

BGP Link State Extensions for Scalable Network Resource Partition (NRP)

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Background

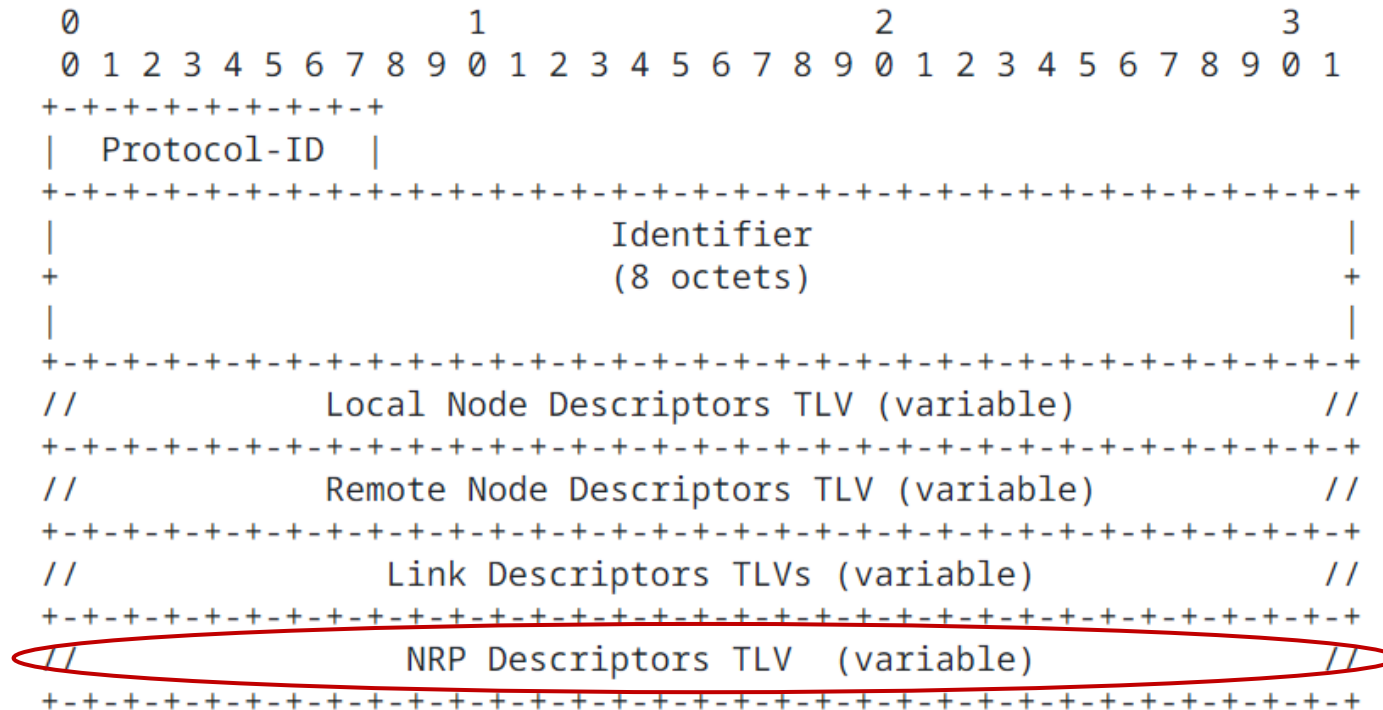
- Network Resource Partition (NRP) is a collection of network resources allocated on a set of links in the underlay network
 - The NRP concept is introduced in RFC 9543 (IETF Network Slice Framework)
 - An NRP can be used as the underlay to support enhanced VPN or network slice services
- The topology and resource attributes of NRPs need to be collected and distributed to network controller for
 - NRP-specific path computation
 - NRP-specific network management
- As the number of NRPs increases, there may be concerns about the scalability in advertising NRP information using control protocols
 - This document specifies BGP-LS mechanisms and extensions for advertisement of NRP-specific information in a scalable way

Possible Mechanisms

- NRPs are usually created based on the partitioning of network link resources
- There are two possible ways for the advertisement of NRP-specific link information using BGP-LS
- Approach 1: NRP information is advertised as link attributes using existing BGP-LS Link NLRI
 - Issue 1: As the number of NRP increases, the amount of NRP information associated with a link would increase accordingly, which may not be able to be accommodated in one BGP Update message
 - Issue 2: When the information of only one NRP changes, the link NLRI and all associated link attributes (including the attributes of all the associated NRPs) need to be updated, which may result in unnecessary route advertisement
- Approach 2: Introduce new BGP-LS NLRI Type for the advertisement of NRP-specific link attributes
 - The attributes of each NRP could be advertised and updated separately
 - The scalability problems in approach 1 could be alleviated

BGP-LS Extensions

- A new BGP-LS NLRI type is defined for the advertisement of NRP specific link information
 - NRP Link NLRI: Type is TBD



- NRP Descriptors TLV
 - Contains one or more NRP Descriptor sub-TLVs
 - NRP ID sub-TLV: carries a 32-bit network wide identifier of the NRP

BGP-LS Extensions (Cont.)

- NRP Attribute TLVs are used to carry NRP-specific link attributes in BGP-LS Attribute associated with NRP Link NLRI

TLV Code Point	Description	Length
1089	Maximum Link Bandwidth	4
TBD4	NRP Hierarchy	1
TBD5	Parent NRP ID	1

- Maximum Link Bandwidth: the amount of link bandwidth allocated to an NRP
- NRP Hierarchy: the level to which the NRP belongs
- Parent NRP ID: the identifier of the parent NRP from which an hierarchical NRP is derived
- Other link attributes may also be used for NRP-specific information

Next Steps

- Comments and feedbacks are welcome
- Refine the document accordingly

Thank You