BGP-LS with Multi-topology
for Segment Routing based Virtual Transport Networks

draft-xie-idr-bgpls-sr-vtn-mt

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Background

• VPN+ framework is described in `draft-ietf-teas-enhanced-vpn`
  • VTN is introduced as the virtual underlay network with required topology and resource characteristics

• SR based VPN+ is defined in `draft-dong-spring-sr-for-enhanced-vpn`
  • Resource-aware SIDs are introduced to build resource guaranteed SR virtual networks

• IGP extensions for SR VPN+/VTN is under discussion in LSR WG
  • Multi-Topology and Flex-Algo can be reused/combined with necessary specifications/extensions

• This documents define the BGP-LS mechanism with MT for SR VTN
  • Distribution of VTN attributes to network controller
  • Reuse Multi-topology to build a basic/simplified solution
  • Considerations about scalability is provided
**Terminology**

- **VPN+**
  - An enhanced VPN service (VPN+) is a VPN service with additional commitments such as resource isolation and performance guarantee.

- **VTN**
  - A virtual network which has a customized topology and a set network resources allocated from the underlay network.

- A VTN provides the required underlay characteristics for one or a group of VPN+ services
Mechanism in this document

• MT-ID is used as the identifier of a VTN in control plane

• Intra-Domain Topology Advertisement
  • Use MT-ID TLV in BGP-LS Link Descriptor, Node Descriptor, and BGP-LS attribute to identify the topology of the link-state information advertised for a VTN
  • Topology-specific SIDs can be advertised using BGP-LS extensions for SR/SRv6

• Inter-Domain Topology Advertisement
  • Use MT-ID TLV with BGP-LS EPE to advertise topology-specific Peer-Adj-SIDs, Peer-node-SIDs and Peer-set-SIDs.
  • MT-ID needs to be consistently used in each domain and on inter-domain links

• Advertise per-topology TE attributes
  • One link can participate in multiple topologies (VTNs)
  • How to advertise topology-specific TE attributes is specified
    • E.g. Maximum Link Bandwidth sub-TLV can be reused to advertise the subset of bandwidth allocated to each VTN
Scalability Considerations

• When a link or prefix participates in multiple topologies, multiple NLRIs needs to be generated to report all the topologies a link or prefix participates in, together with the topology-specific segment routing information.
  • This may increase the number of BGP Updates, hence introduce additional processing burden to both the sending BGP speaker and the receiving network controller.
  • Some optimization may be introduced for the reporting of multi-topology information and the associated segment routing information in BGP-LS.

• Each VTN has a unique MT-ID
  • This means independent topology/route computation for each VTN is needed, even if some VTNs may have the same topology in some domains
Next Steps

• Solicit feedbacks and comments

• Refine the document accordingly
Thank You