BGP SR Policy Extensions for **Segment List Identifier** and **Headend Behavior**

draft-lin-idr-sr-policy-seglist-id

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draft-lin-idr-sr-policy-headend-behavior

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Motivation for Segment List Identifier[draft-lin-idr-sr-policy-seglist-id]

[I-D.ietf-idr-segment-routing-te-policy] specifies a mechanism by using BGP to distribute SR Policy to headend node. But there is **no identifier** for segment list in BGP SR Policy, and this situation has caused **inconvenience** in some scenarios:

For example:

✓ **Report traffic forwarding statistic**

 headend nodes collect traffic forwarding statistics per segment list and report statistic data to controller. Because there is no identifier for segment list,

– **headend**: report whole segment list and statistic

– **controller**: compare the SID one by one to identify the segment list

✓ **Distributing configuration of segment list**

A implementation is SR Policy is distributed by BGP, and configuration is distributed by NETCONF. For the configuration of segment list

– **controller** : distribute whole segment list and configuration

– **headend** : compare the SID one by one to identify the segment list

```
SR Policy SAFI NLRI: <Distinguisher, Policy-Color, Endpoint>
Attributes:
    Tunnel Encaps Attribute (23)
       Tunnel Type: SR Policy
          Binding SID
          SRv6 Binding SID
          Preference
          Priority
          Policy Name
          Policy Candidate Path Name
          Explicit_NULL Label Policy (ENLP)
          Segment List
              Weight
              Segment
              Segment
              ...
          ...
```

Such operations not only **occupy bandwidth**, but also **affect efficiency**.   In these cases, a simple **identifier of segment list** can be helpful

Segment List Identifier in SR Policy

As per [I-D.ietf-idr-segment-routing-te-policy], draft-lin-idr-sr-policy-seglist-id adds the Segment List Identifier in SR policy.

The segment list Identifier could be:

✓ **A 4 octets number**

   Segment List ID Sub-TLV   is defined

✓ **A name**

   Segment List Name sub-TLV is defined

```
SR Policy SAFI NLRI: <Distinguisher, Policy-Color, Endpoint>
Attributes:
    Tunnel Encaps Attribute (23)
        Tunnel Type: SR Policy
            Binding SID
            SRv6 Binding SID
            Preference
            Priority
            Policy Name
            Policy Candidate Path Name
            Explicit NULL Label Policy (ENLP)
            Segment List
                Weight
                Segment List Identifier
                Segment
                Segment
                ...
        ...
```
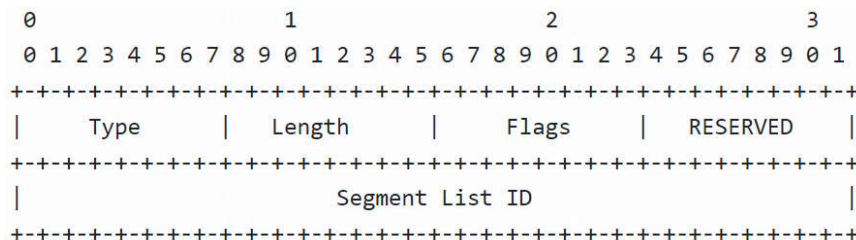
Sub-TLV for Segment List Identifier

✓ **Segment List ID Sub-TLV**

The Segment List ID sub-TLV specifies the identifier of the segment list by a 4-octet number.

The Segment List ID sub-TLV is optional and it **MUST NOT** appear more than once inside the Segment List sub-TLV.

- Type: TBD.

- **Length**: **6**.

- Flags: 1 octet of flags. None are defined at this stage. Flags SHOULD be set to zero on transmission and MUST be ignored on receipt.

- RESERVED: 1 octet of reserved bits. SHOULD be set to zero on transmission and MUST be ignored on receipt.

- **Segment List ID**: **4 octet** of ID for the segment list.

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     Type      |    Length     |     Flags     |   RESERVED    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                        Segment List ID                        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
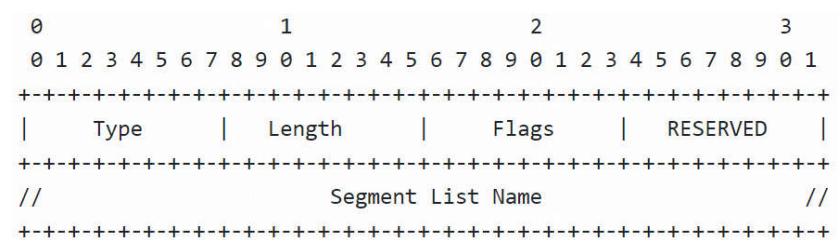
✓ **Segment List Name Sub-TLV**

The Segment List Name sub-TLV specifies the identifier of the segment list by a symbolic name.

The Segment List Name sub-TLV is optional and it MUST NOT appear more than once inside the Segment List sub-TLV.

- Type: TBD.

- Length: **Variable**.

- Flags: 1 octet of flags. None are defined at this stage. Flags SHOULD be set to zero on transmission and MUST be ignored on receipt.

- RESERVED: 1 octet of reserved bits. SHOULD be set to zero on transmission and MUST be ignored on receipt.

- **Segment List Name**: Symbolic name for the segment list. It SHOULD be a **string** of printable ASCII characters, without a NULL terminator.

