Segment Routing for End-to-End IETF Network Slicing

draft-li-spring-sr-e2e-ietf-network-slicing-03

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Background

• Network slicing can be used to meet the connectivity and performance requirement of different services or customers in a shared network
• draft-ietf-teas-ietf-network-slices describes the concepts and general framework of IETF network slice
  • IETF network slices can be realized by mapping one or a group of connectivity constructs to an NRP
  • NRP is an instantiation of VTN defined in draft-ietf-teas-enhanced-vpn (VPN+)
• An end-to-end IETF network slice may span multiple network domains
  • In each domain, IETF network slice traffic needs to be mapped to a local NRP.
• This document describes the SR extensions to support end-to-end IETF network slice
  • By introducing NRP Binding Segments
IETF Network Slice Framework and VPN+ Realization

**Framework**

*Concepts and general framework*
draft-ietf-teas-ietf-network-slices

*VPN+ framework used for slice realization*
draft-ietf-teas-enhanced-vpn

*Mapping of 5G E2E network slice to IETF network slices*
draft-geng-teas-network-slice-mapping

**SR based Network Slice realization**
draftietf-spring-sr-for-enhanced-vpn
draft-ietf-spring-resource-aware-segments

- Based on SR resource-aware segments

**Scalable IETF Network Slice realization**
draft-dong-teas-nrp-scalability
draft-ietf-6man-enhanced-vpn-vtn-id
draft-li-mpls-enhanced-vpn-vtn-id

- Based on data plane VTN resource ID/NRP-ID

**End-to-End IETF Network Slice realization**
draft-li-teas-e2e-ietf-network-slicing
draft-li-spring-sr-e2e-ietf-network-slicing
draft-li-6man-e2e-ietf-network-slicing
draft-li-mpls-e2e-ietf-network-slicing

**Hierarchical IETF Network Slice realization**
draft-dong-teas-hierarchical-ietf-network-slice

- Introduction of hierarchical NRPs
NRP Binding Segments

• NRP Binding Segment (BSID) is a special BSID used by the domain edge nodes to steer traffic into a local NRP

• The NRP BSID can be instantiated with SRv6 or SR-MPLS data plane
Types of NRP Binding Segments

• NRP-TE BSID: to steer traffic to an SR Policy associated with a local NRP
  • The first variant is to use one type of NRP BSID to specify the mapping of traffic to a SR policy which consists of list of resource-aware segments associated with a local NRP.
  • The second variant is to use one type of NRP BSID to specify the mapping of traffic to a SR policy which is bound to a local NRP ID.

• NRP-BE BSID: to steer traffic to follow the shortest path within a local domain NRP.
  • The first variant is to use one type of NRP BSID to determine a local NRP-ID, and instruct the encapsulation of the local NRP-ID into the packet at the domain edge node.
  • The second variant is to use one type of NRP BSID to specify the mapping of traffic to a local NRP, the local NRP-ID is specified in the associated fields by the ingress node, and is encapsulated into the packet at the domain edge node.
SRv6 Functions for NRP BSID

• SRv6 NRP-TE BSID
  • The first variant: End.B6.Encaps defined in RFC 8986 can be reused.
  • The second variant: End.B6NRP.Encaps

• SRv6 NRP-BE BSID
  • The first variant: End.NRP.Encaps
  • The second variant: End.BNRP.Encaps
NRP BSID in SR-MPLS

• Similarly, NRP BSID can be instantiated using SR-MPLS Binding SIDs with different semantics
  • Please refer to the draft for the details
Updates in -03 Version

• Aligns the terminology with IETF network slice and VPN+ draft

• Define two types NRP Binding Segments which are for SR TE and BE

• Editorial changes
Next Steps

• Comments and feedback are welcome

• Refine this draft accordingly
Thank You