MVPN using Segment Routing and BIER for High Reachability Multicast Deployment

draft-geng-bier-sr-multicast-deployment-00

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Problem Statement

- PIM has a high reachability.
  - Only require the Multicast source address is reachable.
- mLDP has a high reachability.
  - Only require the mLDP Root IP address is reachable.
- BIER has a poor reachability.
  - Segmented MVPN introduces per-flow states on boundary routers.
  - It has a limited scope for IGP to advertise the BIER information.
  - Sending to many Sets (SIs) is something like Ingress Replication + BIER.

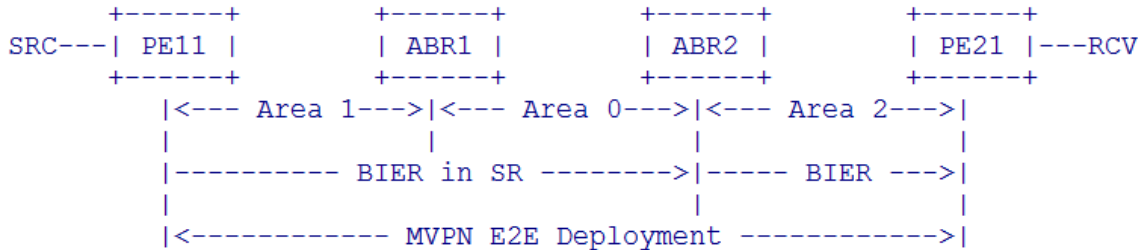 - Considering a highly reachable SR(IR) + BIER for Un-Segmented MVPN.

Solution overview

```
     +------+           +------+          +------+          +------+
SRC---| PE11 |          | ABR1 |          | ABR2 |          | PE21 |---RCV
     +------+           +------+          +------+          +------+
       |<--- Area 1--->|<--- Area 0--->|<--- Area 2--->|
       |               |               |               |
       |---------- BIER in SR -------->|----- BIER --->|
       |               |               |               |
       |<----------- MVPN E2E Deployment ------------>|

     Figure 1: MVPN using BIER and SR for E2E deployment
```

- SR for high reachability, stateless.

- BIER for bandwidth saving, stateless too.

- A hybrid P2MP tunnel ----SR+BIER, or BIER over SR+hop-by-hop.

- MVPN is deployed end-to-end.

