

# Path Segment in BGP/BGP-LS

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draft-li-idr-bgp-ls-sr-policy-path-segment-02  
draft-li-idr-sr-policy-path-segment-00

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IETF#105

# Motivation

- In SR-MPLS, no label or only the last label may be left in the MPLS label stack when the packet reaches the egress node. Thus, the egress node cannot determine from which SR path the packet comes.
- To support use cases like end-2-end 1+1 path protection, bidirectional path correlation or performance measurement(PM), the ability to implement path identification is the pre-condition
- draft-ietf-spring-mpls-path-segment introduces a new segment to unique identify an SR-MPLS path in a specific context that is referred to as Path Segment.
- In SRv6, the segment list may not be a good key to identify an SRv6 path as the length of segment list is too long and flexible according to the number of SIDs.
- An SRv6 Path Segment that identifies an SRv6 path is proposed in draft-li-spring-srv6-path-segment-02.
- For collecting and allocating Path Segment info, extensions in BGP/BGP-LS are needed.

# What we have done?

- **draft-li-idr-sr-policy-path-segment-00** replaces **draft-li-idr-sr-policy-path-segment-distribution-01**
  - defines extensions to BGP to distribute SR policies carrying Path Segment and bidirectional path information.
- **draft-li-idr-bgp-ls-sr-policy-path-segment-00**
  - specifies the way of collecting configuration and states of SR policies carrying Path Segment and bidirectional path information by using BPG-LS.

# Quick Review: draft-li-idr-sr-policy-path-segment-00

- [I-D.ietf-idr-segment-routing-te-policy](#) defines the SR Policy structure.
- An SR path can be specified by an Segment List sub-TLV that contains a set of segment sub-TLVs and other sub-TLVs as shown in the right figure.
- We added a new sub-TLV in Segment List sub-TLV, called Path Segment sub-TLV, to identify an SR path.

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

# Path Segment TLV in BGP

- G-Flag: Global flag. Set when the Path segment/ID is global within an SR domain.
- ST: Segment type, specifies the type of the Path Segment, and it has following types:
  - 0: SR-MPLS Path Label
  - 1: SRv6 Path Segment
  - 2-255:Reserved
- Path Segment: The Path Segment of an SR path, and its type is indicated by the ST field. It can be a Path Segment in SR-MPLS [[I-D.ietf-spring-mpls-path-segment](#)], which is 32-bits value, or a Path Segment in SRv6 [[I-D.li-spring-srv6-path-segment](#)], which is a 128-bits value, or other IDs that can identify a path.

