BGP Flow Specification for DetNet Flow Mapping

draft-xiong-idr-detnet-flow-mapping-02

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Update from last version

- Presented at IETF#112 and got feedback from DetNet and IDR WG:
  - Lou Berger:
    - clarify that this document is focused on TSN mapping, not generic DetNet
    - DetNet chairs are OK to work on this topic in either DetNet or IDR (where flowspec is defined)
  - Jeffrey Haas:
    - need to be implemented in flowspec v2
- Change the draft name to clarify the TSN mapping.
  - "BGP Flow Specification for DetNet and TSN Flow Mapping"
- Change the extensions from BGP-FSv1 to BGP-FSv2 as per draft-hares-idr-flowspec-v2.
  - Adding TSN SubTLV in BGP-FSv2 L2 header TLV defined in draft-hares-idr-flowspec-v2 section 3.4.
  - Adding Sequence Action SubTLV in BGP FSv2 Wide Community defined in draft-hares-idr-flowspec-v2 section 3.2.
  - Adding DetNet SubTLV in BGP FSv2 IP header TLV defined in draft-hares-idr-flowspec-v2 section 3.1.
  - Adding TSN Action SubTLV in BGP FSv2 Wide Community defined in draft-hares-idr-flowspec-v2 section 3.2.

Overview with TSN and DetNet Mapping

- As defined in [RFC8655], the DetNet may provide the deterministic service for the TSN end system and the DetNet IP and MPLS flows may be carried over TSN sub-networks.

- As discussed in RFC8938, RFC9023, RFC9024, RFC9037, the primary requirements of the Controller Plane for the TSN and DetNet flow mapping is as follows.

    - The mapping between TSN Streams and DetNet flows is required for the service proxy function at DetNet Edge nodes and the mapping table can be configured and maintained in the control plane.

- This document proposes extensions to BGP FSv2 for TSN and DetNet mapping by using the traffic filtering rules to identify the packet and using the associated action to map the packet to the related service.
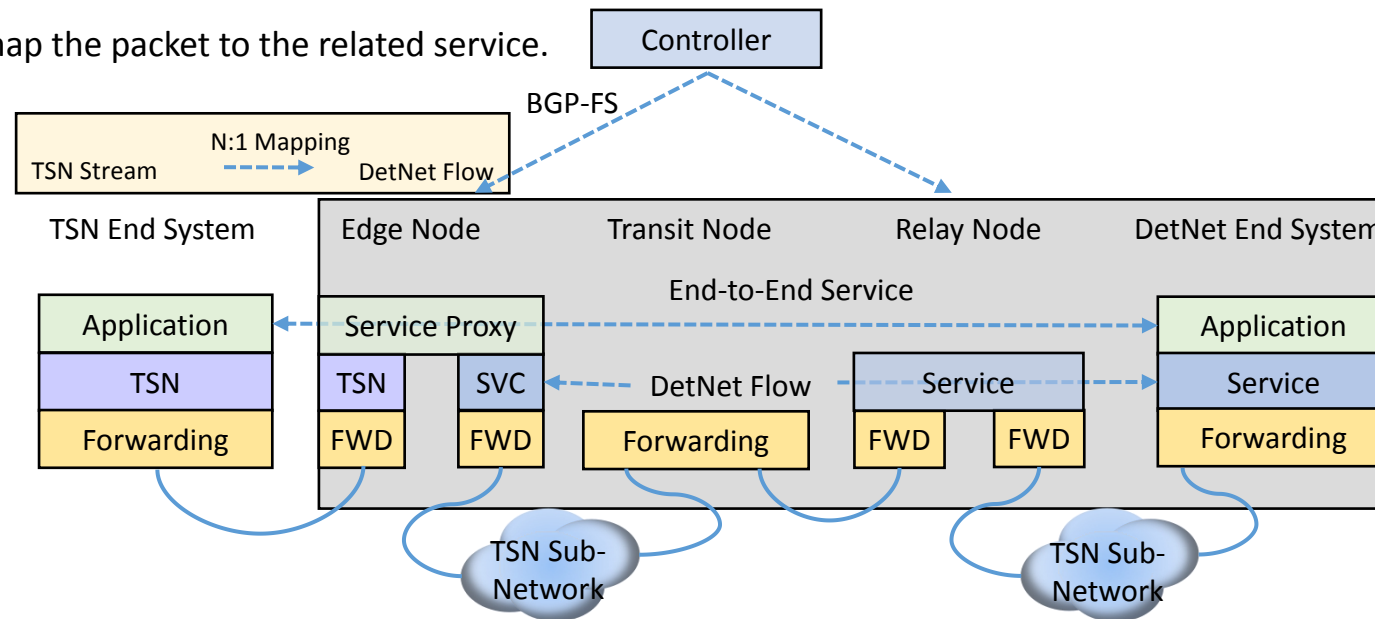
BGP-FS Extensions for TSN Stream Mapping to DetNet Flow

- Filtering Rules for TSN Streams

  - As IEEE Std 802.1Q defined, a Stream ID is a 64-bit field that uniquely identifies a stream and the Stream identification functions are defined in IEEE 802.1CB and IEEE P802.1CBdb.

