

IGP Extensions for Segment Routing based Enhanced VPN (VPN+)

draft-dong-lsr-sr-enhanced-vpn-02

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Background

- VPN+ framework is described in *draft-ietf-teas-enhanced-vpn*
 - A layered architecture and candidate technologies in each layer & plane
 - To meet the requirements of 5G network slicing and other generic scenarios
- SR based VPN+ is defined in *draft-dong-spring-sr-for-enhanced-vpn*
 - Extend SR to identify the network topology and network resources allocated to a virtual network
 - Provide the SR data plane mechanisms for transport network slice
- This document defines the IGP mechanism and extensions for SR VPN+
 - Distribution of the required information to both the controller and network nodes
 - Taking control plane scalability into consideration
 - Detailed analysis please refer to *draft-dong-teas-enhanced-vpn-control-plane*

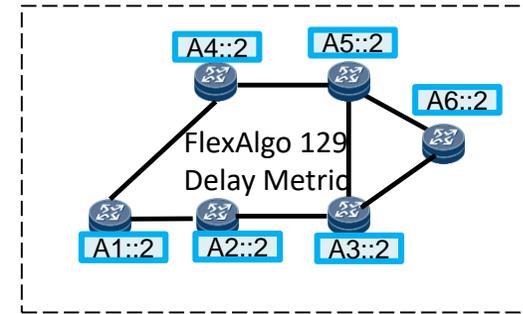
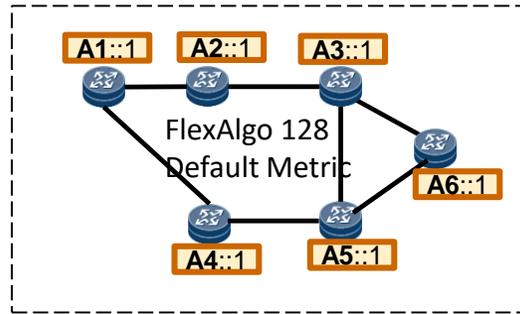
Methodology

- IGP functionality for VPN+
 - Advertise/collect the attributes of different virtual networks
 - Compute routing/forwarding entries for each virtual network
- Flexibility and scalability is important
 - To support network slicing deployment in different scenarios and phases
 - A consistent solution for 10s, 100s, and 1000s+ network slices
- Multi-dimension network slice definition
 - A network slice is defined as a combination of several key attributes
 - Topology
 - Resource
 - ...
 - Decouple the advertisement and processing of different attributes

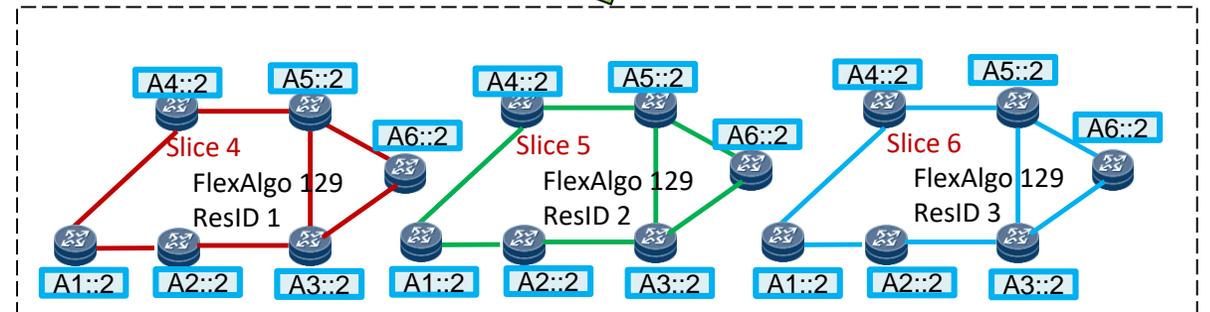
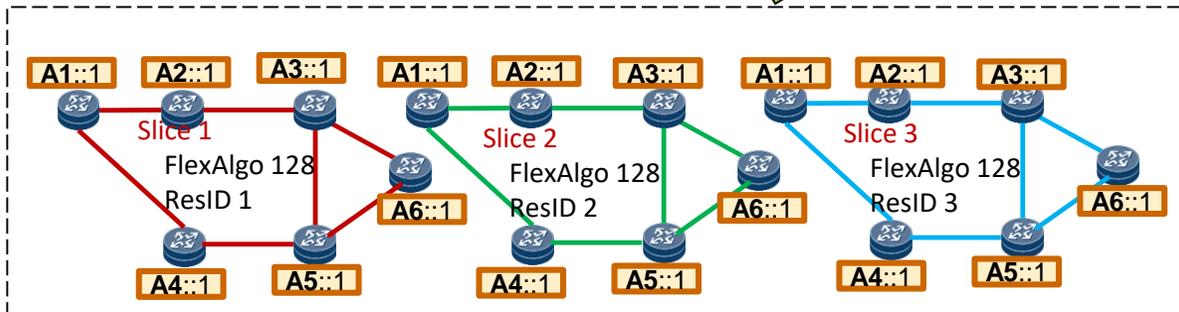
An Example



