mRSVP-TE based mVPN

draft-hlj-l3vpn-mvpn-mrsvp-te-00

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Current Solutions

- **mGRE based solution**
  - The earliest solution
  - Unknown how to support QoS
  - Unknown how to do TE
  - Data planes are different between unicast VPN and multicast VPN (IP vs. MPLS)

- **mLDP based solution**
  - Unified data planes for unicast VPN and multicast VPN (both are MPLS)
  - Unknown how to support QoS
  - Unknown how to do TE

- **P2MP RSVP-TE + BGP based solution**
  - Need 7 new types of routes for BGP + a few new path attributes
  - Unknown how to support customer’s PIM Bootstrap
  - Often required C-RP co-located with PE
  - Sometimes MSDP is required between one of the PEs and the customer C-RP
  - If customer’s PIM fails, the network still supports multicast streaming (is this good or bad?)
  - Customers need two upgrades for P2MP RSVP-TE and BGP, respectively
Why mRSVP-TE based mVPN?

- Use mRSVP-TE described in
  - draft-lzj-mpls-receiver-driven-multicast-rsvp-te
- QoS supported
- TE supported
- FRR supported
- Data tunnel aggregation improves the scalability
- Simpler mandatory configuration and easier deployment
- C-RP can be anywhere in customer’s network
- C-Bootstrap is supported
- Just upgrade one protocol! Not two or more upgrades
Details of mRSVP-TE based mVPN (1)

General Ideas

• Use MPLS MP2MP and P2MP tunnel to carry multicast traffic in MPLS network
• MPLS tunnels are established by mRSVP-TE
• All mRSVP-TE functionality can be used for mVPN
  › QoS
  › Traffic Engineering
  › Protection

• ** Seamlessly integrated/Interworking with C-PIM on PE for MVPN**
  › PIM signaling drives the MPLS tunnel establishment
  › PIM state operation is almost same as normal PIM on PE.
  › MPLS interface on PE has PIM enabled, and join the PIM domain
  › MPLS interface automatically join or exist the Olist of PIM state
  › PIM adjacency between PE for MVPN VRF
Details of mRSVP-TE based mVPN (2)

PIM Signaling

• PIM signaling over a default MP2MP tunnel (default mLSP)
• All PIM multicast message are carried over default mLSP
  › Join/Prune, Assert, Bootstrap
• All PIM unicast message are carried over P2P MPLS tunnel
  › Register, Register-stop, Graft, Graft-Ack, Candidate-RP-Adv
• All PIM modes can be supported
  › PIM-SSM, PIM-SM, PIM-DM, PIM-BIDIR
• PIM adjacency established between PE for each MVPN
• MPLS network details is invisible for PIM
Details of mRSVP-TE based mVPN (3)
Default mLSP

• mLSP: Multicast Label Switched Path, equivalence of IP MDT but for MPLS
• MP2MP tunnel is setup when provisioning the MVPN on PE, without the traffic.
• MP2MP tunnel is always up unless the MVPN is deleted
• One default mLSP per MVPN, could be group based.
• Second MP2MP tunnel for redundancy of default mLSP
• ERO or QoS can be option,
• Tunnel protection can be applied
Details of mRSVP-TE based mVPN (4)
Default mLSP
Details of mRSVP-TE based mVPN (5)
PIM adjacency between PE for MVPN

Virtual PIM interface (MI-PMSI)
Associated with MP2MP tun
C-PIM Adj

mRSVP-TE MP2MP path msg
Default mLSP
Details of mRSVP-TE based mVPN (6)

Data mLSP

- Data mLSP is P2MP tunnel
- Data mLSP tunnel is driven by same mechanism as MDT (Rosen mGRE based mVPN)
  - Src PE monitor the traffic
  - If the traffic rate is exceeding the threshold, flood the mLSP join TLV to default mLSP
  - Rcv PE sends the P2MP path msg to Src PE, Src PE addr is from BGP NH
- One data mLSP per PIM state (S,G),
- Could be multiple (S,G) for aggregation purpose
- ERO per data mLSP can be option
- QoS per data mLSP can be option
- Tunnel protection can be applied
Next Steps

• Looking for feedbacks from you!
• Looking for experience and lessons you learnt from mLDP-based mVPN
• Looking for experience and lessons you learnt from BGP-based mVPN
Thanks & Questions?