MPLS Sub-Stack Encapsulation for Deterministic Latency Action (DLA)

draft-sx-detnet-mpls-queue-05

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Agenda

- Background
- Enhanced Requirements Satisfaction
- DLA Solution
- MPLS Sub-stack for DLA
- Next Steps

Background

- Progress from DetNet WG
  - At IETF 114, the WG Charter updated to V03 with document milestone of requirements and solution for enhanced DetNet Data Plane
  - At IETF 115, the WG adopted the draft on enhanced DetNet data plane requirements
    - draft-ietf-detnet-scaling-requirements-01
  - Recently, the WG set up a DT to make progress on the requirement and solution drafts for enhanced DetNet data plane.

Enhanced Requirements Satisfaction

- Data plane enhancement requirements specified in section 4 of draft-ietf-detnet-scaling-requirements-01

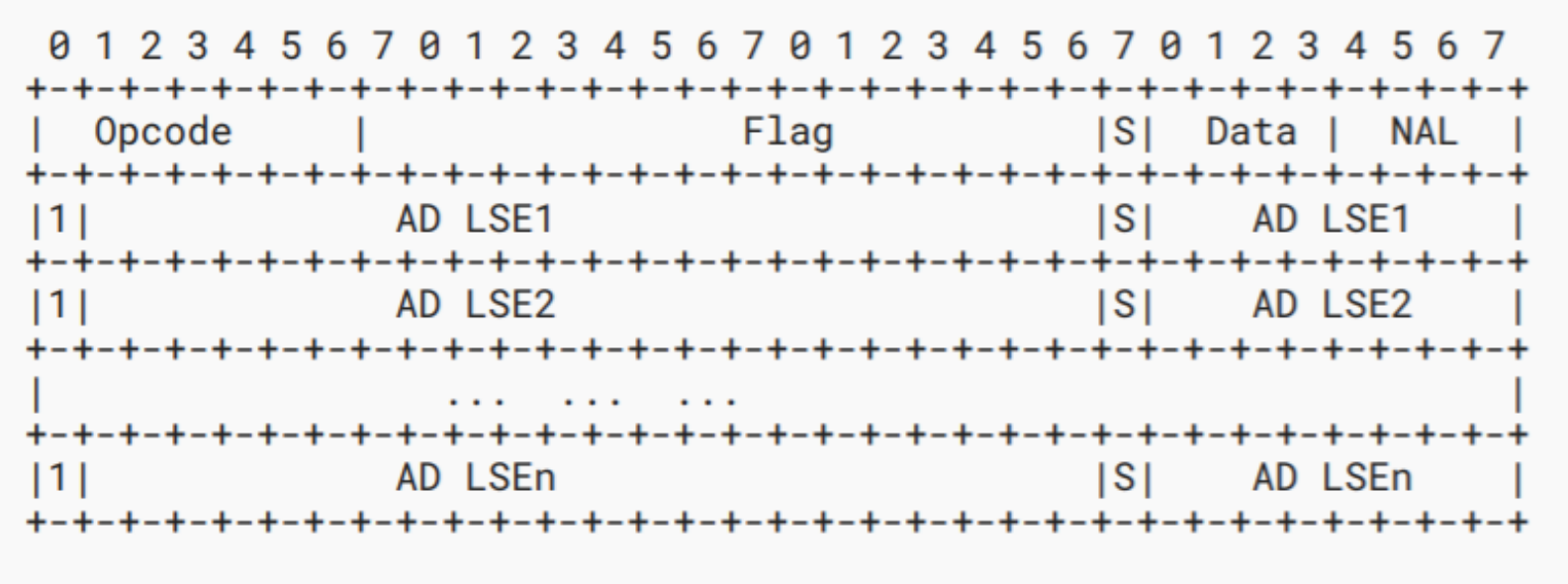
Requirements Number	Requirements Description	Satisfied or Not	Solution Considerations
R1	4.1 Support Aggregated Flow Identification	Yes	The aggregation label refers to A-label carried in MPLS sub-stack. The ability to aggregate individual flows and their associated resource control into a larger aggregate is an important technique for improving scaling of control in the data, management, and control planes as defined in RFC8964.
R2	4.2 Support Information used by Functions ensuring Deterministic Latency	No	Synchronized or asynchronized queuing mechanisms need be supported in DetNet network. Extension with Deterministic Latency information to the existing DetNet data plane is required.
R3	4.3 Support Redundancy Related Fields	Yes	MPLS data plane uses d-CW for sequencing information of a DetNet flow at the DetNet service sub-layer.
R4	4.4 Support Explicit Path Selection	Yes	MPLS F-label is associated with a provisioned outgoing interface. At control plane. The F-label and its associated outgoing interface is provisioned by control and management plane.

