FEATURE BRIEF

CAPTURING IN TIME-SENSITIVE NETWORKING
ENVIRONMENTS WITH PROFISHARK

Time-Sensitive Networking (TSN) is a set of standards defining mechanisms for the time-sensitive transmission of data over Ethernet networks. Deterministic communication is critical to multiple industries (Audio Video Bridging, Automotive, Industrial and Power automation, Mobile Fronthaul Networks).
The purpose of this feature brief is to demonstrate the benefit of ProfiShark in TSN environments and to describe its usage. In order to support TSN, a TAP has special requirements in terms of latency, jitter and capture capability.

Transparent in-line

Like all Profitap's in-line TAPs, the ProfiShark is protocol agnostic and L1 passthrough for all frames, tags, and encapsulations. This includes preempted frames (IEEE 802.1Qbu/802.3br), fragmented and CRC-invalid frames. The in-line latency and the jitter introduced by the in-line circuit is minimal, making it suitable for IEEE 802.1AS and 1588 v2.
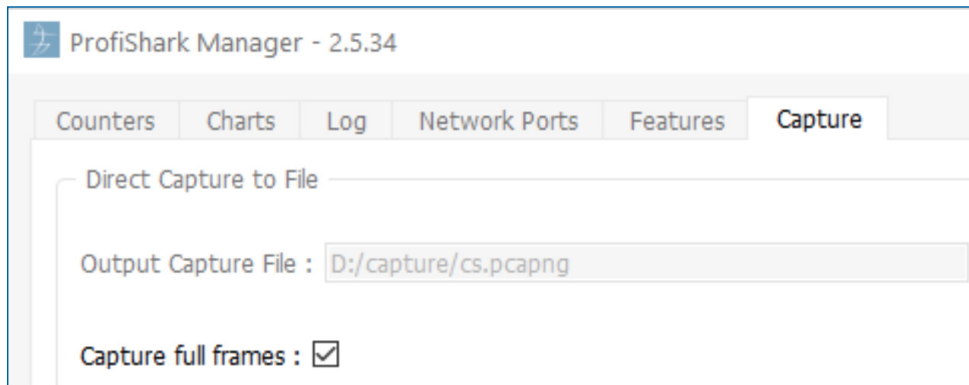
Device	in-line pass-through		
	Latency	Jitter	L1 pass-through
ProfiShark 100M	2 ns	100 ps	Yes
ProfiShark 1G/1G+	400 ns	32 ns	Yes
ProfiShark 10G/10G+	300 ns	40 ns	Yes

Capture capability

The ProfiShark 1G is capable of capturing any type of frame, including preempted frames (IEEE 802.1Qbu/802.3br), fragmented and CRC-invalid frames.

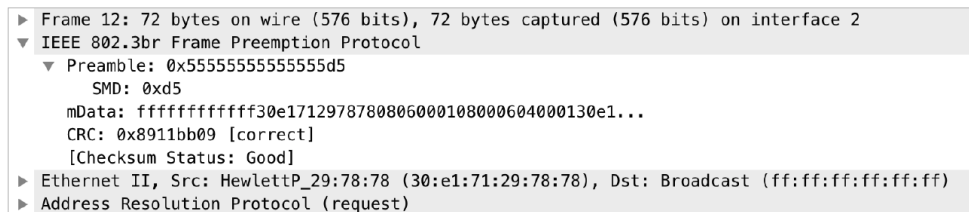| Frame type	Preamble count	SMD	FCS
Express	7	0xD5	CRC
SMD-Sx Preemptable Non-Fragmented	7	0xE6, 0x4C, 0x7F, 0xB3	CRC
SMD-Sx Preemptable Initial Fragment	7	0xE6, 0x4C, 0x7F, 0xB3	mCRC
SMD-Cx Preemptable Continuation Fragment	6	0x61, 0x52, 0x9E, 0x2A	mCRC
SMD-Cx Preemptable Last Fragment	6	0x61, 0x52, 0x9E, 0x2A	original CRC
SMD-V Verify	7	0x07	mCRC
SMD-R Response	7	0x19	mCRC

Moreover, the ProfiShark Manager offers an option to capture the entire L1 Ethernet frame in direct capture. When 'capture full frames' option is enabled, the frames are captured with the preamble (0x55), the SMD and the CRC.

ProfiShark manager

Wireshark Integration

With 'capture full frames' option enabled, the PCAP-NG Link-Layer Header is set to LINKTYPE_ ETHERNET_MPACKET. This Link-Layer type is fully supported by Wireshark since 2.6.0 and allows proper dissection of L1 frames (see Wireshark view below). Once dissected, the additional L1 data is displayed in the Packet detail view and doesn't conflict with higher protocols. Additionally, fragmented preempted frames can be reassembled in Wireshark.

```
► Frame 12: 72 bytes on wire (576 bits), 72 bytes captured (576 bits) on interface 2
▼ IEEE 802.3br Frame Preemption Protocol
    ▼ Preamble: 0x55555555555555d5
        SMD: 0xd5
      mData: ffffffffffff30e1712978780806000108000604000130e1...
      CRC: 0x8911bb09 [correct]
      [Checksum Status: Good]
► Ethernet II, Src: HewlettP_29:78:78 (30:e1:71:29:78:78), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
► Address Resolution Protocol (request)
```

WireShark Packet Detail

The ProfiShark Manager offers different capture options. The different capture options and their effect are listed below.

Preamble	SMD	Destination address	Source address	VLAN Tag	Type/Length	Data/Payload	CRC	Original Frame
Preamble	SMD	Destination address	Source address	VLAN Tag	Type/Length	Data/Payload	CRC	Captured Frame with "Capture full frame" option enabled
		Destination address	Source address	VLAN Tag	Type/Length	Da		Captured Frame with Slicing option enabled
		Destination address	Source address	VLAN Tag	Type/Length	Data/Payload	CRC	Captured Frame with "Keep CRC32" option enabled
		Destination address	Source address	VLAN Tag	Type/Length	Data/Payload		Default Capture Mode

Profitap develops and manufactures hardware and software solutions that help you get complete access and visibility into your network. These network visibility solutions are designed with the security, forensics, deep packet capture and network & application performance monitoring sectors in mind.

Profitap network solutions help eliminate network downtime, add security to existing and new networks all over the world, assist in lawful interception applications and reduce network complexity. All of Profitap's network monitoring tools are highly performant, secure and user-friendly, and provide complete visibility and access to your network, 24/7.

As we are experts in our field, we have developed our products to set new standards in an industry where the definition of excellence is constantly being challenged. With more than 1,000 clients from 55 countries, Profitap has become a must-have solution or many important businesses, many of which are among Fortune 500 companies.

IT ALL STARTS WITH VISIBILITY

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