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     Type      |    Length     |     Flags     |   RESERVED    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
//                     Segment List Name                       //
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Motivation for Headend Behavior [draft-lin-idr-sr-policy-headend-behavior]

headend can steer a packet flow into an SR Policy in various ways

- ✓ **BSID steering**

    BSID has multiple behaviors which are suitable for different scenarios.

    - – End.B6.Encaps behavior
    - – End.B6.Encaps.Red -- [RFC8986]
    - – End.B6.Insert
    - – End.B6.Insert.Red   -- [I-D.filsfils-spring-srv6-net-pgm-insertion]

- ✓ **Per-destination steering**

- ✓ **Per-flow steering**

- ✓ **Policy-based steering**

- ✓ **FlowSpec steering [**I-D.jiang-idr-ts-flowspec-srv6- policy**]**

- ✓ **…**

[I-D.ietf-spring-segment- routing-policy] defines the **SRv6 Binding SID sub-TLV** to signal the SRv6 BSID information along with **SR Policies.**

For other steering way**,** the **headend behavior** is **not specified** during the distributing of **SR Policy** by **BGP**.

Headend Behavior in SR Policy

As per [I-D.ietf-idr-segment-routing-te-policy], draft-lin-idr-sr-policy-headend-behavior adds the Headend Behavior in SR policy.

The Headend Behavior could be:

✓ behavior associated with the candidate path for **L3 traffic**
  Headend Behavior Sub-TLV is defined

✓ behavior associated with the candidate path for **L2 traffic**
  L2 Headend Behavior Sub-TLV is defined

```
SR Policy SAFI NLRI: <Distinguisher, Policy-Color, Endpoint>
  Attributes:
    Tunnel Encaps Attribute (23)
      Tunnel Type: SR Policy
        Binding SID
        SRv6 Binding SID
        Preference
        Priority
        Policy Name
        Policy Candidate Path Name
        Explicit NULL Label Policy (ENLP)
        Headend Behavior
        L2 Headend Behavior
        Segment List
          Weight
          Segment
          Segment
          ...
      ...
```
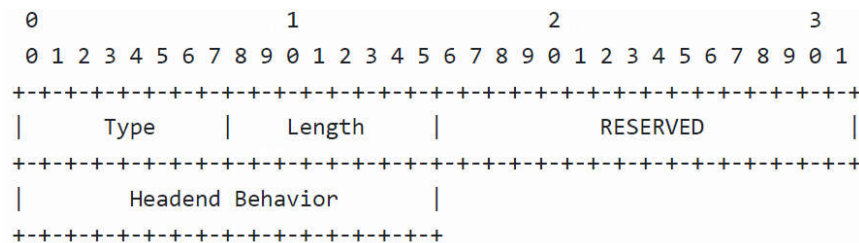
Sub-TLV for Headend Behavior

✓ **Headend Behavior Sub-TLV**

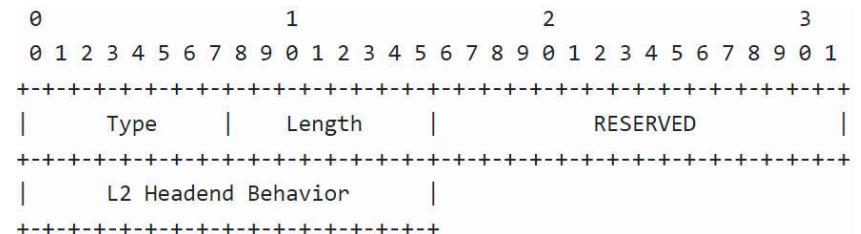The Headend Behavior sub-TLV is optional, and **MUST NOT** appear more than once in the SR Policy encoding..

- — Type: TBD.
- — Length: **4**.
- — RESERVED: 2 octets of reserved bits. SHOULD be set to zero on transmission and MUST be ignored on receipt..

- — **Headend Behavior:** a **2-octet** value. The following values are defined**.**

  - ✓ **TBD: H.Encaps**. A headend behavior defined in [RFC8986].

  - ✓ **TBD: H.Encaps.Red**. A headend behavior defined in [RFC8986].

  - ✓ **TBD: H.Insert**. A headend behavior defined in [I-D.filsfils-spring-srv6-net-pgm-insertion].

  - ✓ **TBD: H.Insert.Red**. A headend behavior defined in [I-D.filsfils-spring-srv6-net-pgm-insertion]..

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     Type      |    Length     |           RESERVED            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|       Headend Behavior        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

✓ **L2 Headend Behavior Sub-TLV**

The L2 Headend Behavior sub-TLV is optional, and MUST NOT appear more than once in the SR Policy encoding..

- — Type: TBD.

- — Length: **Variable**.

- — RESERVED: 2 octet of reserved bits. SHOULD be set to zero on transmission and MUST be ignored on receipt.

- — **L2 Headend Behavior**: a **2-octet** value. The following values are defined**.**

  - ✓ **TBD: H.Encaps.L2**. A headend behavior defined in [RFC8986].

  - ✓ **TBD: H.Encaps.L2.Red**. A headend behavior defined in [RFC8986].

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     Type      |    Length     |           RESERVED            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      L2 Headend Behavior      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Next Steps

- Any questions or comments are Welcomed
- Seeking for feedback

Thank You