

DetNet Architecture

draft-finn-detnet-architecture

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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!