

MPLS Sub-Stack Encapsulation for Deterministic Latency Network Action (DLNA)

[draft-sx-mpls-detnet-bounded-latency-01](#)

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Agenda

- Updates
- DetNet Enhanced Data-plane Requirements
- MPLS DLNA Solution Considerations
- MPLS DLNA Data
- MPLS In-stack DLNA Encoding
- MPLS Post-stack DLNA Encoding
- Next Steps

Updates

- Changed draft name from draft-sx-detnet-mpls-queue-06 to draft-sx-mpls-detnet-bounded-latency-00
- Modified Term DLA to DLNA
- Incorporated MPLS post-stack DLNA solution
- Made editorial updates

DetNet Enhanced Data-plane Requirements

- MPLS MNA Use Case
 - “Delay Budgets for Time-Bound Applications” use case described in section 2.5 of [draft-ietf-mpls-mna-usecases-03](#)
 - A solution is required to enable the delivery of bounded E2E latency service for MPLS data plane packets.
- DetNet Enhanced Data Plane Requirements
 - Data plane enhancement requirements specified in section 4 of [draft-ietf-detnet-scaling-requirements-04](#)

Requirement List	Requirement Item	Satisfied or Not	Solution Considerations
R1	4.1 Support Aggregated Flow Identification	Yes but not enough	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. In scaling network, the flow identification with service-level aggregation should be supported.
R2	4.2 Support Information used by Functions ensuring Deterministic Latency	No	Synchronized or asynchronous queuing mechanisms need be supported in DetNet network. Extension with Deterministic Latency information to the existing DetNet data plane is required.

MPLS DLNA Solution Considerations

- DLNA Data
 - Generic information about DLNA (e.g., Opcode, P bit, IHS, etc.)
 - Ancillary data information (e.g., queue mechanisms, delay, etc.)
 - Variable length, depends on queue mechanisms used and numbers of nodes transmitted in the network
- DLNA Encapsulation using MNA
 - Refer to MPLS MNA OPTION specified at [draft-ietf-mpls-mna-requirements-07](#) and [draft-ietf-mpls-mna-fwk-05](#)
 - Refer to MPLS MNA Header encapsulation specified at [draft-ietf-mpls-mna-hdr-04](#)
- DLNA Data carried in MPLS In-stack/Post-stack
 - 2 options: MPLS In-stack DLNA, MPLS Post-stack DLNA
 - MPLS Post-stack MNA solution has not yet adopted for no specific PSD UCs specified
 - MPLS Post-stack MNA solution is incorporated in this draft for the below considerations
 - MAY have a greater capacity to carry MPLS DLNA option compared with in-stack processing
 - MAY have higher data processing efficiency for the Control Word of DetNet flows is carried in post-stack

MPLS DLNA Data

- [draft-ietf-detnet-scaling-requirements-04](#)

