mLDP/RSVP-TE protocol extension for BIER

draft-xie-mpls-ldp-bier-extension-01
draft-xie-mpls-rsvp-bier-extension-01

2018.11 IETF103 Bangkok

Jingrong Xie @Huawei

Mach Chen @Huawei

Zhenbin Li @Huawei

Update States

- draft-xie-mpls-mldp-bier-extension -01 rev update
  - Address comments about MBB from ietf101
- draft-xie-mpls-rsvp-bier-extension -01 rev update
  - Address comments about MBB from ietf101
- Slides update on IETF103
  - Address comments on MPLS WG @ietf101: MBB support
  - Address comments on BIER WG @ietf102: New FEC lead to overlay change
  - Seeking for feedback/inputs on this draft, and the solution.

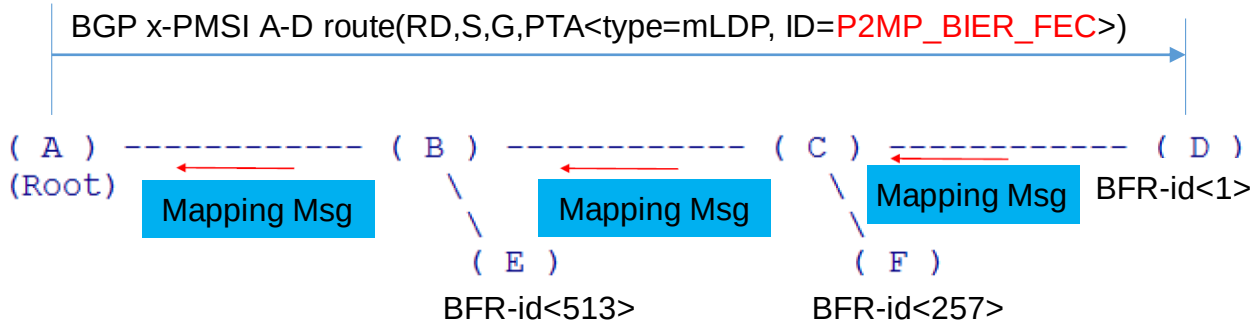
Problem 1: Make Before Break

- MBB: A strong requirement for multicast.
  - Adding some link/router in a network, and the multicast flow is broken.
  - What is your feeling about that ?
- The Key to gain the MBB in multicast.
  - One-shot/atomic change on forwarding state (RFC6388).
  - Double flows from two link temporarily, work on old, and change atomically to use the new.
  - PIM change the incoming-interface, flag from interface 1/0/1 to interface 1/0/2.
  - MLDP change the incoming-label, flag from label 101 to 102.
  - MLDP allocate different Labels for the same P2MP FEC<root> for different upstream interfaces !
- While for IGP-based BIER, can MBB be still available ?
  - BIER don't use RPF/Upstream-check mechanism.
  - One BFR is responsible for staring at many downstream BFERs.
  - Different Line cards may be responsible for different downstream BFERs.
  - It is difficult to do a one-shot/atomic change on two different line cards.

MBB for P2MP-LSP based BIER

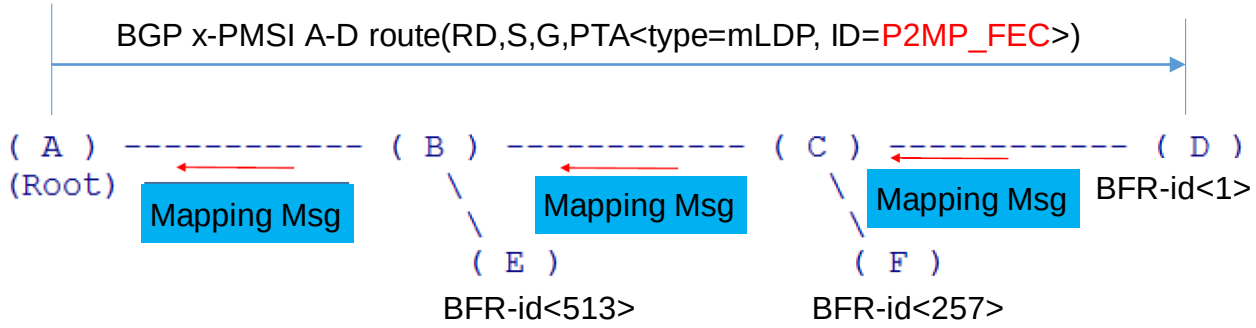
- The Mechanism defined in RFC6388 (MLDP) is still useful for building P2MP LSP with BIER-TLV.
- A router allocate different labels for different upstream interfaces to the same P2MP FEC<root> .
- This has updated to the -01 rev.
- One possible impact is that, a change of F-BM need to be known through the path to the root. So the convergence may be slower than normal P2MP LSP.

Poblem 2: New FEC or existing FEC ?



