



How Provenance™ can make MiFID 2 timing compliance easy

The Challenge

New MiFID 2 timing regulations for recording trade data (RTS 25)

- **Highly accurate timestamps required for high-frequency trade data**
 - Must be synchronized to UTC
 - Granularity: 1 microsecond or better
 - Maximum divergence from UTC: < 100 microseconds
- **Traceability requirements**
 - *Must be able to demonstrate traceability to UTC by documenting the system design, functioning and specifications*

The Problem

Timing accuracy can change over time

- Clock drift, system or network load, cross-traffic, configuration changes ..

Burden of proof is on traders

- To prove timestamps were accurate when trade data recorded

Need to continuously monitor and record timestamp accuracy

- How to do this?
- Needs to be easy to correlate with recorded trade data
- Minimize compliance overhead

The Solution - introducing Provenance

New feature of Endace DAG™ data capture cards

Watermarks recorded traffic every second with additional rich data

- **Full timing data:** time source, synchronization method, clock accuracy (drift)
- **And 150+ other data points:** hostname, location, link name, link type and many more

Provenance records automatically embedded in recorded traffic

- A permanent indelible record archived alongside recorded trade data
- Maintains full context
- Easy to reference with standard packet tools e.g. Wireshark
- Extensible format – future proof for evolving business/regulatory needs

A quick look

The screenshot displays a network traffic analysis tool interface. At the top, a menu bar includes File, Edit, View, Go, Capture, Analyze, Statistics, Telephony, Wireless, Tools, and Help. Below the menu is a toolbar with various icons. A search bar contains the text "Apply a display filter <<Ctrl+F>".

The main window is divided into two panes. The upper pane shows a list of network packets with columns for No., Time, Source, Destination, Protocol, and Length. A callout box points to a specific packet (No. 91) with the text "Metadata records inserted every second".

The lower pane shows a detailed view of a "MetaERF Capture Section". It includes a tree view on the left with sections for "MetaERF Capture Section", "MetaERF Host Section", and "MetaERF Module Section". The right pane displays a hex dump of the captured data, with a callout box pointing to it stating "150+ Provenance data points recorded in each record".

At the bottom of the interface, there is a status bar showing "Packets: 385 · Displayed: 385 (100.0%) · Load time: 0:0.19" and a "Profile: Default" indicator.

A quick look

The screenshot shows the Wireshark network protocol analyzer interface. At the top, the menu bar includes File, Edit, View, Go, Capture, Analyze, Statistics, Telephony, Wireless, Tools, and Help. Below the menu is a toolbar with various icons for file operations and analysis. The main display area is divided into two panes. The upper pane shows a list of captured packets with columns for No., Time, Source, Destination, Protocol, Length, and Info. The lower pane shows the expanded details of the selected packet (No. 225), displaying a tree view of protocol fields for Precision Time Protocol (PTP). An orange callout box with a pointer highlights the 'PTP Grandmaster Clock Quality' field in the details pane.

No.	Time	Source	Destination	Protocol	Length	Info
220	36.600000057	192.168.10.18	192.168.10.120	UDP	271	14067→24863 Len=225
221	36.770411652			ERF	1424	MetaERF Record
222	36.800000676	192.168.10.85	192.168.10.201	HTTP	1518	HTTP/1.1 200 OK (text/html)
223	37.000000058	192.168.10.15	192.168.10.126	UDP	271	21918→34572 Len=225
224	37.200000686	192.168.10.82	192.168.10.155	TCP	1518	[TCP segment of a reassembled PDU]
225	37.400000474	192.168.10.82	192.168.10.155	HTTP	1099	HTTP/1.1 200 OK (text/html)

- > Clock Source: PTP (5)
- > Clock Input Port Protocol: Ethernet (4)
- > Clock State: Synchronized (2)
- > Clock Threshold: 596 nanoseconds
- > Clock PHC Index: 7
- > Clock PHC Offset: 36.000000000 seconds
- > Clock Timebase: UTC
- > Clock Description: Symmetricom XLi IEEE 1588 Grandmaster
- > Clock output source: Internal (6)
- > Clock Link Cable Mode: Disabled Master (3)
- > PTP Domain Number: 0
- > PTP Steps Removed: 1
- > PTP Offset From Master: -11 nanoseconds
- > PTP Mean Path Delay: 1520 nanoseconds
- > PTP Parent Clock Identity: Symmetri_ff:fe:01:c1:7a (00:a0:69:ff:fe:01:c1:7a)
- > PTP Parent Port Number: 1
- > PTP Grandmaster Identity: Symmetri_ff:fe:01:c1:7a (00:a0:69:ff:fe:01:c1:7a)
- > PTP Grandmaster Clock Quality: 0x062142ba, Clock Class: 6, Clock Accuracy: The time is accurate to within 100 ns, Offset Scaled Log Variance: 17082
 - 0000 0110 = Clock Class: 6
 - 0010 0001 = Clock Accuracy: The time is accurate to within 100 ns (33)
 - 0100 0010 1011 1010 = Offset Scaled Log Variance: 17082
- Tag Type: ptp_gm_clock_quality (406)
- Tag Length: 4
- > PTP Current UTC Offset: 36.000000000 seconds
- > PTP Time Properties: 0x0000003c, Current UTC Offset Valid, PTP Timescale, Time Traceable, Frequency Traceable
- > PTP Time Source: GPS (32)
- > PTP Clock Identity: EndaceTe_ff:fe:01:70:a8 (00:0e:a7:ff:fe:01:70:a8)
- > PTP Port Number: 1
- > PTP Port State: SLAVE (9)
- > PTP Delay Mechanism: EZE (1)

Text item (Text), 12 bytes | Packets: 385 · Displayed: 385 (100.0%) · Load time: 0:0.19 | Profile: Default

Including extensive
Timing Data

How do I get Provenance?

- Available **NOW** on all DAG 10X cards



- Dual port: DAG 10X2-S and DAG 10X2-P
- Quad port: DAG 10X4-P

- **Q1, 2017** on EndaceProbe Network Recorders



- New OSm release 6.3 in Q1, 2017

New Pricing!

DAG 10X2-S

- Dual port 1/10 GbE card
- 100% accurate recording
- Nanosecond-level accurate hardware time-stamping
- Dedicated SFP Time Sync Port

Now just US\$2500 per card



Questions?

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