Solution overview: another diagram

```
                    +------+           +------+
                    | ABR1a|           | ABR2a|
      +------+       +------+           +------+           +------+
SRC---| PE11 |                                            | PE21 |---RCV
      +------+       +------+           +------+           +------+
          |          | ABR1b|           | ABR2b|              |
          |          +------+           +------+              |
          |             |                  |                  |
          |<--- Area 1--->|<--- Area 0--->|<--- Area 2 --->|
          |      (Metro)  |     (CORE)    |     (Metro)     |
          |             |                  |                  |
          |---------- BIER in SR -------->|----- BIER ---->|
          |             |                  |                  |
          |<----------- MVPN E2E Deployment ------------->|
```
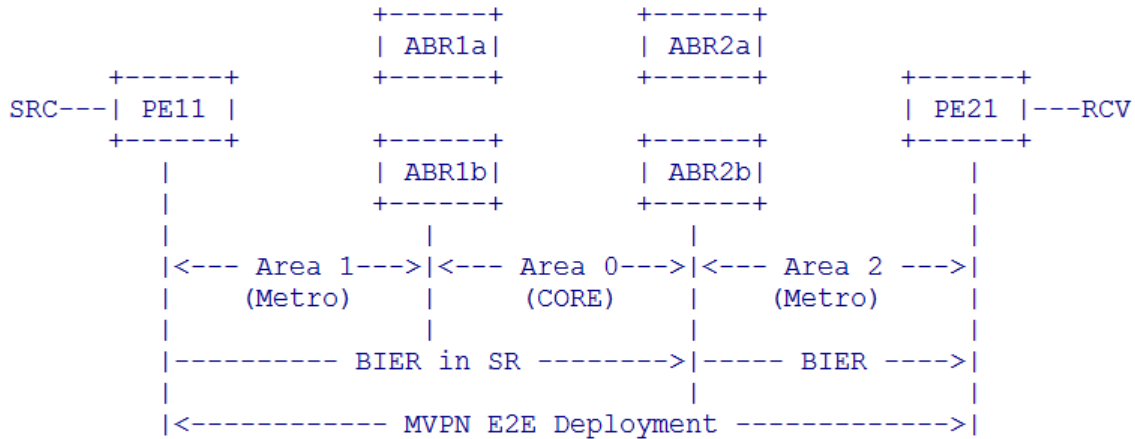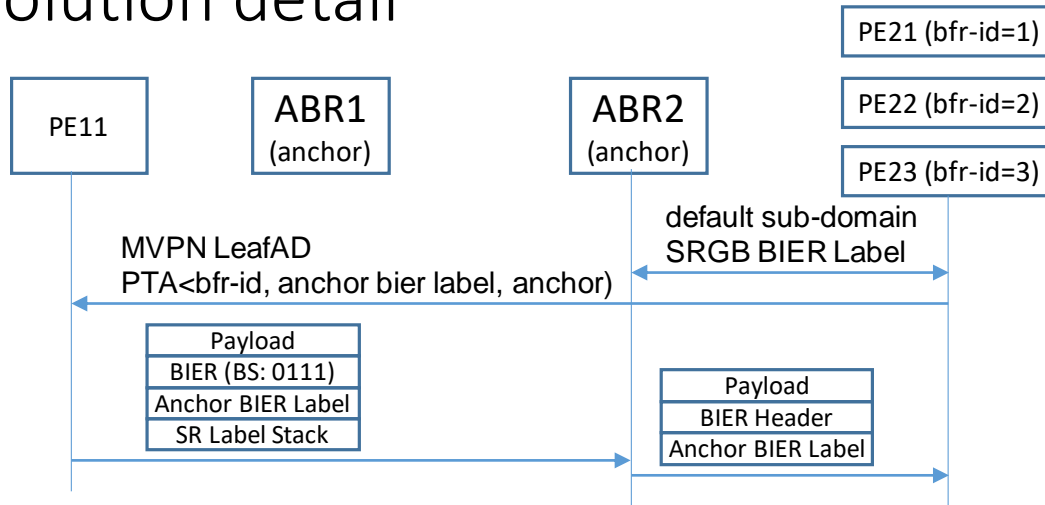
Figure 2: MVPN using BIER and SR for E2E deployment and protection
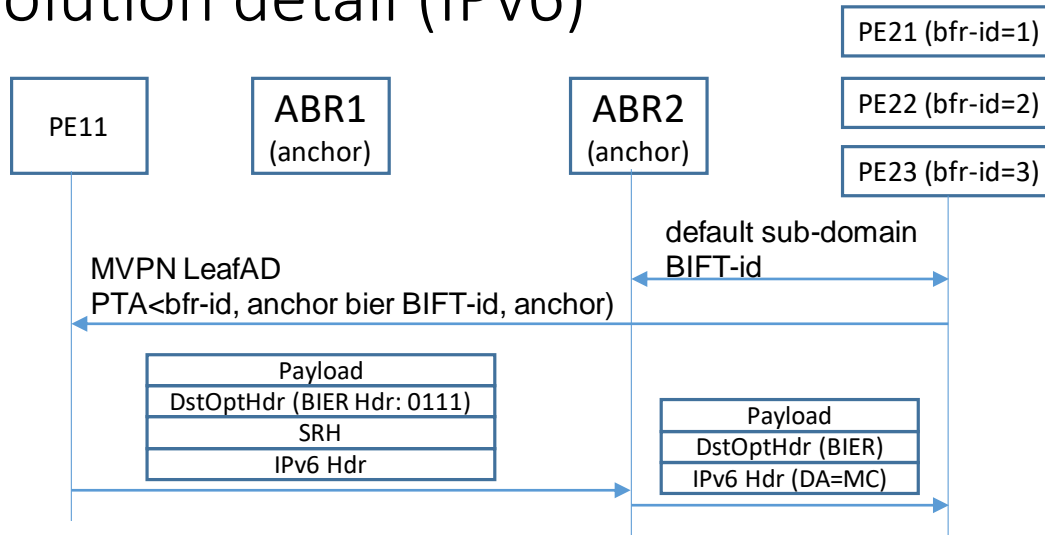
- ABR2a and ABR2b are expected to use the same BIER Label.
- So Use SRGB Label for BIER forwarding in Area2.

Solution detail

- Use SRGB label for BIFT building.
    - 'static' config the 'anchor bier label' on PE21/PE22/PE23 for adv LeafAD.
    - Anycast BIER label for two anchors per-subdomain (next page).
- Forwarding Plane view: BIER over SR + BIER hop-by-hop.

Solution detail (IPv6)

- Use Domain-wide BIFT-ID for BIFT building.

  - 'static' config the 'anchor bier BIFT-id' on PE21/PE22/PE23 for adv LeafAD.

  - Anycast BIER BIFT-id for two anchors per-subdomain. e.g, ABR2a/ABR2b.

- Data Plane : BIER IPv6 over SRH + BIER IPv6 hop-by-hop.

comments and suggestions are welcome

Thank you !