Time Sensitive Network (TSN)

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Time Sensitive Network (TSN) is the Institute of Electrical and Electronics Engineers (IEEE) 802.1Q defined standard technology to provide deterministic messaging on standard Ethernet. **TSN** technology is centrally managed and delivers guarantees of delivery and minimized Jitter using time scheduling for those Real-Time Application (RTA) that require determinism.

TSN is a Open Systems Interconnection (OSI) Model Physical Layer (i.e., **Layer 2**) technology. The IEEE 802.1Q standards work at OSI Layer 2. **TSN** is an Ethernet standard, not an Internet Protocol (IP) standard. The forwarding decisions made by the **TSN** bridges use the Ethernet header contents, not the Internet Protocol Address (IP Address). The payloads of the Ethernet frames can be anything and are not limited to Internet Protocol. This means that **TSN** can be used in any environment and can carry the payload of any Industrial Application.

TSN was developed to enable deterministic communication on standard Ethernet. The market for deterministic communication is using nonstandard technologies or nonstandard Ethernet. Prior to the IEEE 802.1 **TSN** standards, standard Ethernet didn’t have pure Layer 2 deterministic capability.

Deterministic communication is important to multiple industries (for example, aerospace, automotive, manufacturing, transportation, and utilities). Providing a means for determinism over standard Ethernet enables new levels of connectivity and optimization, leading to cost savings for many industries.

As the name suggests, “time” is the primary aspect of **TSN**. **TSN** is a technology focused on time. **TSN** was developed to provide a way to make sure information can travel from point **A** to point **B** in a fixed and predictable amount of time. Being predictable enables increased efficiency.

There’s an implied requirement for those networking devices implementing **TSN** (Endpoint devices and Bridges) to share a common sense of time. Precision Time Protocol (PTP) is used to maintain a common sense of time. The PTP profiles chosen to work with **TSN** are IEEE 802.1AS-2020 - Standard for Local and Metropolitan Area Networks--Timing and Synchronization for Time-Sensitive Applications and IEEE 802.1ASRev.

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