  - The Ethernet Layer 2 traffic filtering rules defined in draft-ietf-idr-flowspec-l2vpn can be used in TSN Stream identification.

  - This document proposes a new TSN SubTLV in BGP-FSv2 L2 header TLV defined in draft-hares-idr-flowspec-v2 section 3.4 for TSN traffic filtering in Mask-and-Match Stream identification.

- Traffic Action for TSN Streams

  - The action is to accept the TSN streams that matches that particular rule and map the streams to the DetNet flows.

  - The action for L3 traffic with extended communities types per RFC8955, RFC8956 and draft-ietf-idr-bgp-flowspec-label can be used for DetNet IP/MPLS flows.

  - This document proposes the Sequence Action SubTLV in BGP FSv2 Wide Community defined in draft-hares-idr-flowspec-v2 section 3.2.
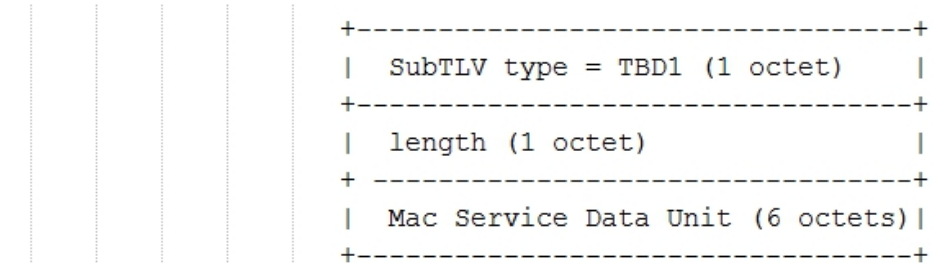
```
+----------------------------------+
|   SubTLV type = TBD1 (1 octet)   |
+----------------------------------+
|   length (1 octet)               |
+ ---------------------------------+
|   Mac Service Data Unit (6 octets)|
+----------------------------------+

         Figure 2: TSN SubTLV

SubTLV type = TBD1: Mac Service Data Unit
Encoding: <type (1 octet), length (1 octet), [op, value]+>
```

```
0                                              15
+------------------------------------------------+
|        SubTLV type = TBD2 (2 octet)            |
+------------------------------------------------+
|             length (2 octet)                   |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|     Type     |        Sequence Number          |
+--+--+--+--+                                    +
|                   ~                            |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
        Figure 3: Sequence Action
```
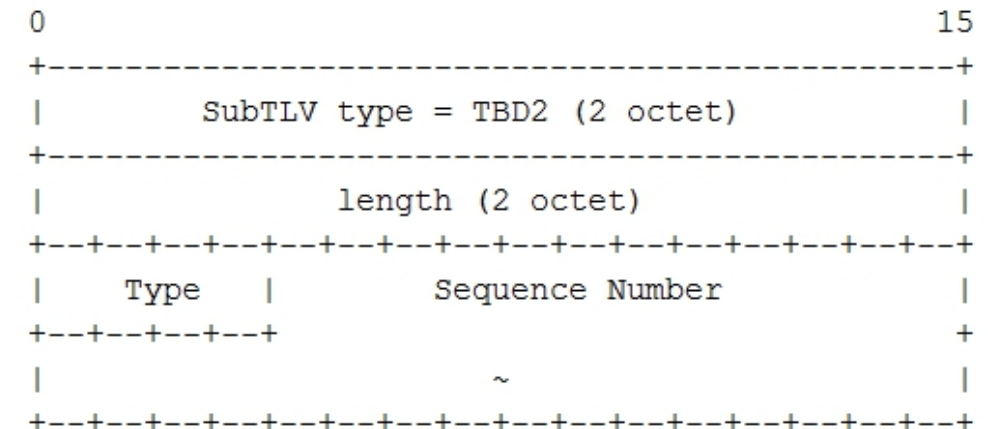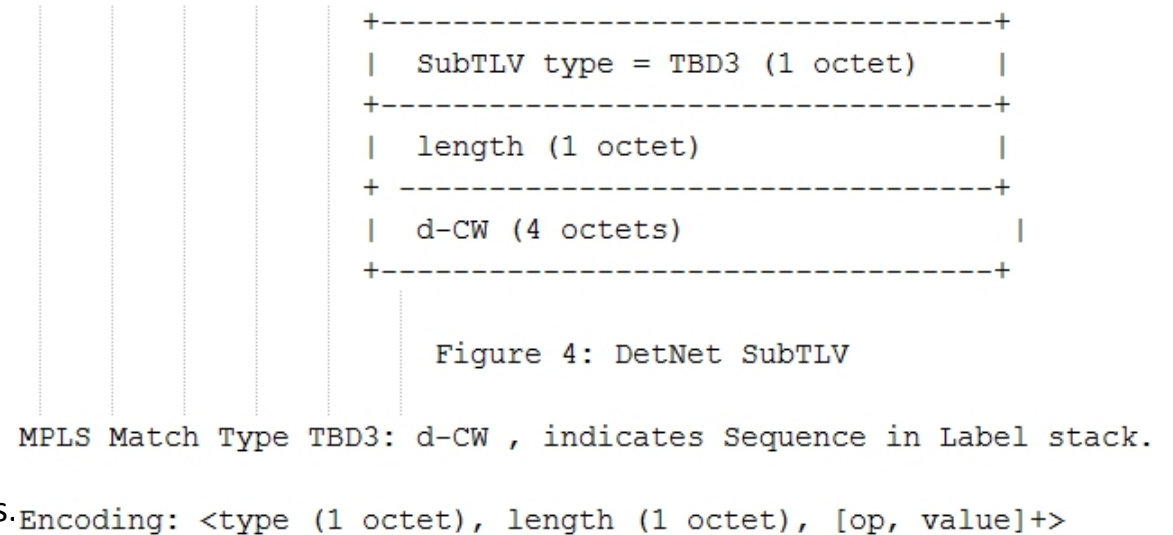
BGP-FS Extensions for DetNet Flow Mapping to TSN Stream