- R1: Section 4.1 Support Aggregated Flow Identification

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+++++
| Type | Behaviour Action |
+++++
|0x0000 | Reserved |
+++++
|0x0100 | Bandwidth guarantee |
+++++
|0x0200 | Jitter guarantee |
+++++
|0x0300 | Delay guarantee |
+++++
|0x0400 | Low delay and jitter guarantee |
+++++
|0x0500 | Ultra-low delay and jitter guarantee |
+++++

```

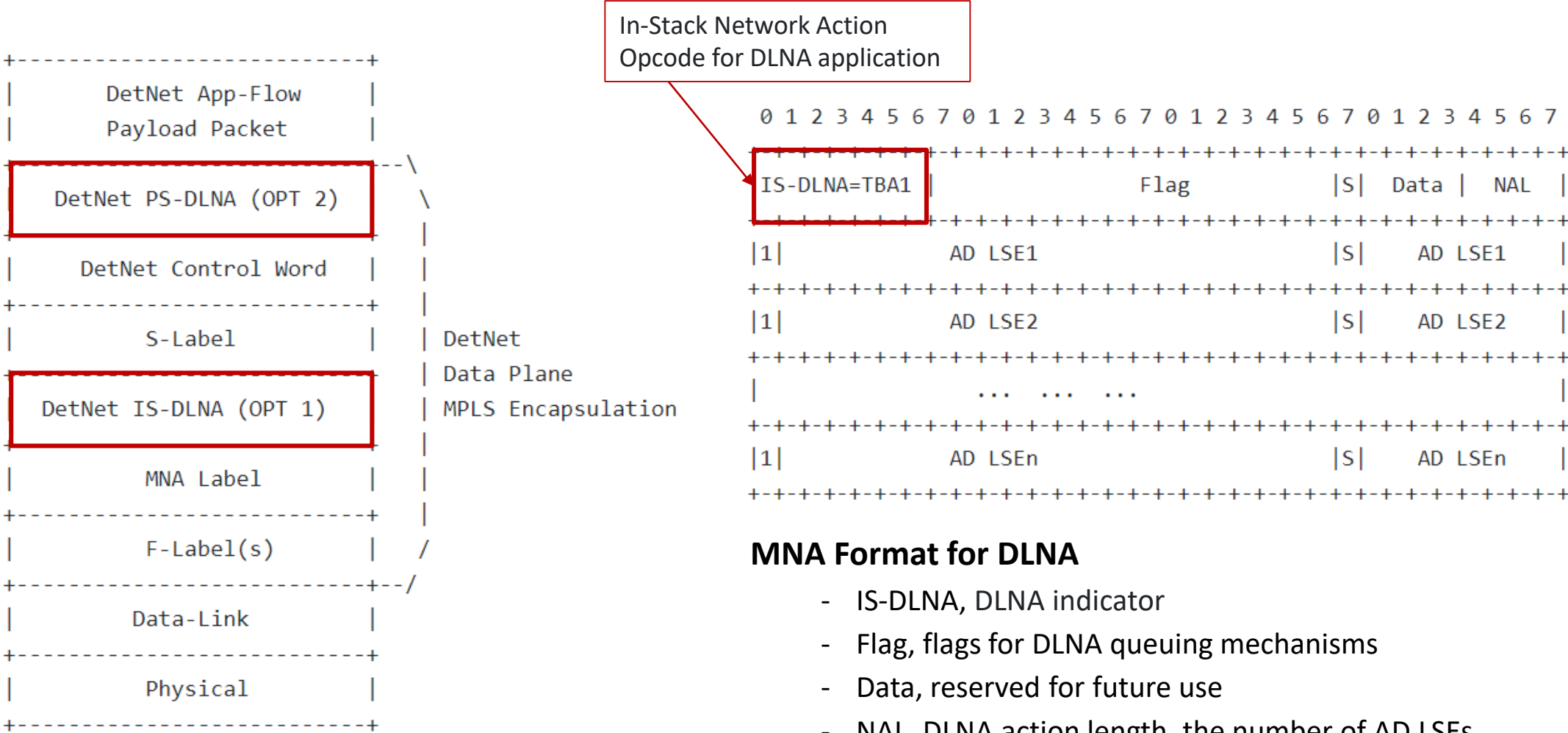
- R2: Section 4.2 Support Information used by Functions ensuring Deterministic Latency

