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on The Future of Ethernet Transport

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# Time Awareness for Bridged LANs: IEEE 802.1 Audio Video Bridging


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# Agenda

- 802.1 AV Bridging Task Group
  - What we do
- Why is it needed?
- What is AV Bridging?
- Where will it be used?
- Possible interactions with ITU efforts

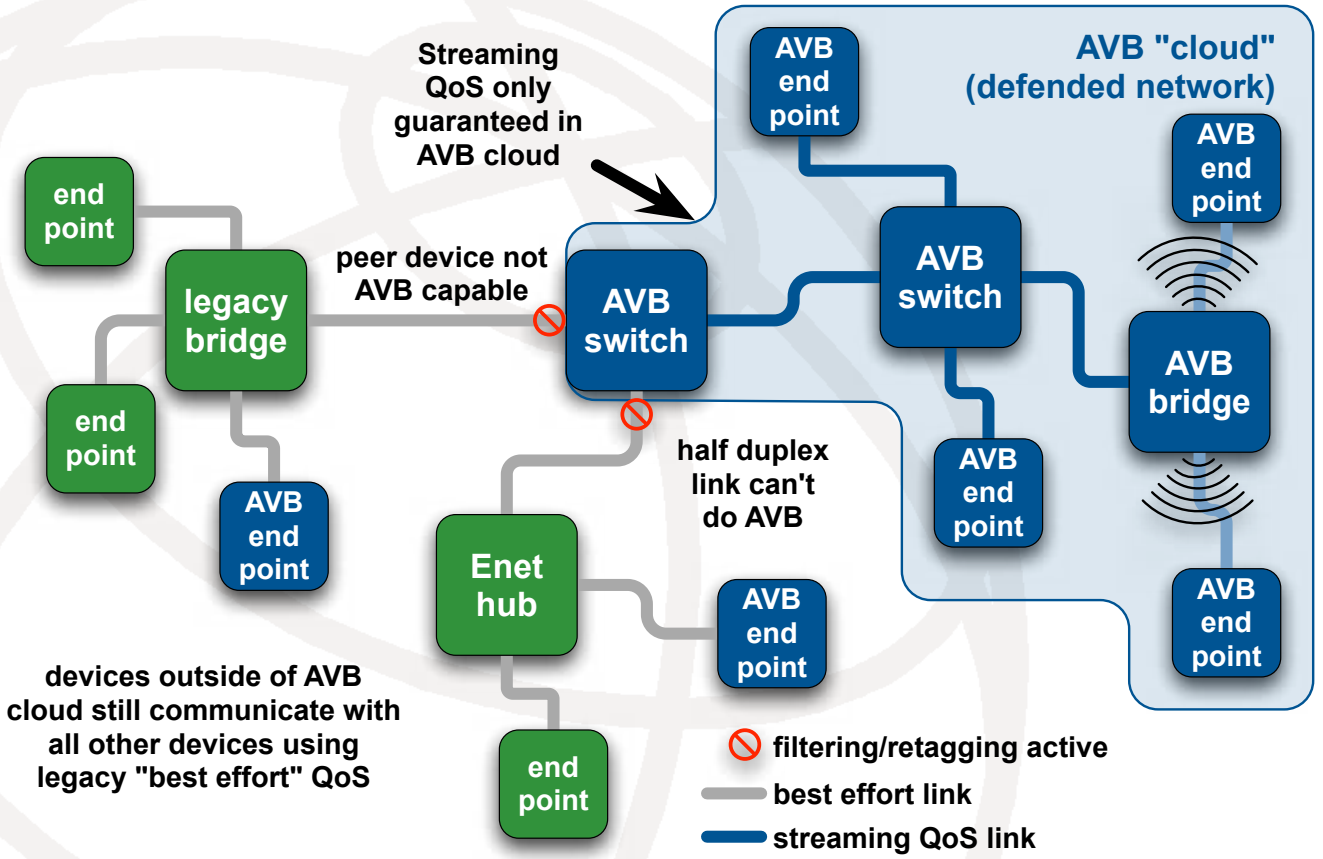
# IEEE 802.1 Audio Video Bridging Task Group

- Formed in late 2005 to provide the specifications that will allow time-synchronized low latency streaming services through 802 networks
- Four projects:
  - P802.1AS: Time Synchronization (in sponsor ballot)
    - Discussed in the next presentation
  - P802.1Qat: Stream Reservation (in sponsor ballot)
  - IEEE Std 802.1Qav-2009: Forwarding and Queuing for Time-Sensitive Streams
  - P802.1BA: AVB Systems (in development)

# Why is it needed?

- Common IT-oriented networks have inadequate QoS controls
  - all use 802.1 “priority” (actually, “traffic class”)
  - no time-based services, no standardized queuing or traffic shaping
  - no guarantees, timing synchronization difficult
- Adding QoS to layer 2 networks is not enough
  - E.g., adding streaming QoS to G.hn only provides better services on a particular G.hn subnet … QoS lost going to WiFi or Ethernet
  - QoS is a NETWORK problem, not just a link problem

# Audio Video Bridging




- AVB is based on 802.1Q bridges
  - The bridges connect together LANs that use different layer 2 technologies: Ethernet, WiFi, MoCA, G.hn

