DetNet Control Plane Signaling

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Premise of the Draft

“This document provides solutions for control plane signaling, in accordance with the control plane framework developed in the DetNet WG. The solutions cover distributed, centralized, and hybrid signaling scenarios in the TSN and SDN domain. We propose changes to RSVP IntServ for a better integration with Layer 2 technologies for resource reservation, outlining example API specifications for the realization of the revised RSVP (called RSVP-detnet in the document)”

• Draft outlines solution proposals, currently focused on distributed control
• Soliciting early feedback of this work
General Structure

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Main focus of current work
Main proposal for aligning L3 with L2 signaling (more later)
For future revisions – contributions welcome
Baseline

• Draft covers all three control plane (CP) classes, as outlined in [ID.malis-detnet-controller-plane-framework-03]
  • Distributed
  • Centralized (SDN-like)
  • Hybrid

• Current contribution focusses on distributed CP proposal
Difference Between RAP(TSN) & RSVP

• Discussed in more detail throughout Section 2.4 covering
  • Assumption on network nodes
  • Mapping of latency model
  • Dealing with latency margins
  • Dealing with jitter and non-shaping nodes
  • Mapping resource reservation styles

• Number of challenges posed upfront in Section 2.2
  1. Is RSVP IntServ (as defined in [RFC2212]) the right starting point?
  2. How to efficiently map the different reservation styles of RSVP onto RAP?
  3. What is the nature of the RSVP-RAP interface?
  4. How is the binding between L3 signaling (RSVP IntServ) and L2 signaling (RAP) realized, e.g., mapping of Stream-ID?
Interactions between L2/L3: Main APIs

Data plane: According to IEEE 802.3 + 802.1 (with extensions defined by TSN)

L2 – Control plane e.g. IEEE P802.1Qdd for Bridged Ethernet

L3 – Control plane: RSVP - DetNet

Maybe: L 2.5 (e.g. MPLS + RSVP)

Application specific Higher Layer Protocol

TSN API (tAPI)

Maps / Signal / Aggregation

Lower API (dIAPI)

Upper API (duAPI)

Application

Endsystem

IEEE 802.1 Q-Bridge

First Router
RSVP-DetNet

• Rationale
  • *Split control over resource style and sender selection* (see Section 2.5.1) to align RSVP to announce model of RAP in TSN, where resource style is known when propagating the Announce downstream
  • *Introduce ‘Coordinated Share Resource’ Style* to support large amount of deterministic connections with small data usage each, using instead scheduling of those connections (coordination) into the shared resource

• API specifications for RSVP-detnet
  • Provided in Section 2.6.1 and 2.6.2 of draft
  • Example TSN API provided
Future Plans

• Solicit feedback on proposed changes to signaling in RSVP, specifically the proposed split of resource control and sender selection
  – A possible goal could be a new RFC for RSVP-detnet

• Common duAPI - independent of configuration model like Distributed, Centralized (SDN-like) or Hybrid

• Add centralized and hybrid solutions

• Co-authors and contributors welcome!