PAR and 5C
Stream Reservation Protocol (SRP) Enhancements and performance improvements

Version 4

Craig Gunther, 15May2013

Introduction

The PAR and 5C presented here are based on the
"SRP Next Generation (unrelated to IS-IS); A New PAR?"
(http://www.ieee802.org/1/files/public/docs2013/new-tsn-cgunther-SRP-next-gen-0313-v01.pdf)
presentation given at the March 2013 plenary in Orlando, FL.

Much of the text in the PAR section of this document is expected to be copy-and-pasted into the official document to be submitted to NesCom. With that in mind there are several notes and discussions that should not be copied. These are indicated by the prefix "*<EDITOR'S NOTE:*" .

PAR – Title, Dates and Participation

HARMAN

2.1 Title:

Standard for
    Local and metropolitan area networks –
    Media Access Control (MAC) Bridges and Virtual Bridged Local Area Networks –
    Amendment: Stream Reservation Protocol (SRP) enhancements and performance improvements

4.2 Expected Date of Submission for Initial Sponsor Ballot:

May 2015

<EDITOR'S NOTE: This may need to be adjusted based on Scope decisions>

4.3 Projected Completion Date for Submittal to RevCom:

December 2015

<EDITOR'S NOTE: This may need to be adjusted based on Scope decisions>

5.1 Approximate number of people expected to work on the project:

25

PAR - Scope

5.2 Scope:

This amendment provides protocols, procedures and managed objects for bridges and end stations that allow:

- Maintain backwards compatibility with Qat
- Support for more streams

  <EDITOR'S NOTE: MRP timer work and refresh reduction (including timer negotiation?). Talker VLAN pruning. Talker Pruning per port. Speed up make/break reservation time. Support reservations on aggregated links.>

- Configurable SR classes and streams

  <EDITOR'S NOTE: Configurable Priority, VID, Observation interval, Max latency. More SR classes. Per stream selection of Qav or Qbv, Q??, or CB. Configuration of new Qbv time-aware Shaper. Modify clause 12 and 17 to allow creation of reservations from a management interface(MIB should not say "persistent over power-up").Energy Efficient Ethernet and its affects on latency. Effects on latency in the presence of Qbu.>

- Better description of stream characteristics

  <EDITOR'S NOTE: Configure max latency per bridge port. Lock-down current latency. Talkers and/or Listeners specify acceptable stream characteristics. Multiple talkers per stream. Two-way reservations. Tear-down rank bit. Allow latency changes from network reconfiguration. Unicast address Stream DA (is locally administered good enough?) or is this a layer 3 IP address problem? Connect reservation to path created by Qca, including redundant paths.>

- Support for Layer 3 streaming

  <EDITOR'S NOTE: Interoperability with RSVP. Layer 3 IP addressing problem with multiple VLANs (PVID & SR_PVID). 268M IP multicast -> 8M Ethernet multicast: 32 IP multicasts addresses for every allocated Ethernet multicast address (01:00:5e:00:00:00 through 01:00:5e:7f:ff:ff).>

- Deterministic stream reservation convergence

  <EDITOR'S NOTE: Avoid flapping. A reboot results in restoration of same reservations (although not persistent in MIB).>

TO-DO:

Support explicit path setup via SRP, IETF PCE (Path Computation Element)?

PAR – Completion and Purpose

5.3 Is the completion of this document contingent upon the completion of another document:

No

5.4 Purpose:

<EDITOR'S NOTE: This document will not include a Purpose clause.>

PAR – Need and Stakeholders

5.5 Need:

The first generation of the Stream Reservation Protocol (SRP) has been accepted by the Professional, Industrial, Consumer, and Automotive markets. This set of enhancements extends the capabilities of SRP as requested by those markets.

5.6 Stakeholders for the Standard:

Developers, providers, and users of networking services and equipment for Professional, Industrial, Consumer electronics, and Automotive networking.