```

+++++
|Sub-type| Queuing/Function Action |
+++++
|0x0000 | Unassigned |
+++++
|0x0001 | Cycle Information |
+++++
|0x0002 | Deadline Information |
+++++
|0x0003 | Local Deadline Information |
+++++
|0x0004 | Time Slot Information |
+++++

```

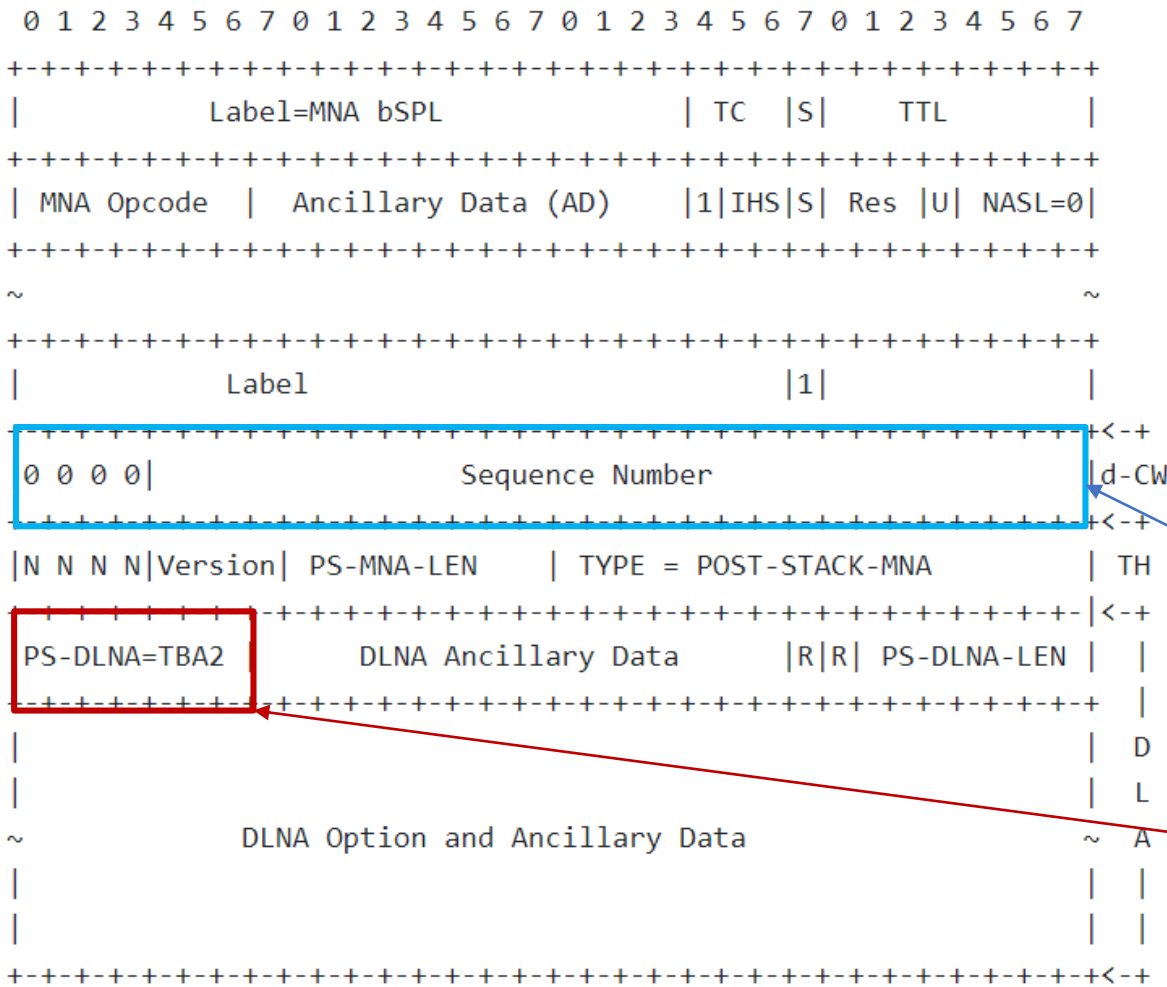
MPLS In-stack DLNA Encoding



MNA Format for DLNA

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

MPLS Post-stack DLNA Encoding



Principal:
 PSD solutions are not well developed nor yet accepted by MPLS WG. The MPLS DLNA Network Action encapsulation with Post-Stack Data proposed in this draft is initially designed following the encoding principals of the MNA solution requirements and header format and for further study.

DetNet Control Word

Post-Stack Network Action Opcode for DLNA application

Next Steps

- Ask for WG reviews and suggestions
- Request for WG adoption