DetNet Architecture

draft-finn-detnet-architecture
Norm Finn, Pascal Thubert, Michael Johas-Teener

IETF 95 Buenos Aires
DetNet Architecture

• Objective/purpose of document
  – Goals
  – Non-goals
• Current status
• Essential aspects of the architecture
• Open issues questions/discussion
• Plans
• Open discussion
Objectives / goals

• To define an architecture that:
  – Provides assured maximum latency and extremely low packet loss rates for fixed-bandwidth critical streams
  – Across a mixed bridged and routed network
  – Taking advantage of IEEE 802.1 TSN standards
  – Without disrupting existing Qualities of Service,
  – While adding and/or modifying as few concepts, hardware requirements and protocols as possible.
Objectives / non-goals

• Critical streams have fixed bandwidth; congestion control via feedback / throttling is not an option.
• Tunneling through L3 networks to connect L2 TSN domains is not precluded, but is not a specific goal; target applications’ networks are too big for L2 connectivity.
• Precise time synchronization is typically required by the target applications, and by some proposed DetNet queuing techniques, but is not an objective of DetNet.
Current status

- draft-finn-detnet-architecture-04 uploaded on 21 March
- Changes from version 03:
  - Terminology changes, especially:
    - Stream $\rightarrow$ DetNet flow
    - Seamless redundancy $\rightarrow$ packet replication and deletion
  - Layering clarifications (Individual sequence checking layer deleted).
Essential aspects of architecture

• **Reservation/enforcement:** Network resources are reserved and various forms of data plane queuing/shaping/scheduling are configured along a stream’s path to ensure worst-case latency and zero congestion loss.

• **Seamless redundancy:** Sequentialized streams can be sent over divergent and/or pinned-down paths and reassembled at intermediate points, or at/near the destination(s).

• **Defense:** The effects of a misbehaving talker / bridge / router must be minimized.
Essential aspects of architecture

• One size does not fit all. Different applications and verticals make different selections of techniques.

• Reservation model includes Applications Controllers requesting QoS for streams from a Network Controller.
Open issues

• Are the existing and in-progress shapers and schedulers necessary? Sufficient?
• Are DiffServ techniques adequate? Shall we define IntServ techniques?
• Which techniques for stream ID and sequencing for QoS and pinned-down paths are suitable in a mixed bridged and routed network?
  – L2 addresses? L3 5-tuple or deeper? MPLS labels?
• Is a peer-to-peer L2/L3 reservation protocol, working without a central controller, needed?
  – If so, shall we base it on IETF RSVP? IEEE MSRP?
Plans

• Decide whether draft-finn-architecture is a suitable starting point for an architecture draft for the DetNet WG.
• If so, make whatever changes are needed to make the draft suitable for adoption by the DetNet WG.
Open Discussion

• Blindfold? Cigarette? Ready! Aim!