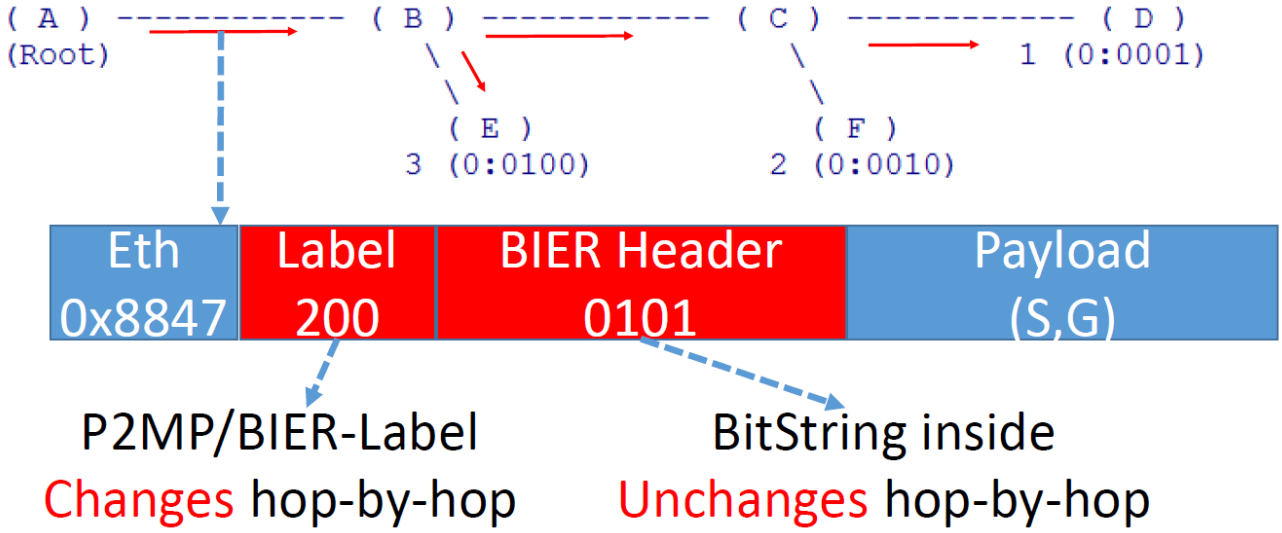
- P2MP_BIER_FEC = P2MP_FEC + BIER_Set_Id<0 to 255>
- One BIG comment from BIER WG is that, a new FEC means a new PTA type, and thus a overlay multicast service (MVPN service) signaling change.
- Above picture, D has a BFR-id<1>, F has a BFR-id<257>, E has a BFR-id<513>, they are belonging to different sets for a 256bit bit-string-length.
- Can the original P2MP FEC (RFC6388) be used for multiple BIER sets ?

How about using existing P2MP_FEC ?



- D-->C: Label Mapping(FEC<Root=A, ID=10>, Label=**400**, BIER_TLV<Label=401, Set=0, FBM=0001>)
- F-->C: Label Mapping(FEC<Root=A, ID=10>, Label=**600**, BIER_TLV<Label=601, Set=1, FBM=0001>)
- E-->B: Label Mapping(FEC<Root=A, ID=10>, Label=**500**, BIER_TLV<Label=501, Set=2, FBM=0001>)
- C-->B: Label Mapping(FEC<Root=A, ID=10>, Label=**300**, BIER_TLV<Label=301, Set=0, FBM=0001> <Label=305, Set=1, FBM=0001>)
- B-->A: Label Mapping(FEC<Root=A, ID=10>, Label=**200**, BIER_TLV<Label=201, Set=0, FBM=0001> <Label=205, Set=1, FBM=0001> <Label=208, Set=2, FBM=0001>)

P2MP LSP based BIER fwd overview



- P2MP LSP for simple forwarding.
- BIER for selective/optimization/bypassing.
- Whether to change the BitString can be done locally/differently for different purpose.

Summary

- The authors believe that, it is a simple way to introduce BIER in the current P2MP deployment, for at least the following reasons:
  - MBB: IGP BIER may be hard to support.
  - Multi-AS BIER deployment: OSPF/ISIS/BGP are all need to change for BIER. While mLDP is protocol-independent, and the Recursive FEC can easily reach the rootIP acorssing any Area/AS/ASes.
  - Bypassing: So many effort has been through in the bypassing of some BIER-incapable routers, and turns out to be very complex and side-effect.

Next Steps

- Update the <mpls-mldp-bier-extension> using the original P2MP FEC instead of a new FEC type.
- Update the BIER-TLV in LDP mapping message to carry multiple <Label + Set ID +FBM> tuples for building of multiple p2mp LSPs using one FEC.
- BIER-TLV used with Recursive FEC (RFC5512) for building inter-AS P2MP LSP with BIER.

Open discussions/feedback

- Do you think it right to build multiple P2MP LSPs for multiple BIER sets using only One P2MP FEC ?

- Do you think it useful ?

Thank you !