- Filtering Rules for DetNet Flows

  - The L3 traffic filtering rules defined in [RFC8955] and [RFC8956] can be used for DetNet IP flow.

  - The S-label in DetNet MPLS flow can use the filtering rules defined in draft-ietf-idr-flowspec-mpls-match.

  - This document proposes a DetNet SubTLV in BGP FSv2 IP header TLV defined in draft-hares-idr-flowspec-v2 section 3.1.for DetNet MPLS flows.

```
+----------------------------------+
|  SubTLV type = TBD3 (1 octet)    |
+----------------------------------+
|  length (1 octet)                |
+ ---------------------------------+
|  d-CW (4 octets)                 |
+----------------------------------+

        Figure 4: DetNet SubTLV

MPLS Match Type TBD3: d-CW , indicates Sequence in Label stack.
Encoding: <type (1 octet), length (1 octet), [op, value]+>
```

- Traffic Action for DetNet Flows

  - The extended action for an DetNet traffic filtering flowspec is to accept the DetNet flows that matches that particular rule and map the flows to the TSN streams.

  - This document proposes the TSN Action SubTLV in BGP FSv2 Wide Community defined in draft-hares-idr-flowspec-v2 section 3.2.

  - The TSN-profile can be converted to the stream related parameters and requirements including TSN Stream ID, stream_handle, sequence_number and traffic_scheduling information.
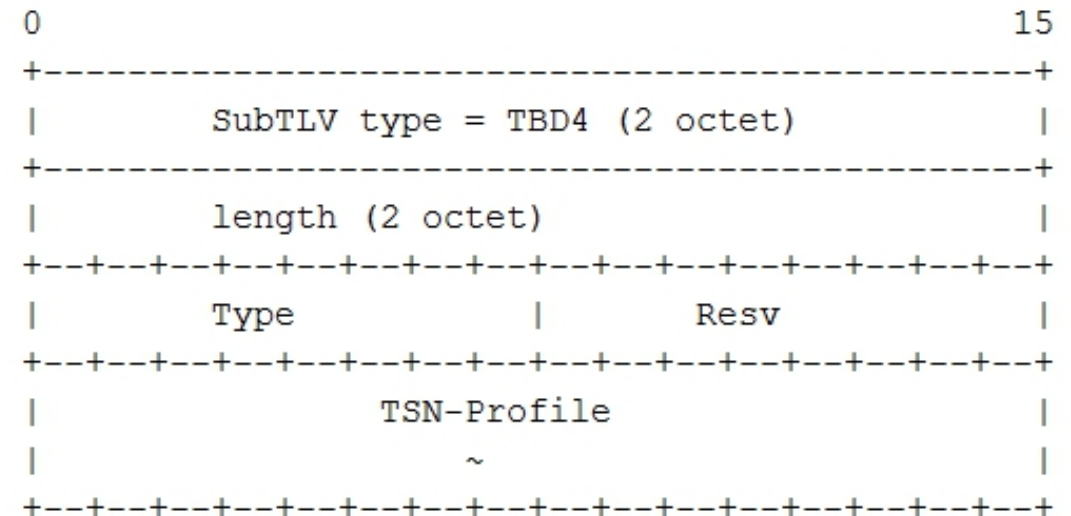
```
0                                               15
+-----------------------------------------------+
|        SubTLV type = TBD4 (2 octet)           |
+-----------------------------------------------+
|        length (2 octet)                       |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|     Type          |        Resv               |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
|             TSN-Profile                       |
|                ~                              |
+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
            Figure 5: TSN Action
```

Next Step

- Discuss and collaborate with BGP FSv2 [draft-hares-idr-flowspec-v2].

- Comments and discussions are very welcome!

Thank you!