Segment Routing BGP Egress Peer Engineering over Layer 2 Bundle Members

draft-lin-idr-sr-epe-over-l2bundle-06

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Updates

• Main modifications after shepherd's review:
  – Describe what mechanisms are missing and why RFC9085 and RFC9086 need to be updated (in Section 2 & Section 3).
  – Add information about RFC update: header, abstract, introduction.
Motivation

1. Why current BGP-LS cannot provide the L2 Bundle attributes?

   - RFC9086 only specifies how BGP-LS advertises IGP L2 Bundle Member Attributes information through the L2 Bundle Member Attributes TLV, with no mention of how BGP EPE over L2 Bundle can be advertised through L2 Bundle Member Attributes.

2. What mechanisms are missing in the SRv6 or SR-MPLS for the BGP-EPE policy for time-sensitive L2 traffic?

   - There is currently a lack of mechanism description for BGP Egress Peer Engineering operation on L2 bundle interfaces, as well as how to advertise the peer adj SID allocated on the L2 bundle.

3. The aim of this draft

   - Describes how to support Segment Routing BGP Egress Peer Engineering over Layer 2 bundle members.
   - Updates [RFC9085] to allow the L2 Bundle Member Attributes TLV to be added to the BGP-LS Attribute associated with the Link NLRI of BGP peering link.
   - Updates [RFC9085] and [RFC9086] to allow the PeerAdj SID TLV to be included as a sub-TLV of the L2 Bundle Member Attributes TLV.
BGP EPE Over L2 Bundle Members

There are deployments where the Layer 3 interface on which a BGP peer session is established is a Layer 2 interface bundle (L2 Bundle).

The operator of AS1 wishes to apply a BGP-EPE policy to steer the time-sensitive traffic from AS1 to AS2 via member link 1 of the Layer 2 bundle.

BGP Peering SIDs need to be allocated to individual bundle member links, and advertisement of such BGP Peering SIDs in BGP-LS is required.
Existing TLVs defined in RFC9085, RFC9086, RFC9514

RFC9085:
• Adjacency SID TLV (Type-1099)  IGP Adj-SID (SR-MPLS), can be sub-TLV of L2 Bundle Member Attributes TLV
• L2 Bundle Member Attributes TLV (Type-1172)  Only used for IGP links

Restrictions: These TLVs should only be added to the BGP-LS Attribute associated with the Link NLRI that describes the link of the IGP node that is originating the corresponding IGP TLV/sub-TLV... (Section 2.2)

RFC9086:
• PeerAdj SID TLV (Type-1102)  BGP-EPE PeerAdj SID (SR-MPLS), currently used for L3 links, cannot used as sub-TLV of L2 Bundle Member Attributes TLV

RFC9514:
• SRv6 End.X SID TLV (Type-1106)  Used both for IGP and BGP-EPE (SRv6), can be sub-TLV of L2 Bundle Member Attributes TLV
Peer Adjacency Segment for L2 Bundle Member Link

BGP peering segments are generally advertised in BGP-LS from a BGP node along with its peering topology information, in order to enable computation of efficient BGP-EPE policies and strategies.

Requirements for BGP-LS to support EPE over bundle members:

- Advertising identifier of each bundle member
- Advertising link attributes, such as delay (Optional)
- Advertising Peer Adjacency SID for each bundle member

Section 2.2 of RFC9085: These TLVs should only be added to the BGP-LS Attribute associated with the Link NLRI that describes the link of the IGP node ...

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Advertising Peer Adjacency Segment for Bundle Member in BGP-LS

- Link NLRI (parent L3 link)
- Link Attributes:
  ① SR-MPLS:
    - PeerAdj SID TLV (Label for parent L3 link)
    - L2 Bundle Member Attribute TLV (member link 1) [RFC9085]
      - PeerAdj SID TLV (Label for member link 1) [RFC9086]
    - L2 Bundle Member Attribute TLV (member link 2) [RFC9085]
      - PeerAdj SID TLV (Label for member link 2) [RFC9086]
  ② SRv6:
    - SRv6 End.X SID TLV (SID for parent L3 link)
    - L2 Bundle Member Attribute TLV (member link 1) [RFC9085]
      - SRv6 End.X SID TLV (SRv6 SID for member link 1) [RFC9514]
    - L2 Bundle Member Attribute TLV (member link 2) [RFC9085]
      - SRv6 End.X SID TLV (SRv6 SID for member link 2) [RFC9514]

This document updates [RFC9085] to allow the L2 Bundle Member Attributes TLV to be added to the BGP-LS Attribute associated with the Link NLRI of BGP peering link.

This document updates [RFC9085] and [RFC9086] to allow the PeerAdj SID TLV to be included as a sub-TLV of the L2 Bundle Member Attributes TLV.

No update is needed for SRv6. [RFC9514] already specified that END.X SID TLV can be carried in the L2 Bundle Member Attributes TLV.

The inclusion of a L2 Bundle Member Attributes TLV implies that the identified member link is up. If any member link fails, the L2 Bundle Member Attributes TLV must be withdrawn, along with the associated Peer Adjacency SID.
Next Steps

• Request WG adoption.
• Any questions or comments are Welcomed.
Thanks