Advancing Professional Audio and Video with Time-Sensitive Networking

The complexity of live performance installations and the need for convergence in fixed installations is accelerating the need for open, interoperable networking that delivers precise timing, low-latency, and predictable performance across live events, all sized venues, and converged Operational Technology and Information Technology environments (OT/IT). The IEEE 802.1 Time-Sensitive Networking (TSN) set of standards provides the deterministic Ethernet framework to meet these demands and enable scalable networking solutions capable of supporting modern ProAV workflows.

The IEEE 802.1BA "Audio Video Bridging (AVB) Systems" TSN profile selects the features and configurations that ensure AVB devices interoperate predictably on Ethernet networks. Avnu Alliance's Milan Specification builds on this foundation adding other necessary technologies, such as IEEE 1722 for media transport and IEEE 1722.1 for device discovery, connection management, and control, thus defining a complete set of mechanisms to satisfy ProAV requirements. Some of the largest live events world-wide use Milan Certified Products. This TSN profile-based approach demonstrates how different industries can align on a common network infrastructure, helping break down traditional silos so that applications – from industrial automation, automotive, aerospace and defense, to professional media – can confidently share the same deterministic Ethernet without resorting to separate cabling and dedicated networks.

IEEE Standards in Professional Audio/Video

Key Factors:

Interoperability: Optimal parameter choices of the IEEE 802.1BA "Audio Video Bridging (AVB) Systems" standard. AVB is a TSN profile defined by the IEEE, designed to enable deterministic, real-time communication allowing products from different vendors to connect and communicate and be managed.

Discovery, Connection, and Control: AV devices automatically find each other, establish reliable media streams, and maintain coordinated operation on the network. Discovery enables endpoints to announce capabilities and be easily identified within a Milan system. Connection ensures deterministic, standards-based stream setup and reservation using IEEE 802.1BA TSN mechanisms, providing guaranteed bandwidth and low latency. Control provides a common model for configuration, monitoring, and status management, enabling predictable behavior and seamless interoperability across multivendor Professional AV deployments.

Base Stream Formats: A specific format type described in the Milan Specification based on the TSN definition to ensure interoperability.

Media Clocking: The process of precisely synchronizing time across audio and video devices so that media streams stay perfectly aligned during transport and playback, ensuring glitch-free, phase-accurate performance in networked AV systems.

Seamless Network Redundancy: The ability of a network to continue carrying audio and video without interruption by automatically switching to a backup path if the primary path fails.

Standards:

1. IEEE 802.1BA – Audio Video Bridging (AVB) Systems

2. IEEE 802.1Q – Bridges and Bridged Networks

3. IEEE 802.1AS – Timing and Synchronization for Time-Sensitive Applications

4. IEEE 1722 – Transport Protocol for Time-Sensitive Applications in Bridged Local Area Networks

5. IEEE 1722.1 – Device Discovery, Connection Management, and Control Protocol for IEEE 1722(TM) Based Devices