MVPN/EVPN-BUM
Segmented Forwarding

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draft-zzhang-bess-mvpn-evpn-segmented-forwarding
draft-xie-bess-mvpn-segmented-updates
draft-xie-bier-mvpn-segmented
Background

• **MVPN/EVPN PMSI – Provider Multicast Service Interface**
  - A virtual interface for sending/receiving customer multicast traffic through provider network
  - Instantiated with provider tunnels
  - Advertised with Inclusive/Selective-PMSI A-D routes
    - A PMSI Tunnel Attribute (PTA) in the routes specify tunnel type/ID
    - EVPN IMET route is the equivalent of I-PMSI A-D routes

• **MVPN/EVPN PMSI Tunnel Segmentation**
  - Different tunnel type-instance used in different AS/area/regions
    - For administrative or technical reasons
  - When segmentation points re-advertise an x-PMSI A-D route from an upstream region to downstream regions, it updates the PTA to specify the tunnel used in the downstream region
Forwarding at Segmentation Points

- Assumed to be label switching
  - Traffic arriving at an upstream segment label switched to downstream segments
  - Like unicast inter-as Option-B
  - Requires per-PMSI label:
    - If Ingress Replication (IR) is used, label is advertised in the PTA of Leaf A-D route
      - Leaf A-D routes are (normally) in response to S-PMSI A-D routes
    - If mLDP/RSVP-TE P2MP tunnel w/o aggregation is used, tunnel label is the per-PMSI label
    - If mLDP/RSVP-TE P2MP tunnel aggregation, or BIER is used, the per-PMSI label is advertised in the PTA of x-PMSI A-D routes

- **X-PMSI A-D routes are needed in case of P2MP/BIER**
  - There could be a lot of S-PMSI A-D routes if one wants to use selective tunnels for individual flows
Reducing S-PMSI A-D Routes

• For RSVP-TE P2MP, IR and BIER, ingress PEs track egress PEs for selective forwarding
  • Explicit Leaf Tracking; via Leaf A-D routes
    • EVPN SMET routes are equivalent of Leaf A-D routes
  • S-PMSI A-D routes have Leaf Information Required (LIR) flag set in PTA, triggering Leaf A-D routes from egress PEs that needs to receive traffic

• A LIR-pF flag in a (*,G)/(*,*) wildcard S-PMSI can be used to trigger more specific Leaf A-D routes without more specific S-PMSI A-D routes
  • This allows leaf tracking for individual flows w/o individual S-PMSI A-D routes
    • And use of individual selective tunnels for those flows
    • EVPN SMET routes can be viewed as if triggered by implicit (*,*) S-PMSI A-D routes with the LIR-pF flag
  • But that does not work with segmentation
    • Because there are no corresponding S-PMSI A-D routes to advertise per-PMSI label
Draft-ietf-bier-mvpn explicitly disallows LIR-pF with segmentation

Draft-xie-bier-mvpn-segmented documents the use of IP forwarding at segmentation points
  • To allow LIR-pF with segmentation for the BIER & MVPN specific use case

Lots of discussions
  • IP forwarding is much more heavy weighted
  • Instead of IP forwarding, problem can be solved by triggering individual S-PMSI A-D routes from Leaf A-D routes that are triggered by LIF-pF flag
    • This gives per-PMSI labels to allow label switching
    • Counter argument is that it leads to more control plane state
      • Counter argument for that: forwarding state is less compared to IP forwarding option
    • Another counter argument is that this can cause traffic loss because of added signaling
      • Counter argument for that: the delay can be mitigated by switching to individual selective tunnels after a delay (traffic continue to follow on less specific tunnel for a while before switching)
  • This is also not specific to BIER or MVPN
The problem/solution/discussions are:
  • applicable to both MVPN and EVPN BUM, not specific to BIER

draft-zzhang-bess-mvpn-evpn-segmented-forwarding
  • Explaining that switching has been the de-facto forwarding option at segmentation points
    • And why LIR-pF was not allowed with segmentation
  • Documenting that IP forwarding could be used if really desired
    • Pros and cons of label switching vs. ip forwarding
  • Laying out basic rules for label allocation to allow:
    • Label switching whenever desired and possible (even with the IP forwarding option)
    • IP forwarding w/o requiring VRFs on segmentation points
draft-xie-bess-mvpn-segmented-updates

- Draft-xie-bier-mvpnd-segmente replaced with draft-xie-bess-mvpn-segmented-updates
  - Since it is not BIER specific
- The authors of the three drafts agree to consolidate to draft-zzhang-bess-mvpn-evpn-segmented-forwarding
Next Steps

• Polish draft-zzhang
  • Likely to take BIER specific text from draft-xie into draft-zzhang as examples
• Seek comments
• Seek adoption when it is ready (not yet)