# AVB provides …

- Bounded latency …
  - For 100Mbit/sec it's about 250 usec per link, for 1Gbit/sec it's about 25 usec link
- … with no dropped packets due to congestion …
- … for streams that do not exceed their maximum bandwidth established using the end-to-end "Stream Reservation Protocol"
- PLUS a high-quality time reference

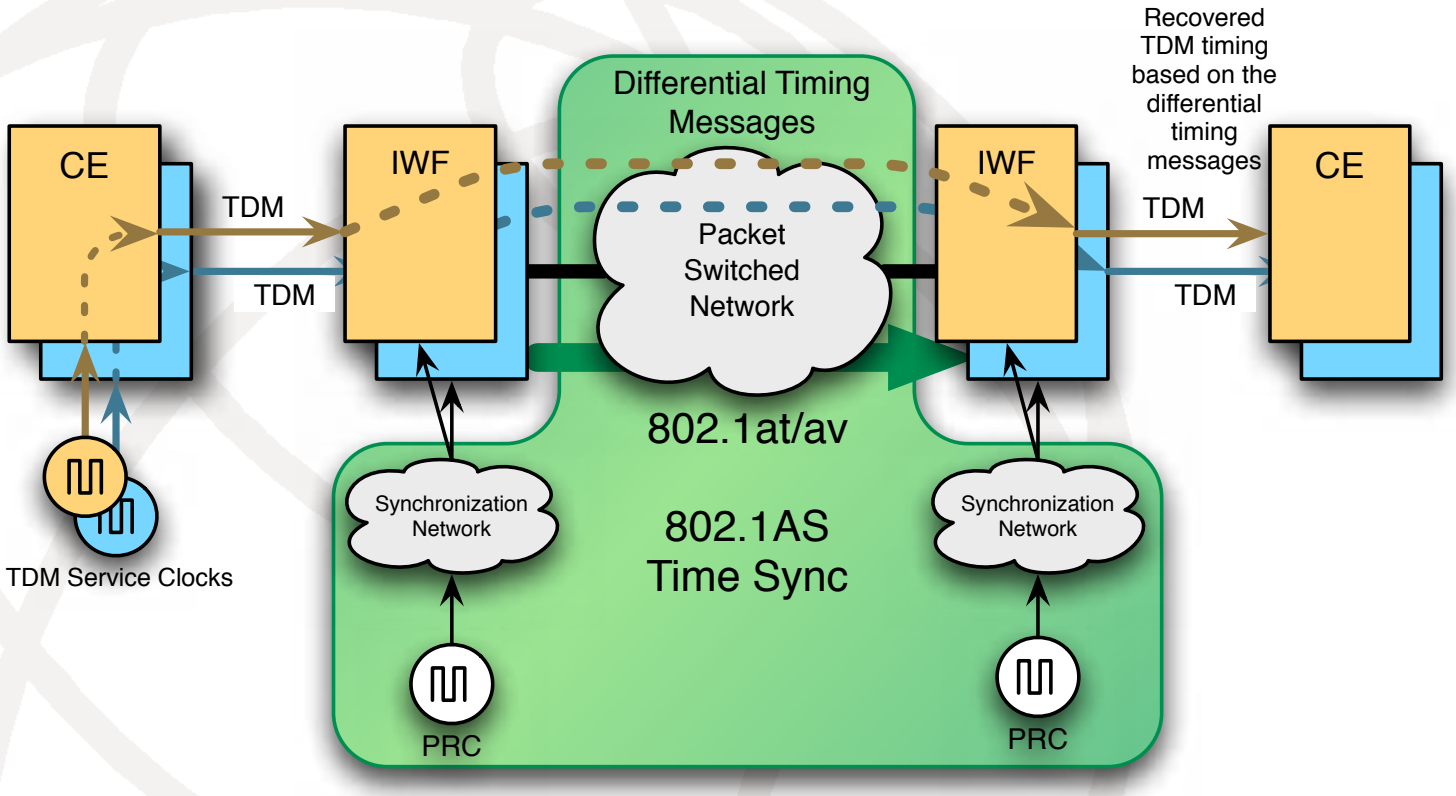
# AVB Will Be Used …

- … in professional audio/video environments
  - Audio and video studios, stadiums, hospitals, airports, live performances
- … in automotive applications
  - Infotainment, sensor systems
- … in consumer electronics
  - Home A/V networking and interconnects
- … in industrial systems
  - Sensors, actuators, motion control

# AVB Provides Carrier Networks …

- Precise synchronization services
  - 802.1AS - IEEE 1588v2 as applied to 802.1 bridged networks.
  - Much better MTIE than needed for SONET
- Connection-oriented services
  - 802.1Qat - Stream Reservation Protocol to manage streams
  - 802.1Qav - Guaranteed latency and bandwidth for established streams
- Removes the need for external PHY-level synchronization
  - Any 802.3 PHY will work, nothing special needed, full configuration flexibility
  - Support for other full-duplex point-to-point PHYs trivial
  - Support for shared media MACs allowed (EPON, 802.11, MoCA) via sublayer definition

# Putting it All Together




- AVB supports multiple independently clocked streams/domains

# Thank you!

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