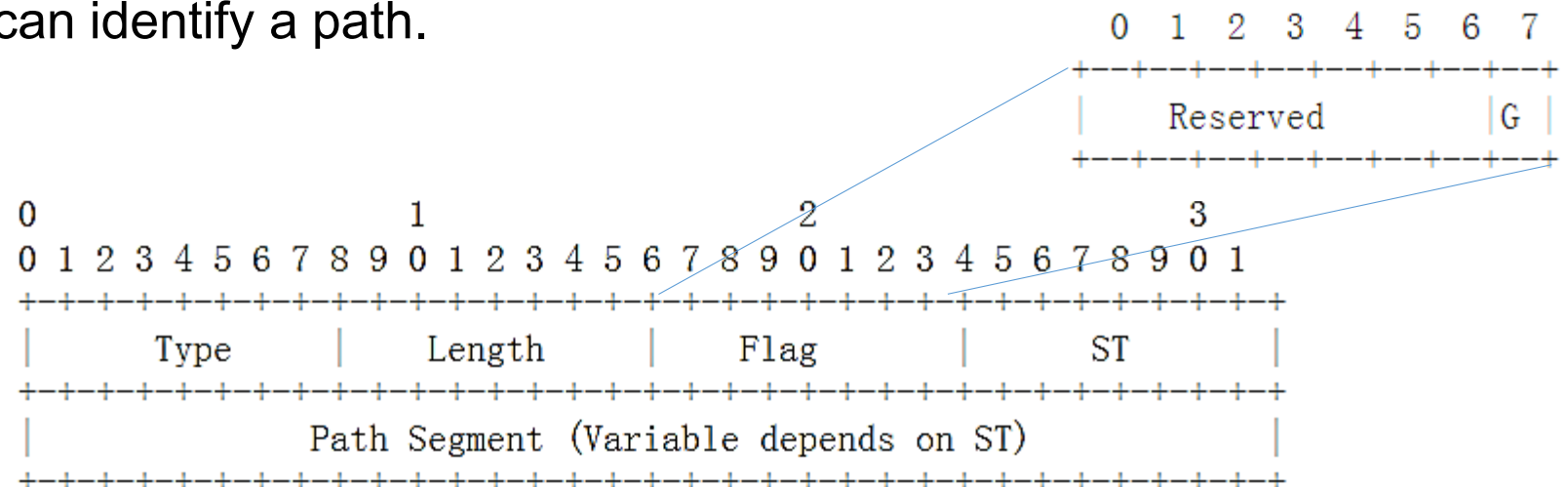


Figure 1. Path Segment sub-TLV

# SR Policy for Bi-directional Path in BGP

- SR Bi-directional Path Sub-TLV
- SR Reverse Path Segment List Sub-TLV

```

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

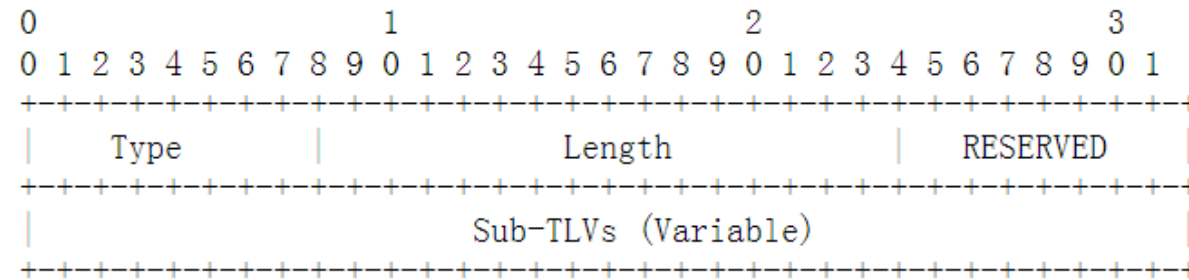


Figure 2. SR Bidirectional path sub-TLV

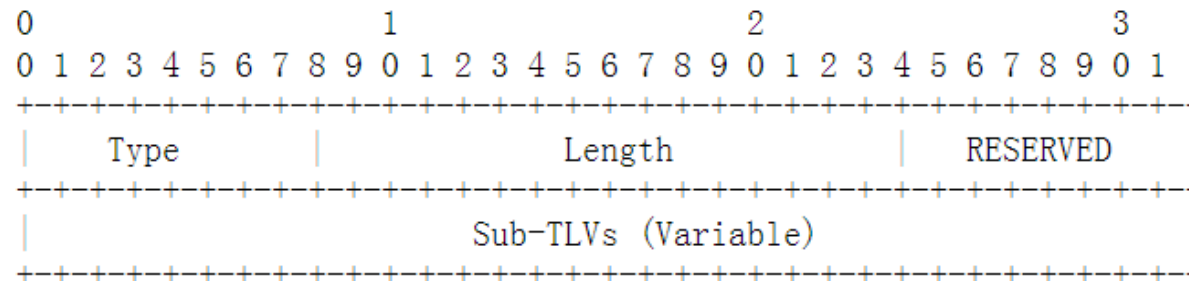


Figure 3 SR Reverse Path Segment List Sub-TLV

# Updates

- Adding new co-author Huanan Chen from China Telecom
- Address comments from Shraddha Hedge
- Adding IANA allocations
- Adding text to specify the Path Segment sub-TLV can appear at two levels
  - Candidate path
  - Segment List
- Sync up refs

# Quick Review: draft-li-idr-bgp-ls-sr-policy-path-segment-02

- [I-D.ietf-idr-segment-routing-te-policy](#) defines the SR Policy structure.
- [I-D.ietf-idr-te-lsp-distribution](#) defines a new mechanism to collect SR TE Policy information by using BGP-LS update messages.
- To report Path Segment in SR policy, we added a new sub-TLV, called Path Segment sub-TLV.

SR Policy SAFI NLRI: <Distinguisher, Policy-Color, Endpoint>

Attributes:

Tunnel Encaps Attribute (23)

Tunnel Type: SR Policy

Binding SID

Preference

Priority

Policy Name

Explicit NULL Label Policy (ENLP)

Path Segment

Segment List

Weight

Path Segment

Segment

Segment

...



# Path Segment TLV in BGP-LS

- It **reuses** the format defined in [draft-li-idr-sr-policy-path-segment-00](#)
- G-Flag: Global flag. Set when the Path segment/ID is global within an SR domain.
- ST: Segment type, specifies the type of the Path Segment, and it has following types:
  - 0: SR-MPLS Path Label
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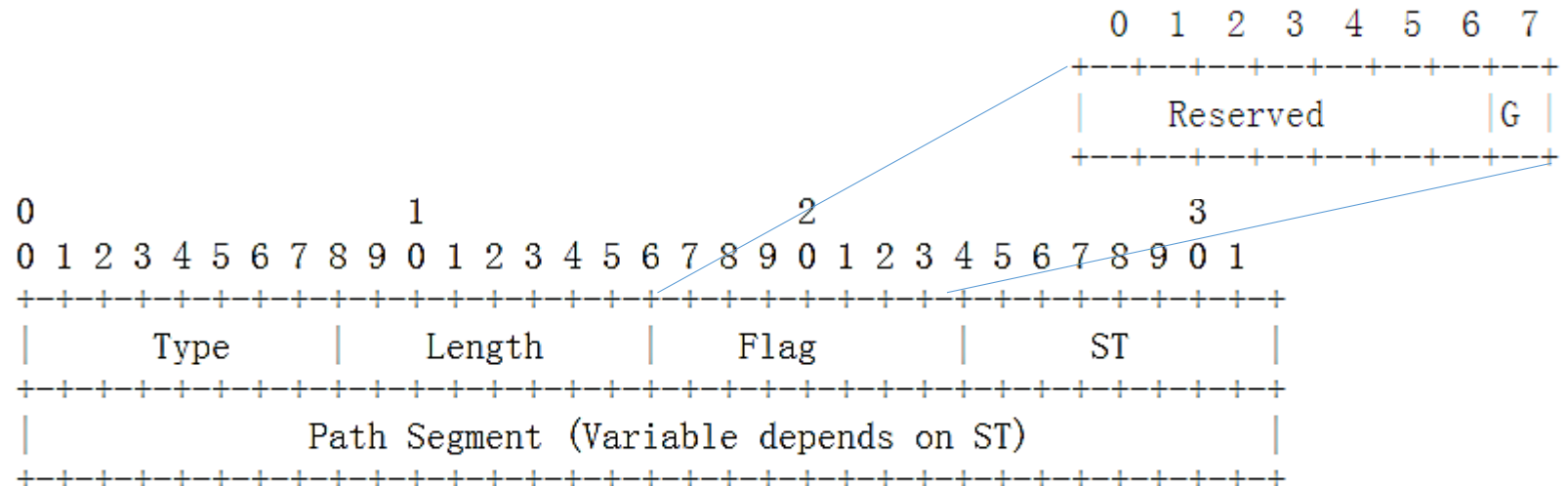


Figure 1. Path Segment sub-TLV

# SR Policy for Bi-directional Path in BGP-LS

- It **reuses** the format defined in **draft-li-idr-sr-policy-path-segment-00**
  - SR Bi-directional Path Sub-TLV
  - SR Reverse Path Segment List Sub-TLV

