Scalability Considerations for Network Resource Partition (NRP)

draft-dong-teas-nrp-scalability-01

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Recap of VPN+ and Network Slicing

- VPN+ framework is described in draft-ietf-teas-enhanced-vpn
  - One typical use case is to deliver IETF network slices services
- The high-level realization architecture of IETF network slice is described in draft-ietf-teas-ietf-network-slices
  - Mapping network slice connectivity constructs to the underlay NRPs
- An NRP consists of a set of dedicated or shared network resources, and is associated with a (filter) topology
  - Can be used to support one or a group of network slice services
- The scalability of NRP is important for widely deployment of IETF network slices
  - This document provides scalability considerations of NRP in both the control plane and data plane
Updates after IETF 112

• The draft name is changed from vtn-scalability to nrp-scalability
  • Based on the terminology discussion in the WG and between the draft authors
  • The relationship between NRP and VTN is described in VPN+ framework

• New coauthors are added
  • Join effort in the alignment between several network slicing related documents

• Updates the descriptions and terminologies to align with IETF network slice draft

• The valuable review comments from Adrian and others are resolved
Next Steps

• This document provides the scalability analysis and optimization suggestions for the data plane and control plane of NRP
  • Provides guidance to the data plane and control plane mechanisms and protocol extensions

• The authors believe this version is ready for WG adoption
  • WG adoption request has been sent to the mail list at Feb. 7, 2022
Thank You
Proposed Scalability Optimizations

• Control plane scalability optimization
  • Shared control protocol instances/sessions among multiple NRPs
  • Shared topology specific computation among multiple NRPs
  • Hybrid control plane with the help of centralized controller

• Shared IGP instance and adjacency for multiple NRPs

• Shared topology and SPF computation between multiple NRPs

Shared topology

Shared SPF Tree
Proposed Scalability Optimizations (Cont.)

• Data plane scalability optimization
  • Decouple the resource ID from the topology-specific IDs used in packet forwarding
  • A data plane NRP ID can be introduced
    • IPv6 data plane
      • Based on IPv6 HBH extension header
    • MPLS data plane
      • Under discussion in MPLS Open DT