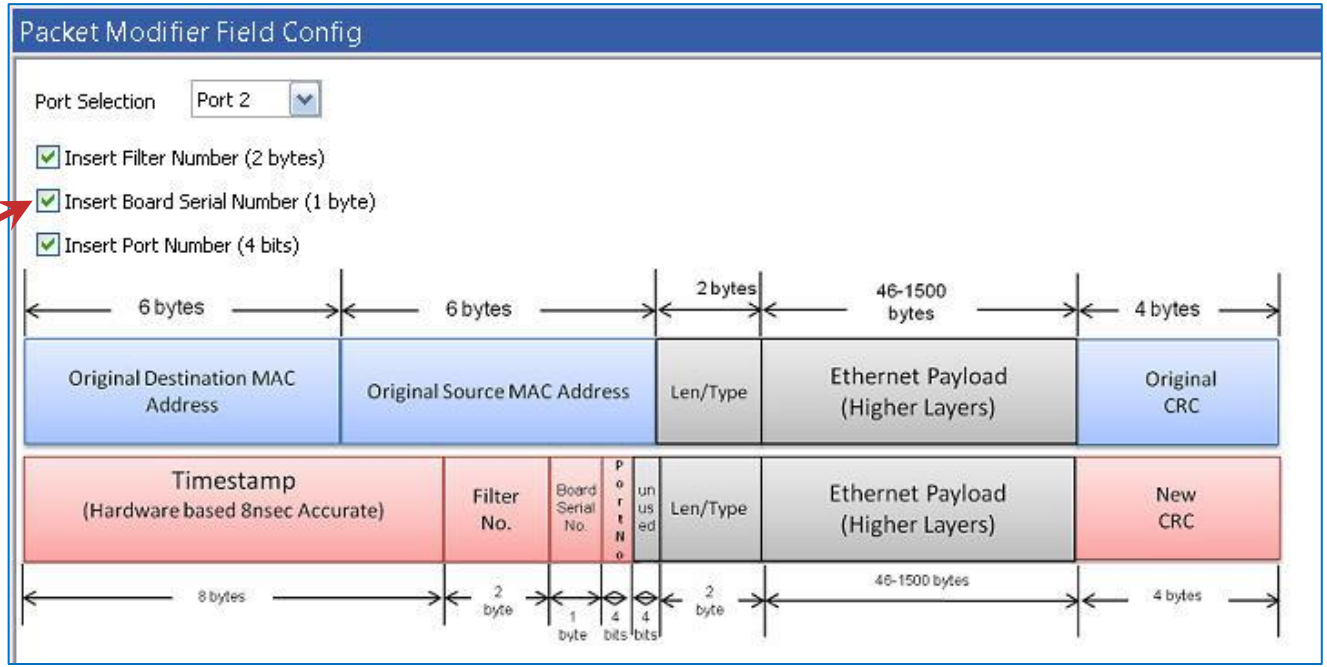


Packet Modifier Field Config Menu

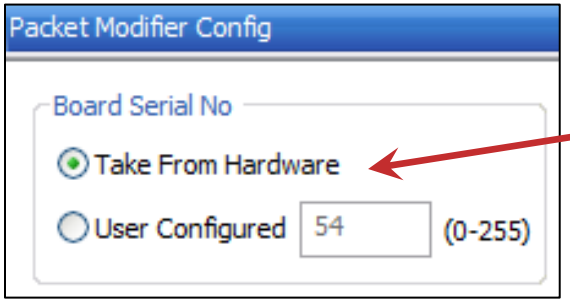


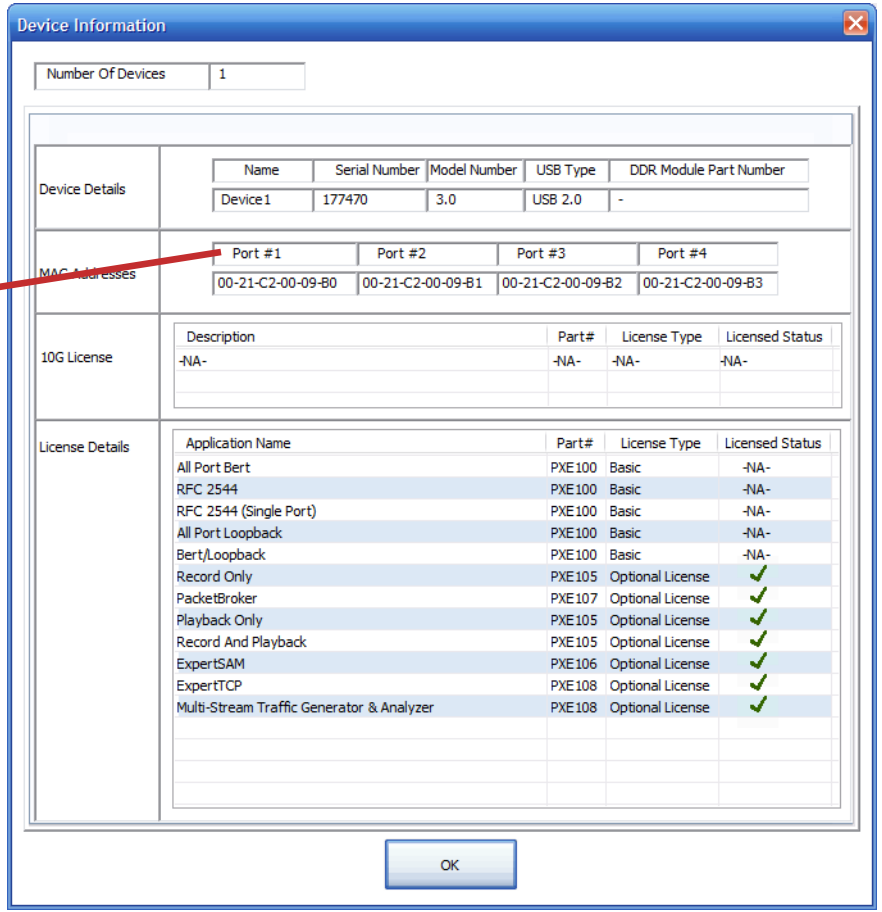
Packet Modifier Field Configuration





Packet Modifier Board Serial Number Config UI





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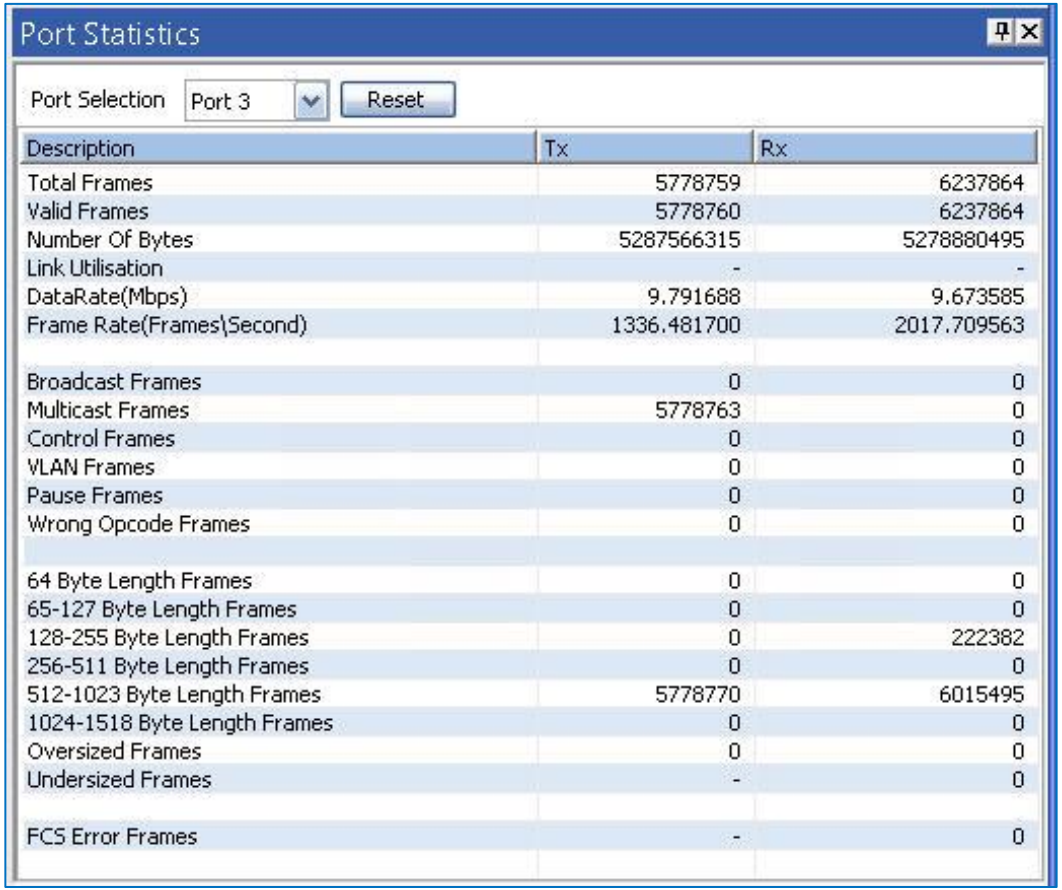
Port Statistics



Description	Tx	Rx
Total Frames	5778759	6237864
Valid Frames	5778760	6237864
Number Of Bytes	5287566315	5278880495
Link Utilisation	-	-
DataRate(Mbps)	9.791688	9.673585
Frame Rate(Frames\Second)	1336.481700	2017.709563
Broadcast Frames	0	0
Multicast Frames	5778763	0
Control Frames	0	0
VLAN Frames	0	0
Pause Frames	0	0
Wrong Opcode Frames	0	0
64 Byte Length Frames	0	0
65-127 Byte Length Frames	0	0
128-255 Byte Length Frames	0	222382
256-511 Byte Length Frames	0	0
512-1023 Byte Length Frames	5778770	6015495
1024-1518 Byte Length Frames	0	0
Oversized Frames	0	0
Undersized Frames	-	0
FCS Error Frames	-	0

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Thank you