Usecases of MPLS Global Label
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Zhenbin Li, Quintin Zhao (Huawei)
Tianle Yang (China Mobile)

IETF 88, Vancouver, BC, Canada

Introduction

- As the SDN concept is introduced, the MPLS global label mechanism are proposed again for new solution such as Segment Routing ([I-D.previdi-filsfils-isis-segment-routing]).
- This document proposes possible use cases for MPLS global label:
  - Identification of the location
  - Identification of the service
  - Identification of the network

Use cases – Identification of Location (1)

- VPLS Multicast over MP2MP LSP
  - [I-D.ietf-l2vpn-vpls-mcast] only defines the VPLS multicast over P2MP LSPs
  - If MP2MP LSP is introduced to transport BUM traffic, there exists issue for unknown unicast traffic: Source PE of MAC address cannot be learned.
  - MPLS global label can be used to identify the source PE to unify the BUM traffic forwarding in VPLS multicast over MP2MP LSP.

Use cases – Identification of Location (2)

- Segment-Based EVPN
  - [I-D.li-l2vpn-segment-evpn] proposes S-EVPN mechanism to to satisfy the requirements of PBB-EVPN without the necessity of implementing PBB functionality on PE.
  - MPLS global label can be used to identify Ethernet Segment (ES) in EVPN to implement C-MACs summarization.
  - Through the source ES label the egress PE can determine the source Ethernet Segment and corresponding source PE for the learned C-MAC.
  - Through the source ES label, the split horizon functionality can also be unified for ingress replication, P2MP LSPs and MP2MP LSPs.

Use cases – Identification of Location (3)

- MPLS OAM for LDP LSP
  - Owing to the MP2P(Multi-Point to Point) or MP2MP model of MPLS LDP LSP, it is difficult for MPLS LDP to implement Performance Monitoring since it cannot count the number of the received packets based on the MPLS label in the encapsulation for a specific flow between two PEs
  - [I-D. chen-mpls-source-label] proposes the concept of Source Label (SL) that is carried in the label stack and used to identify the ingress Label Switching Router (LSR) of an Label Switched Path (LSP).

Use cases – Identification of Service (1)

- Aggregating MVPNs over single P-Tunnel
  - In BGP-base Multicast VPN and VPLS Multicast, in order to implement aggregating multiple MVPNs or VPLS on a single P-Tunnel (i.e. sharing one P2MP LSP) , the upstream-assigned label mechanism is introduced to associate the MPLS label with one MVPN or VPLS.
  - MPLS global label can be used identify the MVPN instance or the VPLS instance. This can simplify the possible change of the existing control plane and the existing MPLS forwarding mechanism in the data plane can be reused.

Use cases – Identification of Service (2)

- Local Protection of PE Node
  - The local protection mechanism for PE node in VPN such as [I-D.shen-pwe3-endpoint-fast-protection] has been introduced.
  - [I-D.zhang-l3vpn-label-sharing] proposes an alternative solution for PE node protection based on MPLS global label.
  - MPLS global label can be introduced to identify the same L3VPN instance or L2VPN instance for all joined PEs.
  - When Primary PE node failure happens, the traffic switched to the backup PE by the P node can still be forwarded in the right L3VPN instance without changing the inner label.

Use cases – Identification of Network

- Segment Routing
  - Node Segment: Using global label
  - Adjacency Segment: Using local label
- MPLS Network Virtualization
  - [I-D. li-mpls-network-virtualization-framework] proposes Network Virtualization mechanism based on MPLS Global Label.

Next Steps

- More use cases would be taken into account, such as MPLS global label in the service chain scenario.
- Solicit more comments and feedback.
- Revise the draft.