Criteria and Assessment for DetNet Services Forwarding Plane Methods

draft-eckert-detnet-criteria-assessment-00

DETNET WG IETF116

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Goals

- Q: How should we (DetNet WG)
  and later implementers/operators compare and select
  - For a particular deployment (network, speed, scale, application)
  - The most fitting forwarding plane method ?
- A: Ideally there was a “Spec-Sheet”
  - Describing the Method
  - Maybe later also implementations of the method (adds more implementation parameters)

- This draft is an attempt at defining such a “Spec Sheet”
  - Definition / explanation of criteria
  - Example spec-sheet for one method (TCQF)

Criteria (1)

End-to-end Service characteristics

- Latency guarantee: NA / Bounded or Heuristic
- Hop-by-hop jitter bounds: in-time / on-time / <other>

Network Applicability

- Intended / applicable for IP / IPv6 / MPLS (subset)
- Intended for 100Gbps networks and faster (Yes/No)
- Requires new on-the-wire packet header fields (Yes/No/ Optional)

Link Latency/Jitter requirements

- Latency requirements for links
- Jitter requirements/impact for wireline links
- Jitter requirements/impact for radio links

Asynchronous: Yes / No (No =~ Asynchronuous)

Clocking: MTIE impact on jitter and bounded latency

Criteria (2)

Traffic Model – of flows to use the model

Forwarding model

- (per-hop, per-flow) Stateful: Yes / No (No =~ stateless)
- Algorithm parameters and mechanisms

Calculus

- Published per-hop calculus: Yes/No
- Published linear per-hop, per-flow calculus: Yes/No
- Hop-by-hop jitter bounds: in-time / on-time / <other>

Packetization

- Per-flow compatibility with per-hop source-routing: Yes/No (SR-MPLS, SRv6, BIER-TE,…)
- End-to-end packet header requirements (~N bits/bytes)
- Hop-by-hop packet header requirements (M + N/per-hop bits/bytes)

Assessment – TCQF (1)

End-to-end Service characteristics

- Latency guarantee: **Bounded**
- Hop-by-hop jitter bounds: **on-time (2 * cycle-time T)**

Network Applicability

- Intended / applicable for: **IP, IPv6, MPLS**
- Intended for 100Gbps networks and faster: **Yes**
- Requires new on-the-wire packet header fields: **No**

Link Latency/Jitter requirements

- Latency requirements for links: **arbitrary**
- Jitter requirements/impact for wireline links: **supported (at cost of higher latency)**
- Jitter requirements/impact for radio links: **TBD**

Asynchronous: **No**

Clocking: MTIE impact on jitter and bounded latency: **higher MTIE translates into added latency**

Assessment – TCQF (2)

Traffic Model – of flows to use the model: **bits/cycle time T for a flow**

Forwarding model

(per-hop, per-flow) Stateful: **No**

Algorithm parameters and mechanisms:

mapping table on each egres interface:

(input-interface, ingres-cycle) -> (egres-cycle / egres-cycle-buffer)

Calculus

Published per-hop calculus: **Yes**

Published linear per-hop, per-flow calculus: **Yes**

Hop-by-hop jitter bounds: **on-time (2 * T) – same as end-to-end jitter**

Packetization

Per-flow compatibility with per-hop source-routing: **Yes** (SR-MPLS, SRv6, BIER-TE,…)

End-to-end packet header requirements: **2 bits** (3 cycle values)

Hop-by-hop packet header requirements: **0 bits**

Summary

- Very early proposal how we could start capture “common parameters”
- If other methods propose would attempt to apply criteria, it would hopefully help to identify gaps / improve these parameters

- Feedback / collaboration highly welcome!