DLA Solution Consideration

- DLA (Deterministic Latency Action)
  - Carry latency information applied to DetNet flows to allow the DetNet nodes to reserve or occupy appropriate resources
- Solution consideration to satisfy R2
  - DLA indicator for enhanced data plane processing
  - Queue mechanisms carried for resource reservation and occupation
  - Detailed latency information per queue mechanism carried in packets
  - DLA option processed per hop
- Selection for queue mechanisms
  - Right queue mechanism selected first to satisfy differentiated SLAs of DetNet service
  - Queue mechanisms such as IEEE 802.1Qbv, IEEE 802.1Qch, IEEE802.1Qcr, etc.
- Mapping of flows with queues
  - Per flow-id, src-des-addr, mpls label, etc.

MPLS Sub-stack for DLA

- Use b-SPL to indicate the presence of DLA option
- Follow the MNA specifications in draft-ietf-mpls-mna-requirements-04 and draft-ietf-mpls-mna-hdr-01



MNA for DLA

MNA Format C for DLA

- **Opcode field**, DLA indicator
- **Flag field**, flags for DLA queuing mechanisms
- **Data field**, reserved for future use
- **NAL field**, DLA action length, the number of AD LSEs
- **AD LSE**, carries the Ancillary Data for specific DLA latency information of queue mechanism

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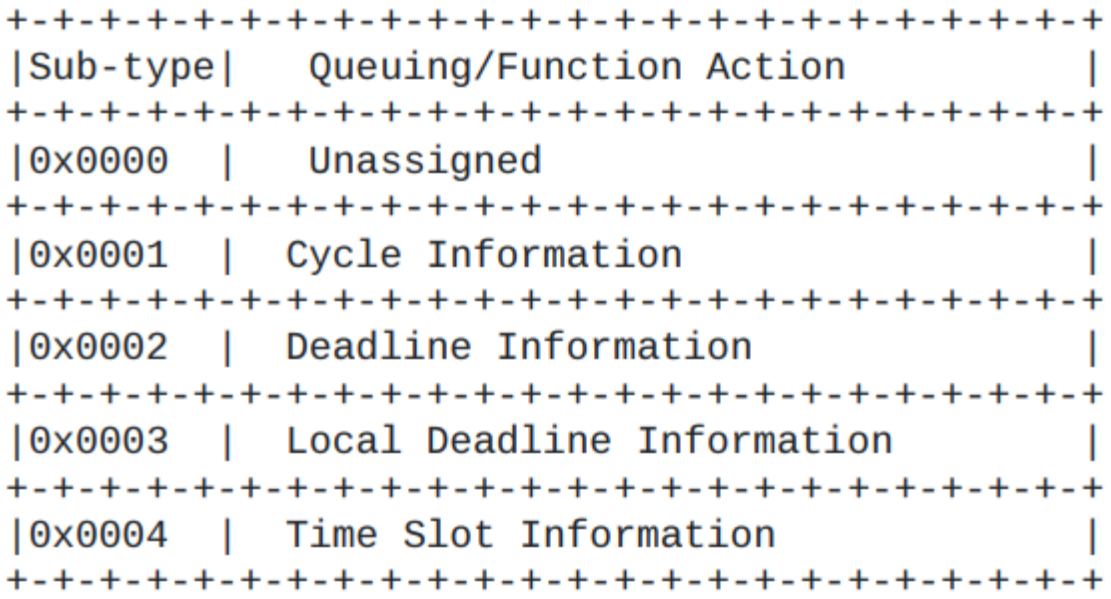

MPLS DLA Queuing Type

- Flag field indicates the type of queuing-based mechanisms or functions in DetNet network.
- Queue mechanisms for enhanced DetNet data plane are uncertain now.
- Queue flag update is needed to follow the DetNet DT discussion.

Next Steps

- Make DLA term updates
- Make DLA information updates to satisfy new enhanced DetNet requirements
- Make MPLS encapsulation updates to include post-stack processing
- Add MPLS DLA forwarding behaviors of DetNet edge and intermediate nodes
- Resolve comments and questions received