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Proposal for RAP Alignment to RSPV-IntServ (V0.1)

Contribution to IEEE P802.1Qdd

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Proposal:
Align RAP to RSVP-IntServ with guaranteed QoS by additional optional Features

General:

- Base of this proposal is the current RAP draft v0.2 (IEEE P802.1Qdd)
- Only additional optional RAP features are proposed
- Some of the additional optional features are data plane (bridge) dependent
  (e.g. not each optional RAP feature can be supported by every shaper)

Recap:
MSRP is Basis for RAP

Principles of MSPR:

- Only one Talker (source) per Stream with multiple Listeners
- **Single** context (assumption RSTP)
- Simple Stream identification by DA and VID
- Simple Stream classification by PCP (use of internal priority value is not intended)
- Traffic class for Streams
- Only the class based transmission selection algorithm called CBS is supported
- **No** support for Per-Stream policing and metering

Based on the given hardware features specified by IEEE Std. 802.1Q-2012 MSRP was designed to be extremely simplified in comparison to RSVP-IntServ with guaranteed QoS

Recap:
Since 2012 the IEEE 802.1 WG has specified a bunch new Features for Date Plane

Some of the new data plane features specified in the IEEE Std. 802.1Q + drafts and the IEEE Std. 802.1CB can be used to make RAP (successor of MSRP) more aligned to RSVP-IntServ with guaranteed QoS!

- Extended Stream identification function (specified in Clause 7 of IEEE 802.1CB)
- Per-Stream Filtering and Policing (PSFP, IEEE Std. 802.1Qci)
- Internal priority value specification (IPV)
- Class based or Stream based transmission selection algorithm like cyclic queuing and forwarding (CQF) or asynchronous traffic shaping (ATS, IEEE P802.1Qcr)

This presentation does not request further data plane enhancements!

Proposal:
Additional optional RAP Features

To extent the field of applications further features has to be inserted in RAP to support redundancy, to improve flexibility and to provide the facility for increasing efficient resource utilization.

- **Introduce RAP Session** (RFC 2205)
  - To support reservation over multiple RAP contexts (see RAP draft v0.2)
  - To support one Listener multiple talkers for e.g. one “scheduled” aggregated stream
    see LINK http://www.ieee802.org/1/files/public/docs2019/dd-chen-flow-aggregation-0119-v03.pdf
    (Basic requirements are Per-Stream filtering and policing with grouping, extended Stream identification and appropriate shaper)

- **Introduce filter style** (RFC 2205)
  - Shared-Explicit (SE) reservation style could be used by RAP to support switchover between multiple talkers for one common Stream
    (Basic requirements are Per-Stream filtering and policing, extended Stream identification with grouping, no longer restricted to DA and VID)

- **Introduce Listener Acceptable-Maximum-Latency**
  - Acceptable-Maximum-Latency can be used to optimize per-hop Stream traffic class latency by management
  - Acceptable-Maximum-Latency can be used to optimize latency for a Steam per-hop by managing internal priority value
    (IPV, introduce by IEEE 802.1Q)

More technical details can be provided in a next version of this presentation.

Proposal:
RAP still follows the Principles of MSRP

Fundamental differences between RAP and RSVP-IntServ with guaranteed QoS (RFC 2210) remain

- RAP supports peer-to-peer signaling mode only
- RAP operates class based, e.g. separate traffic class for streams, max per-hop class latency
- One of the transmission selection algorithms (SP, ATS, CQF, …) can be selected per bridge per traffic class for queue draining
- In principle the PCP (comparable to DSCP used by DiffServ) is used to address the stream traffic class
- Listener may use Acceptable-Maximum-Latency instead of Rspec (defined by RSVP-IntServ, RFC 2210)

For our point of view architectural differences between Bridges and Routers and RAP PAR scope argue against

- Tunneling of signaling messages (RFC2746)
- Pipes for time sensitive streams which consists of multiple talkers and multiple Listeners