Path Segment/ID in BGP/BGP-LS

draft-li-idr-sr-policy-path-segment-distribution
draft-li-idr-bgp-ls-sr-policy-path-segment

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Background

• The extension of BGP to advertise the SR Policy is defined in draft-ietf-idr-segment-routing-te-policy.

• To support use cases like performance measurement, path identification is required.

• In SR-MPLS, the egress node cannot determine from which SR path the packet comes
  • since no label or only the last label may be left in the MPLS label stack when the packet reaches the egress node.

• draft-cheng-spring-mpls-path-segment introduces a new segment to uniquely identify an SR path called Path Segment.

• For easier identifying an SRv6 path, the Path ID that identifies an SRv6 path is proposed in draft-li-spring-passive-pm-for-srv6-np-00.

• For advertising path ID information within an BGP SR policy, new extension is needed.

• Also, for collecting path ID information within an BGP SR policy, new extension in BGP-LS is needed.
• **draft-li-idr-sr-policy-path-segment-distribution-00**
  • defines extensions to BGP to distribute SR policies with Path segment and bi-directional path information.
  • based on the extension described in **draft-ietf-idr-segment-routing-te-policy**.

• **draft-li-idr-bgp-ls-sr-policy-path-segment-00**
  • specifies the way of collecting configuration and states of SR policies carrying path ID and bi-directional path information by using BPG-LS.
  • based on the extension described in **draft-ietf-idr-te-lsp-distribution**.
• draft-ietf-idr-segment-routing-te-policy defines the SR Policy structure in BGP.
• draft-li-idr-sr-policy-path-segment-distribution-00 introduced a path segment to identify an SR path, so the SR policy structure becomes:
  • SR Policy SAFI NLRI: <Distinguisher, Policy-Color, Endpoint>
  • Attributes: Tunnel Encaps Attribute (23)
  • Tunnel Type: SR Policy
    • Binding SID
    • Preference
    • Segment List
      • Weight
        • Path ID
      • Segment ...
Path ID TLV

- **G-Flag**: Global flag.
  - Set when the Path segment/ID is global within an SR domain.

- **E-Flag**: Egress flag for local segment/IDs.
  - Set when a path segment/ID is a local segment/ID allocated by the egress node.
  - When G-flag is set, this flag should be ignored.

- **PIT**: Path ID type, specifies the type of the Path ID, and it has following types:
  - 0: SR-MPLS Path Label
  - 1: 4-octets integer Path ID

- **Path ID**: The Path ID of an SR path.

![Path ID sub-TLV diagram](image)
SR Policy for Bidirectional Path

- In SR, a bidirectional path can be represented as a binding of two unidirectional SR paths.
- New sub-TLVs are defined to describe an SR bi-directional path in SR Policy.

SR Policy SAFI NLRI: ⟨Distinguisher, Policy-Color, Endpoint⟩
Attributes: Tunnel Encaps Attribute (23)
    Tunnel Type: SR Policy
    Binding SID
    Preference
    **Bi-directional Path**
    Segment List
        Weight
        Path ID
        Segment
        Segment
        ...

    **Reverse Segment List**
        Weight
        Path ID
        Segment
        Segment
        ...

Figure 2. SR Bi-directional path sub-TLV

Figure 2. SR Reverse Path Segment List Sub-TLV
Path Segment/ID in BGP-LS

• Specifies the way of collecting configuration and states of SR policies carrying path ID and bi-directional path information by using BGP-LS.

• The characteristics of an SR policy can be described by a TE Policy State TLV defined in draft-ietf-idr-te-lsp-distribution, which is carried in the "LINK_STATE Attribute" [RFC7752].

• Reuses the equivalent sub-TLVs as defined in draft-li-idr-sr-policy-path-segment-distribution.
Next Steps

• Comments and contributions are welcome.
Thank you