# Routing of AVTP and ATDECC

Ashley Butterworth
Apple Inc.

# Routing AVTP

- AVTP an ATDECC both have a higher layer addressing scheme (StreamID and Entity ID) as such they can both be routed between separate subnets
- Applications are emerging where due to network size or other constraints the network must be split up into separate subnets but require streams to flow between them

# AVTP Router

- routes packets from one subnet to another
- **a time aware system that bridges time between ports**
  - i.e. both subnets are in the same gPTP domain
- does not re-clock media
- SRP attributes are transferred by higher layer routing application not with the SRP MAD
  - i.e. each port is running it’s own SRP instance

# AVTP Gateway

- receives packets in one subnet and regenerates in the others
- **typically an ordinary clock in each subnet that do not bridge time between ports**
  - i.e. each subnet has it's own gPTP domain
  - May support bridging of time between ports
- Re-clocks media
- SRP attributes are transferred by higher layer routing application not with the SRP MAD

# How it works?

- AVTP Routers and Gateways are managed devices
  - unlike IP routers/gateways they will not just automagically forward streams
- Once ATDECC establishes the streams and SRP establishes the reservation the stream is allowed to flow from one subnet to the other
- AVTP Routers and Gateways are Talkers and Listeners in each subnet (separate AVB domains)

# Media Re-clocking

- Since AVTP embeds the media clock, streams can flow from one gPTP domain to another however the timestamps need to be translated between gPTP time domains
- Most stream formats utilizing the common stream header can just translate the AVTP presentation timestamp
- CRF, TSCF, etc. need to have specialized translators since they contain more than one timestamp

# Max Transit Time - AVTP Router

- The expected use case for an AVTP router is where media playback is synchronized on devices across both subnets
  - e.g. splitting a network into multiple subdomains to limit the number of devices in each
- It is expected that the Max Transit Time is large enough to include the stream passing over the router
  - may require a larger than default presentation time

# Max Transit Time - AVTP Gateway

- The expected use case for an AVTP Gateway is where media playback does not have to be synchronized across subnets or where it is required to have multiple gPTP domains
  - e.g. media being sent between buildings or long haul across the country/world
- It is not expected that the Max Transit Time is large enough to cross the gateway.
  - A control within the entity model will allow the controller to specify and adjustment to the presentation time

# SRP - AVTP Router

- AVTP Router takes the accumulated latency received at the Listener, adds it's latency (the time between the Listeners ingress time reference plane and the Talkers egress time reference plane) and adds the usual SRP/FQTSS times and uses this as the accumulated latency of the Talker Advertise

# SRP - AVTP Gateway

- AVTP Gateway starts the accumulated latency again as though it’s the first Talker of the stream

# Comparison

| | AVTP Router | AVTP Gateway |
|---|---|---|
| gPTP | Bridges time | Usually separate domains may bridge time as well |
| SRP | Talker starts of with accumulated latency of received Listener | Talker starts of with only the standard accumulated latency |
| Media Re-clocking | None (same domain) | Re-clocked if different domains |
| Presentation time offsetting | None | Control to adjust, defaults to the default Max Transit Time + gateway delay |

# What work needs to be done?

- AVTP (1722)
  - Need an annex or a clause describing AVTP routers and gateways
  - Need an annex or a clause (could be same as above) describing how to re-clock media
- ATDECC (1722.1)
  - Enhancements to describe the router and allow setting up of the routed streams
  - New controls, etc.

# Feedback

- Comments, suggestions, darts…