MPLS Network Action for Deterministic Latency

draft-sxg-mpls-mna-deterministic-latency-01

Xueyan Song	ZTE Corp.
Quan Xiong	ZTE Corp.
Rakesh Gandhi	Cisco Systems, Inc.

IETF 120 Meeting, July 2024

Acknowledgement

- The co-authors would like to thank the comments from Adrian Farrel, Lou Berger, Gregory Mirsky, Loa Andersson, et al.
- The draft has been presented at IETF 116 and 118 meetings, thanks for your attentions.

Updates

1. Modified draft name/title
2. Aligned with the latest MNA header
3. Simplified ancillary data encapsulation
4. Editorial updates

Requirements

1. This document presents an MPLS MNA solution for Deterministic Latency to resolve DetNet scaling issues described in [I-D.ietf-detnet-scaling-requirements].
2. The use case Delay Budgets for Time Bound Applications described in MPLS MNA [I-D.ietf-mpls-mna-usecases].

Terminology

- **Deterministic Latency (DL)**

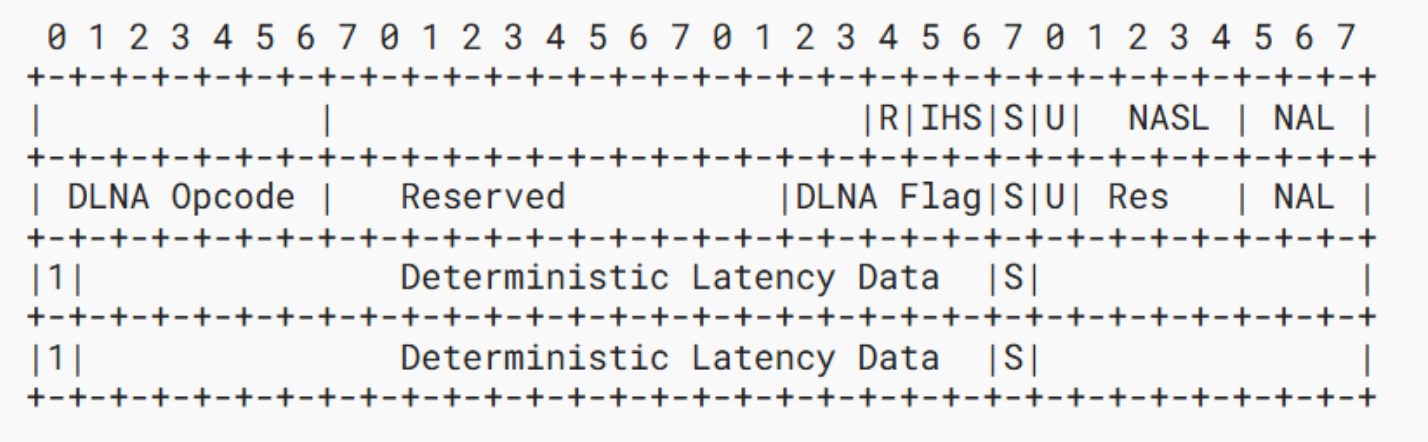
  /Old/ The bound of network latency and delay variation between two DetNet endpoints.

  /New/ The ability to precisely determine the delay in the network from source to destination(s). The delay is variable and depends on the queuing mechanisms used for network flows and the operations of the network nodes. The delay variation is acceptable but should be bounded and measurable.

- **Deterministic Latency Network Action (DLNA):** used to indicate deterministic latency network action for MPLS data plane.

DLNA Sub-Stack

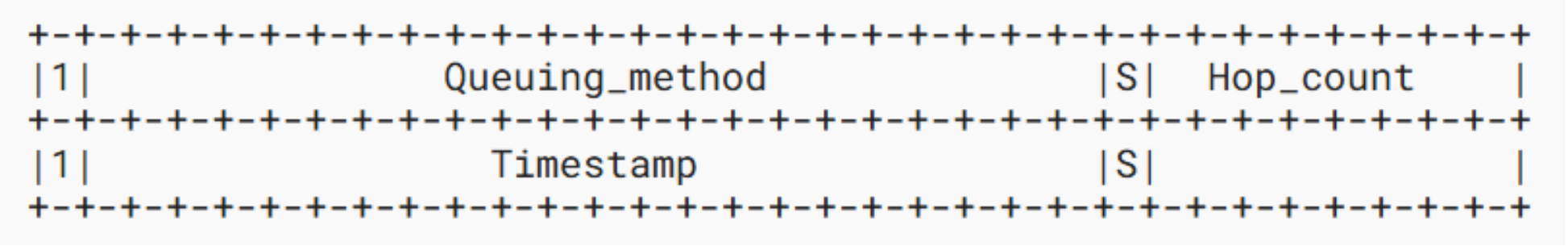
- DLNA Header Considerations
  - Information used by functions ensuring Deterministic Latency for scaling topo and scaling flows
    - Queuing mechanism (e.g., TAS, CQF, etc.)
    - Delay data (e.g., latency, cycle, time budget, etc.)
  - DetNet PREOF supported via sequence number and S-label
  - Aggregated flow identification supported via MPLS A-label



- MNA Format for DLNA
  - DLNA Opcode: DLNA network action
  - DLNA Flags: DL type, Latency Bound or Queueing Delay Bound
  - IHS (2 bits) : includes Ingress To Egress (I2E) (00) and Hop-By-Hop (HBH) (01) processing
  - U (1 bit): Unknown, suggested 0 (ignore)
  - NAL, DLNA action length, the number of AD LSEs
  - AD LSE, Ancillary Data for specific DLNA latency information

Ancillary Data

- What information carried is expected
  1. Ensure end-to-end latency and jitter information (e.g., deadline, timestamp, etc.), it is important to select the right queuing methodology applied to specific applications and carry necessary queuing delay information.
  2. Network delay be related to network topology scale and network flows scale, hop counts for delay assessment is an important factor.
  3. No consensus for delay information carried for data plane in DetNet WG.
  4. Packet-by-packet load-sharing e.g., via ECMP is not utilized in DETNET [RFC8938], Section 3.5.1.5, hence timestamp can be added in In-Stack Data.
- Possible information carried in LSE Format D



Next Steps

- Request for WG reviews and suggestions
- Request WG adoption

Thank You!