1. Reuse MT/Flex-Algo to define different topologies



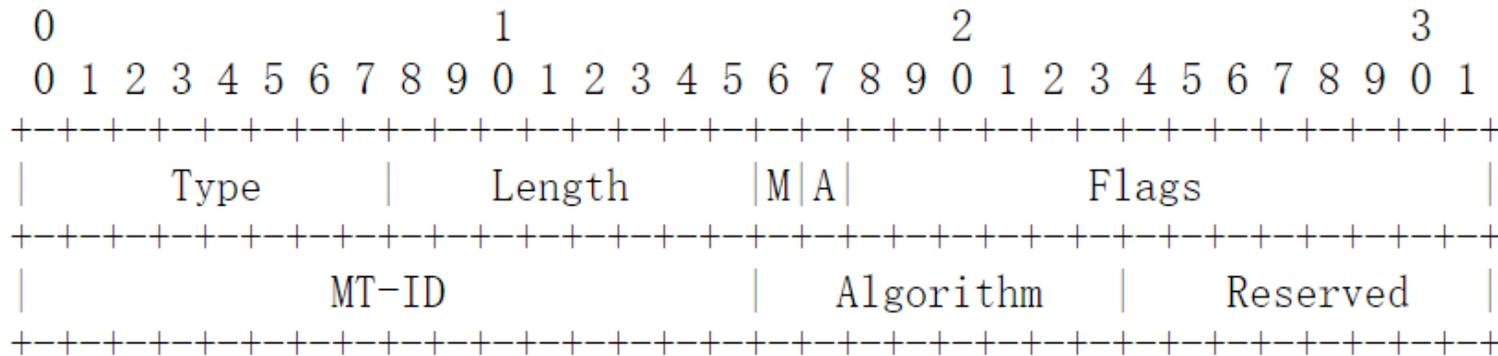
2. Use ResIDs to define different groups of network resources



