Audio Video Bridging SRP 2.0 Assumptions

IEEE 802.1 AVB Plenary

Jul 2010 – San Diego, CA

Green Text = Agreed to at a Plenary (was Blue or Red)

Blue Text = Newly Agreed to (was Red at last Face 2 Face)

Black Text = Not Decided

Changes Marked with Red from last version

Craig Gunther

Harman International

Craig.Gunther@harman.com

Revision History

- at-cgunther-srp-rev2-assumptions: First draft presented July 2010, San Diego, CA

Overview

This document is a collection of concepts and ideas for *possible* inclusion in the next version of SRP.

It should not be considered as a Work Item list.

Reservations

- Dynamic bandwidth reservations (modify ‘on the fly’)
  - Done by requesting the same Stream ID with a new T-Spec?
- Variable bit rate reservations (statistical averaging)
- Dynamic changes to latency
- Two-way reservations (VOIP phones)

802.3 Link Requirements

- Link aggregation
- Redundancy
- Energy Efficient Ethernet

Stream Characteristics

- Unicast Stream destination address
- Multiple Talkers per Stream (one streaming at a time)
  - Networked video switcher
- Multiple Talkers per Stream (time sliced approach)
  - Industrial control (http://www.ieee802.org/1/files/public/docs2010/at-goetz-AVB-lowlatency-part1-0510.pdf)

SR Classes

- More SR Classes
- Configurable SR class priorities and VIDs
  - No service primitives (e.g. REGISTER_DOMAIN.request/indication), management (clause 12), or SNMP (clause 17) to do this currently
- Gateway between conflicting SR Class domains

Other SRP/MRP Enhancements

- Latency calculation algorithm
- Automatic Talker pruning
- The maximum time to make or break an SRP reservation in the absence of a topology change is:
  - This goal is defined per hop assuming a max of 7 hops
  - For consumer remote control applications this must not exceed 100 mSec?
  - For professional video applications this must not exceed 20 mSec?
  - This may need to be moved to 802.1BA
- Enhance MRP to use diff based updates rather than complete database updates (reduces bridge CPU overhead and control bus bandwidth usage)

Other Ideas - 1

- Cloud diagnostics (devices along the path)
  - Perhaps 802.1ag?
- Add “time aware” shaper support for lowest latency
- Ingress policing
- 802.1AE (MACsec) environments
  - Any AVB Streams and PTP & SRP frames can be AE Tagged
  - Implementation detail… but we already want 802.3 to give us timing information!
- PONs are currently not specifically supported
  - i.e., PON support is dependent on contributions from those that need it and may need to become part of a separate PAR

Other Ideas - 2

- How will MSTP select an SRP path over a CM (Congestion Management) path or a non-SRP/non-CM path using 'out of the box' defaults?
  - For AVB with non-AVB devices: Use MSTP with at minimum one spanning tree instance and set AVB to AVB path costs low (match terms in capability vectors) and playing with root costs using MSTP's priority vector?
  - May need a new PAR to define how these vectors are defined?
- SRP for Layer 3? IETF issue?

BACKUP SLIDES AND ADDITIONAL INFORMATION

Dynamic bandwidth reservations

- Application
  - Listener surfs from HD channel to SD channel and bandwidth requirements shrink
- Concerns
  - Bandwidth may not be there for SD to HD channel surf. How does Listener request change from Talker? TSpec has been removed from Listener.
- Solutions?
  -

Variable bit rate reservations

- Application
  - More video channels for a given medium since statistically not every channel will need full bandwidth at the same time
- Concerns
  - What happens when instantaneous requirements exceeds available bandwidth?
  - Also could affect Qav shaping
- Solutions?
  - Temporarily steal bandwidth from Best Effort traffic. Make sure variable bandwidth reservations don't exceed ?95%? of total link bandwidth?
  - Drop precedence?

Dynamic changes to latency

- Application
  - Management reconfigures the Class A % of bandwidth marker
  - Management reconfigures maximum latency in a bridge
  - Management activates more AVB ports
- Concerns
  - Listeners have already configured buffers
  - Increased latency could eliminate active Listeners
  - How to synchronize the change?
- Solutions
  -

Two-way reservations (VOIP phones)

- Application
  -
- Concerns
  -
- Solutions
  -

Link Aggregation

- Application
  - Increased bandwidth availability
- Concerns
  -
- Solutions
  -

Redundancy

- Application
  - Critical systems (e.g. life-safety)
- Concerns
  -
- Solutions
  -

Energy Efficient Ethernet

- Application
  –
- Concerns
  – Increased latency
- Solutions?
  – Disable Periodic timer – DONE IN D6.1

Unicast Stream destination address

- Application
  -
- Concerns
  -
- Solutions?
  -

Multiple Talkers per Stream (one streaming at a time)

- Application
  - Networked video switcher
- Concerns
  -
- Solutions?
  -

Multiple Talkers per Stream (time sliced approach)

- Application
  - Industrial control (http://www.ieee802.org/1/files/public/docs2010/at-goetz-AVB-lowlatency-part1-0510.pdf
- Concerns
  -
- Solutions?
  -

More SR classes

- Application
  -
- Concerns
  -
- Solutions
  -

Configurable SR class priorities and VIDs

- Application
  -
- Concerns
  -
- Solutions?
  -

Gateway between conflicting SR class domains

- Application
  -
- Concerns
  - Increased latency
- Solutions?
  -

Latency calculation algorithm

- Application
  - Identical operation of multi-vendor solutions
- Concerns
  - Someone needs to derive the formula
- Solutions?
  - av-fuller-queue-delay-calculation-0809-v02.pdf

Automatic Talker pruning

- Application
  - Simplified set up
  - Automatic operation
- Concerns
  - All Listeners must be capable and involved
- Solutions?
  -

Maximum time to make or break an SRP Reservation

- Application
  –
- Concerns
  – For consumer remote control applications this must not exceed 100 mSec?
  – For professional video applications this must not exceed 20 mSec?
- Solutions?
  –

Enhance MRP to use diff based updates

- Application
  - Reduces bridge CPU overhead and control bus bandwidth utilization
- Concerns
  -
- Solutions?
  -

Cloud diagnostics

- Application
  - Topology discovery
- Concerns
  -
- Solutions
  - 802.1ag LinkTrace?
  - LLDP + SNMP (which MIBS?)

Add “time aware” shaper support for lowest latency

- Application
  -
- Concerns
  -
- Solutions
  -

Ingress Policing

- Application
  -
- Concerns
  - Stop errant Talkers from corrupting other streams in the Bridge
- Solutions
  -