```

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

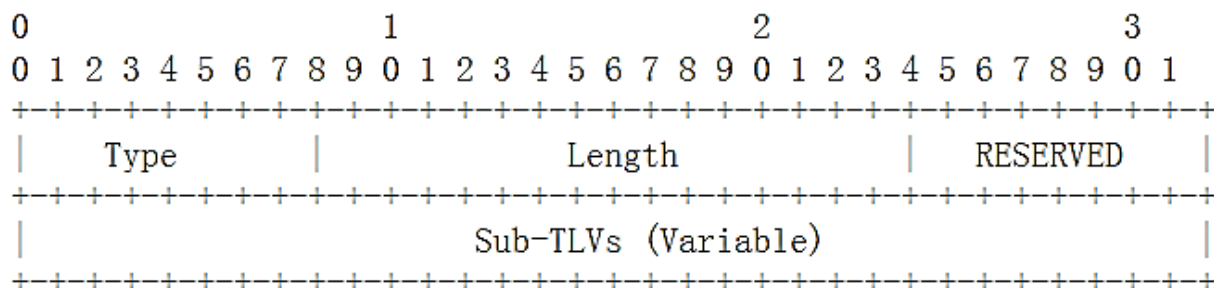


Figure 3. SR Bidirectional path sub-TLV

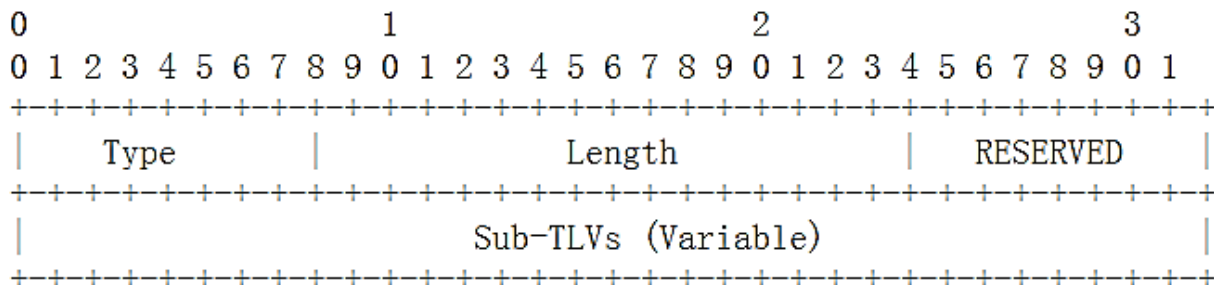


Figure 4. SR Reverse Path Segment List Sub-TLV

# Updates

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# Next Step

- Comments are welcome!
- Request for WG adoption.

Thank you