PAR – Sponsor and Joint Development

6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?:

No

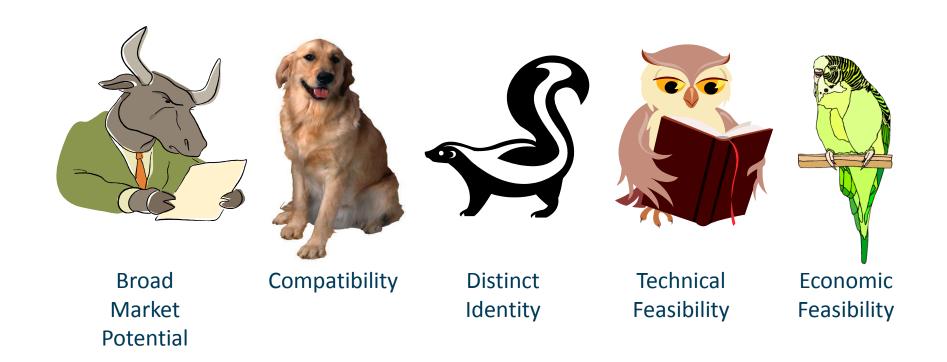**6.1.b. Is the Sponsor aware of possible registration activity related to this project:?**

No

7.1 Are there other standards or projects with a similar scope?:

No

<EDITOR'S NOTE: What about Qca PAR?>

7.2 Joint Development. Is it the intent to develop this document jointly with another organization?:

No

<EDITOR'S NOTE: What about IETF PCE (Path Computation Element)?>

The 5 Critters

Broad Market Potential

Compatibility

Distinct Identity

Technical Feasibility

Economic Feasibility

Broad Market Potential

a. Broad sets of applicability
b. Multiple vendors and numerous users

a. The proposed amendment would apply to 802 networks composed of full duplex IEEE 802.3 and IEEE 802.11 networks as well as Coordinated Shared Networks (CSN) and Multimedia over Coax Alliance (MoCA) networks.

<EDITOR'S NOTE: Should we excluded CSN and/or MoCA so there is more flexibility in wired and wireless?>

a. This amendment is proposed based on requests from silicon providers as well as customers who want to employ SRP in new and varied ways. This includes uses in small automotive networks up through extremely large installed sound installations and industrial networks.

Compatibility

IEEE 802 LMSC defines a family of standards. All standards should be in conformance: IEEE Std 802, IEEE 802.1D, and IEEE 802.1Q. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with IEEE 802.1 Working Group. In order to demonstrate compatibility with this criterion, the Five Criteria statement must answer the following questions.

    a.   Does the PAR mandate that the standard shall comply with IEEE Std 802, IEEE Std 802.1D and IEEE Std 802.1Q?

    b.   If not, how will the Working Group ensure that the resulting draft standard is compliant, or if not, receives appropriate review from the IEEE 802.1 Working Group?

a. This is an amendment to IEEE Std 802.1Q and will be internally consistent.

b. (Not applicable)

Distinct Identity

a. Substantially different from other IEEE 802 LMSC standards
b. One unique solution per problem (not two solutions to a problem)
c. Easy for the document reader to select the relevant specification

a. There is no existing 802 standard or approved project that provides the SRP enhancements specified in the Scope of this project.

b. The proposed amendment will consist of a single set of specifications for the enhancements. There is other work currently underway (IEEE P802.1Qca) that will enhance the path selection used by SRP, however that project does not address the SRP enhanced services specified in this project.

c. The proposed project will be formatted as an amendment to IEEE 802.1Q-2011.

Technical Feasibility

a. Demonstrated system feasibility

b. Proven technology, reasonable testing

c. Confidence in reliability

a. The first generation of the Stream Reservation Protocol (SRP) has been accepted by the Professional Audio, Consumer, and Automotive markets and is included in AVB Compliance and Interoperability certification program specified by the AVnu Alliance. This set of enhancements extends the capabilities of SRP as requested by the above mentioned markets.

b. This amendment is based on mature virtual LAN bridging protocols and is expected to be included in future AVnu C&I testing criteria.

c. The technology re-use, and other augmented methods are deemed proven for their reliability.

Economic Feasibility

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a. Known cost factors, reliable data

b. Reasonable cost for performance

c. Consideration of installation costs

a. This enhancement would add no hardware costs beyond the minimal and well-known resources consumed by an enhanced software protocol whose requirements are firmly bounded.

b. Adding the enhancements will have a negligible impact on the cost of 802 networks.

c. It will be possible for configuration related to the enhancements to be automatic and require no action by the user; therefore, there are no incremental installation costs for the provision of these enhancements.