802 AVB: 
bringing it all together

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Agenda

• What is 802 AVB?
• Why is it needed?
• Where will it be used?
• How does it work?
• Beyond?
What is 802.1 AVB? (Audio/Video Bridging)

- Simple enhancement to IEEE 802.1 bridges to support streaming services
  - 2 ms guaranteed latency through 8 Ethernet hops
    - longer, but still guaranteed, latency through other network hops
  - Admission controls (reservations) for guaranteed bandwidth
  - Precise timing and synchronization services for timestamps, media coordination, and localization
    - jitter less than 100ns, filterable down to 100ps
    - < 1μs absolute synchronization between devices
    - localization granularity < 10m

- Applies to all networks compatible with IEEE 802 48-bit addressing
Why is it needed? (1)

- Common IT-oriented networks have inadequate QoS controls
  - All use 802.1 “priority” (actually, “traffic class”)
- Ethernet is the best
  - but it’s easy for the customer to misconfigure or overload
  - no guarantees
- Wireless has inadequate bandwidth and excessive delays for whole-home coverage
  - 802.11n and UWB work for non-critical applications, or short range
  - latencies through multiple A/Ps may be too much for interactive applications
  - no guarantees
  - and we still need a backbone for the wireless attachment points
Why is it needed? (2)

- Proposed CE-based networks need new media or are expensive
  - MoCA requires coax everywhere, and is not cheap, and does not carry power, and has modest performance
    ... but it’s part of the solution
  - Power line is not cheap, has modest performance, is susceptible to interference, and is blocked by protection circuits
    ... but it’s part of the solution
  - 1394b/c long distance has limited developer base & infrastructure, is not cheap
    ... but even this is part of the solution
Digital Home Media Distribution

Satellite Broadband
Over-the-air Broadcast
Content/Services
MSO Broadband
Telco Broadband

Home network backbone

Den
Living Room
Bedroom
802.11 Coax STB
2nd Wireless AP

Residential Gateway(s)
WebPad
Security Panel

802.11 Coax STB

Family Room
Kitchen

Content/Services
Residential Gateway(s)
802.11 Coax STB
Security Panel

MSO Broadband
Telco Broadband
"Ethernet AV": the Gold Standard

- Backbone for home
  - Highest quality/lowest cost way to interconnect wireless A/Ps
  - “Perfect” QoS, requires the least customer interaction

- Within the entertainment cluster
  - Trivial wiring, no configuration, guaranteed 100/1G/2.5G+ per device, not just per room or per house
  - PoE for speakers, extra storage (HD/optical), wireless A/Ps, other lower-power devices
  - Ideal long-term replacement for 1394

- Numerous non-“residential” applications
  - Professional audio/video studios, industrial automation, test and measurement
Wireless and AVB

• Fundamental services are in place for both 802.11 (WiFi) and UWB
  – Rather different model, but compatible

• QoS will not be as good as Ethernet
  – much longer latency
    • but OK for “remote control” responsiveness
  – much less bandwidth
    • but OK for limited channels
  – and very, very useful for a huge number of applications
    • mobile and “no new wires”
Streaming QoS only guaranteed in AV cloud

Peer device not AV capable

Half duplex link can’t do AV

Filtering/retagging active

Devices outside of AV cloud still communicate with all other devices using legacy "best effort" QoS
When?

• IEEE standardization process started
  – IEEE 802.1 created “Audio/Video Bridging Task Group” in November 2005

• First hardware/software soon after stabilization
  – Possibly a number of “pre standard” implementations

• Later editions support uncompressed HD video
  – “multiGigabit” NIC/Switch (“Ethernet HD”)
Summary

- Ethernet AV will be the standard interconnect for uncompromised quality of service – soon!
- Wireless 802.11 AV shortly after that for “no new wires” and mobile applications
- Bridging to other nets is likely – 1394 and MoCA bridging rather straight-forward
Thank you