P1722.1 Use Case

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Use-Case Summary

This description gives an 802.1AVB Use-case for large-scale live-audio events

Key Requirements:

• Multiple vendors must independently operate on one network
• A balance of auto-configuration and manual configuration is desirable for repeatable, predictable operation.
Pro Audio Use Case Block Diagram

Approx 10 - 100 output streams

Speaker System
AVB Endpoint
DSP
Amps
Speaker Cab
Speaker Cab
Speaker Cab

AVB Encoder

Switch

Approx 100 input channels

Stage Mixing Console(s)

Switch

Up to 2km fiber

Switch

Non-AVB Devices, e.g. Mgmt Console(s)

FOH Mixing Console(s)

AVB Controller

Vendor A Device Controller

Vendor B Device Controller

Controller:
- Address management
- Stream identification

Figure 1: Use Case Block Diagram
Interworking Goals

• Allow speaker systems, AVB-enabled switches, microphone and instrument pre-amps and mixing consoles to be interconnected to create a reliable, easy-to-use sound reinforcement systems.

• Minimize configuration complexity, (e.g. MAC addresses shall not be tapped into a keypad to make a stream happen.)

• Maintain enough centralized control to ensure reliable, predictable and repeatable configurations.
Interworking Non-Goals

• Standardized Application-specific and Device-specific configuration isn’t a requirement... Just get the streams to flow...
Assumptions

• Multiple Speaker Control and Mixing Console systems may be in separate administrative domains.
  – They’re all plugged into one AVB network, but each requires its own focus of control, with “just enough” visibility into each others’ devices.
  – E.g. Not every controller can set up connections on every part of the network
• A system controller may be beneficial in this network
  – i.e., completely automatic self-configuration is not required
  – Functions that cross administrative domains should be minimized
  – Failure of a System Controller should not affect the flow of established streams.
• WiFi / 802.11 is not expected to be used for audio connectivity
  • But WiFi might be used for network control
• Devices may not be physically accessible without substantial effort.
  • i.e., access must not be required for control and/or configuration.

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Scaling

In one L2 network domain, there might be:

• ~100 streams from sources to one or more mixing desk(s)

• More than one mixing desk
  • Microphone/instrument channels may be multicast to monitor, Front-of-House (FOH) and recording mixers

• ~10 multicast streams from FOH mixing desk to stage
  (or ~100 multicast streams in the case of large fixed-install conference centers)

• ~100 speaker cabinets.
Areas where Interworking Must Work

• Transport protocol, P1722/1733
  Endpoints must identify/configure the expected bit rates... 48, 96 kHz and 192kHz x 24 bit are all used

• Stream configuration
  i.e. endpoints must agree on which MAC address corresponds to which program stream, with what coding & rate

• L2 and L3 address assignment
  MAAP for L2, ZeroConf or whatever for L3

• Multicast tree pruning
  Fully covered by MMRP, aka 802.1Qak?

• Bandwidth Reservation
  Fully covered by SRP
Areas where Interworking Agreements Might be Helpful

• Network Security, Authentication, Access Control, possibly Encryption
• Device Naming
• Transport Protocol Performance Monitoring
  E.g. RTP/P1733 has the associated RTCP where end points can report transmission impairments such as lost packets in a standardized way
• Redundancy Plan
  Spanning tree provides basic redundancy, but additional standardized redundancy may be valuable.
• Fault Diagnosis