Packet Network Slicing using Segment Routing

draft-peng-teas-network-slicing-03
All Overview

- **AII** (Administrative Instance Identifier): Explicit virtual network identification, it could be used as a TN-slice identifier, it indicates the topology, computing, storage resources of the dedicated virtual network.
  - AII is the identifier of the dedicated Virtual Networks for the slice.
  - Support the End-to-End Slicing.
  - Identifier the Unified NSI across multi-domain of TN.
  - AII is one of constraint criteria of the color template (draft-ietf-spring-segment-routing-policy), and color template with AII provides a more flexible control.
  - Uniform Color template (Centralized and distributed, intra and inter domain) for overlay service mapping to underlay resource.
  - AII meet the link requirements from 3GPP. It is independent of the existing domain partition of the network, i.e., any intra- or inter-domain link, and it is also independent of the existing underlay frame or routing technologies (IGP, BGP, Segment Routing, Flex-E, etc.), i.e., any L2 or L3 link is the candidate resource.

- There is no modification to the forwarding table (dataplane).
All as a TN-slice Identifier

I. SR-policy@All installed
II. Flow steer to SR policy or SR-BE @All

SR policy@All-1
color 1000(red)
All IS 1
te metric

SR-BE@All-1
===
SR policy@All-1
color 10(black)
All IS 1
igp metric

Create the TN-slice
- Assign/Select the All to the slice.
- Allocate resources(vNode,vLink...) to All
- All information is advertised via Control plane.
**L3 Interface Slice Isolation**

- L2 Bundle members share the same IGP instance.
- L2 Bundle members could be any interface type.
- Control-plane packets will always be forwarded over the same path.
- Data-plane packets will be forwarded on the specific L2-bundle member.

**L2 Interface Slice Isolation**

- L2 Bundle members share the same IGP instance.
- L2 Bundle members could be any interface type.
- Control-plane packets will always be forwarded over the same path.
- Data-plane packets will be forwarded on the specific L2-bundle member.

**Resource Isolation**

- SIDs are allocated per AII, and the resource (such as bandwidth) is allocated to AII.
- AII is one of constraint criteria of the Color Template (draft-ietf-spring-segment-routing-policy), and color template with AII and other traditional criteria, such as bandwidth, delay, affinity, provide a more flexible control.
All for Multi-Domain Deployment

**Option C: Colored BGP-LU without SDN**

**Option B Inter-domain**

- **color 1000 is:**
  - All 1
  - SPF

- **color 1001 is:**
  - All 1
  - te metric

- **VPN1 LSP need <color=1000>**

- **VPN2 LSP need <color=1001>**

ASBR selects All-specific out-link according to uniform Color Template.
• BGP-LS advertised link-state NLRI containing AII information.
• For the inter-domain link, BGP-LS can advertise DIRECT protocol type, or firstly put inter-domain interconnections to IGP instance, then always import data from IGP protocol source.
• Controller supports computation of E2E TE path based on TE-DB with AII attribute.
Combined with SR Flex-algorithm

**Scenario 1:**
For inter-AS case, SDN controller can create VN for All-AS based on All, and VN for FA-AS based on FA respectively. SDN controller computes E2E segment lists, each containing multiple ASes and based on different technologies.

**Scenario 2:**
For a single All-AS, we can continue to apply SR FA to optimize label stack depth. In this case, a new criteria All is added in FAD, same as adding All to Color Template.
Next Step

• Comments welcome.

Thanks!