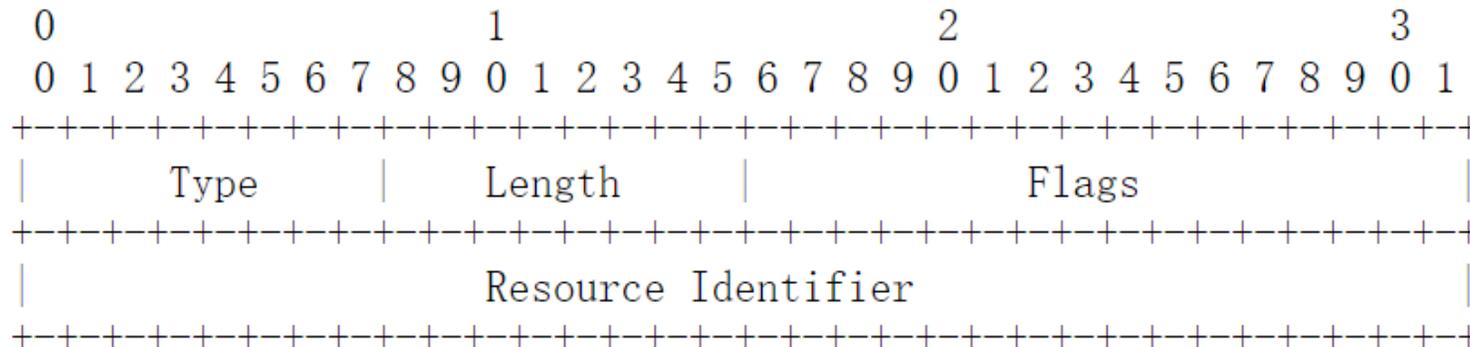
3. Combination of topology and resource

More on sub-TLVs

- Network Topology sub-TLV
 - Use MT/Flex-Algo to identify the topology



- Network Resource sub-TLV
 - Use a new 32-bit global-significant identifier to identify the group of resources

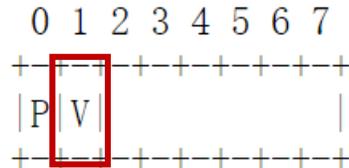


Advertisement of Topology Attributes

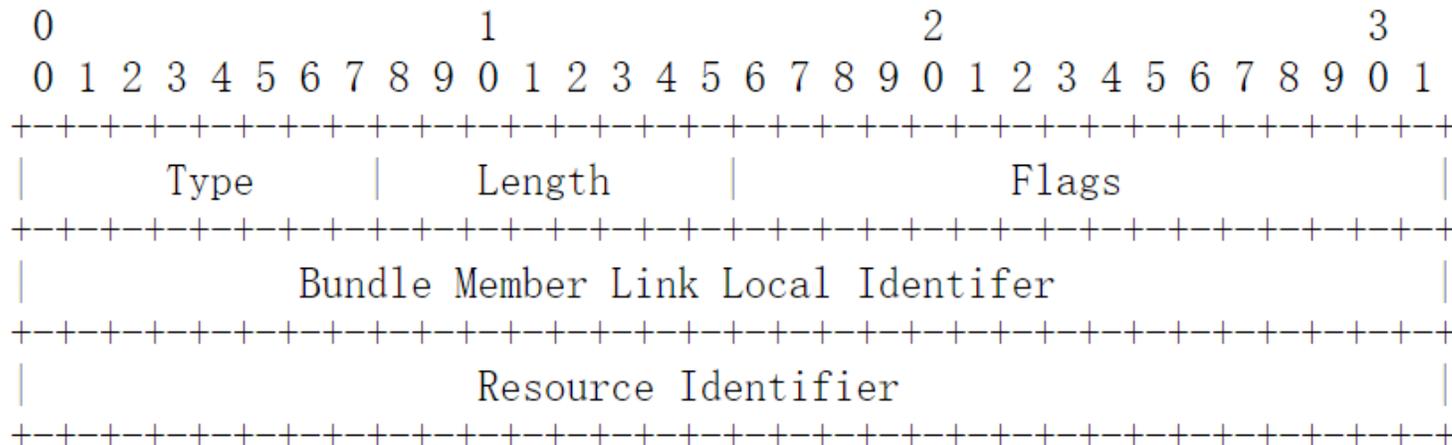
- Multi-topology based topology advertisement
 - MTR can be used with SR to define network topologies
 - Applicable to both SR-MPLS and SRv6
 - Topology-specific SIDs and SRv6 Locators
 - Topology-specific attributes
- Flex-Algo based topology advertisement
 - Flex-Algo can be used to define the topological constraints
 - Applicable to both SR-MPLS and SRv6
 - Algorithm-specific SIDs and SRv6 Locators
- Both are considered as options for topology advertisement

Advertisement of Resource Attributes

- Reuse and extend the IGP L2bundle mechanism (ISIS TLV 25)
 - A subset of link resource is described as physical or virtual member link
 - A new Flag “Virtual (V)” is used to indicate whether the member links are virtual or physical



- A new Resource Identifier (ResID) sub-TLV in the L2 Bundle Member Attributes
 - Advertised together with other TE attributes of the member links



Next Steps

- Solicit feedbacks and comments
- Refine the document accordingly

Thank You