

# Scalability Considerations for Enhanced VPN (VPN+)

*draft-dong-teas-enhanced-vpn-vtn-scalability-04*

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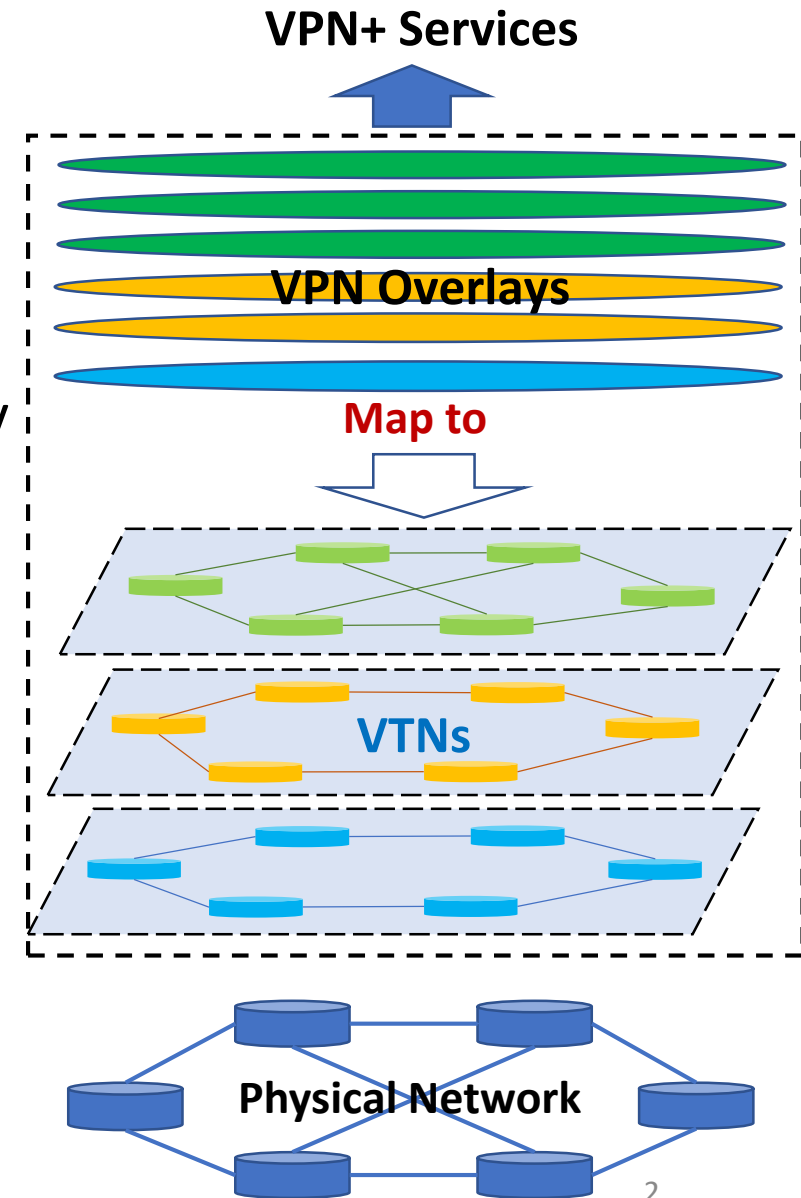
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# Recap of VPN+ and VTN

- VPN+ framework is described in *draft-ietf-teas-enhanced-vpn*
  - One typical use case is to deliver IETF network slices
- A VTN consists of a set of dedicated or shared network resources, and is associated with a customized logical topology
  - Can be used as the virtual underlay to deliver enhanced VPNs (VPN+)
- With the widely deployment of network slices, the scalability of VPN+/VTN becomes an important factor
- This document provides scalability considerations of VPN+/VTN
  - Analysis about the scalability in control plane and data plane
  - Proposes the optimization mechanisms to improve scalability



# Proposed Scalability Optimizations

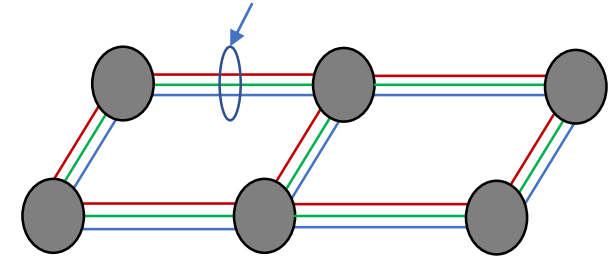
- Control plane scalability optimization

- Shared control protocol instances/sessions among multiple VTNs

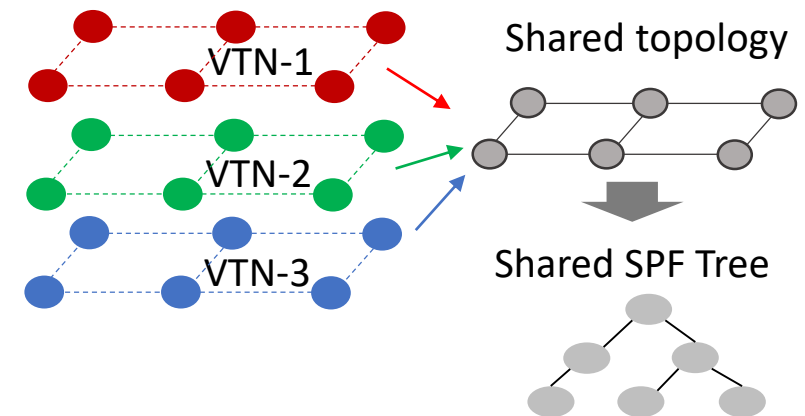
- Shared topology specific computation among multiple VTNs

- Hybrid control plane with the help of centralized controller

- Shared IGP instance and adjacency for multiple VTNs

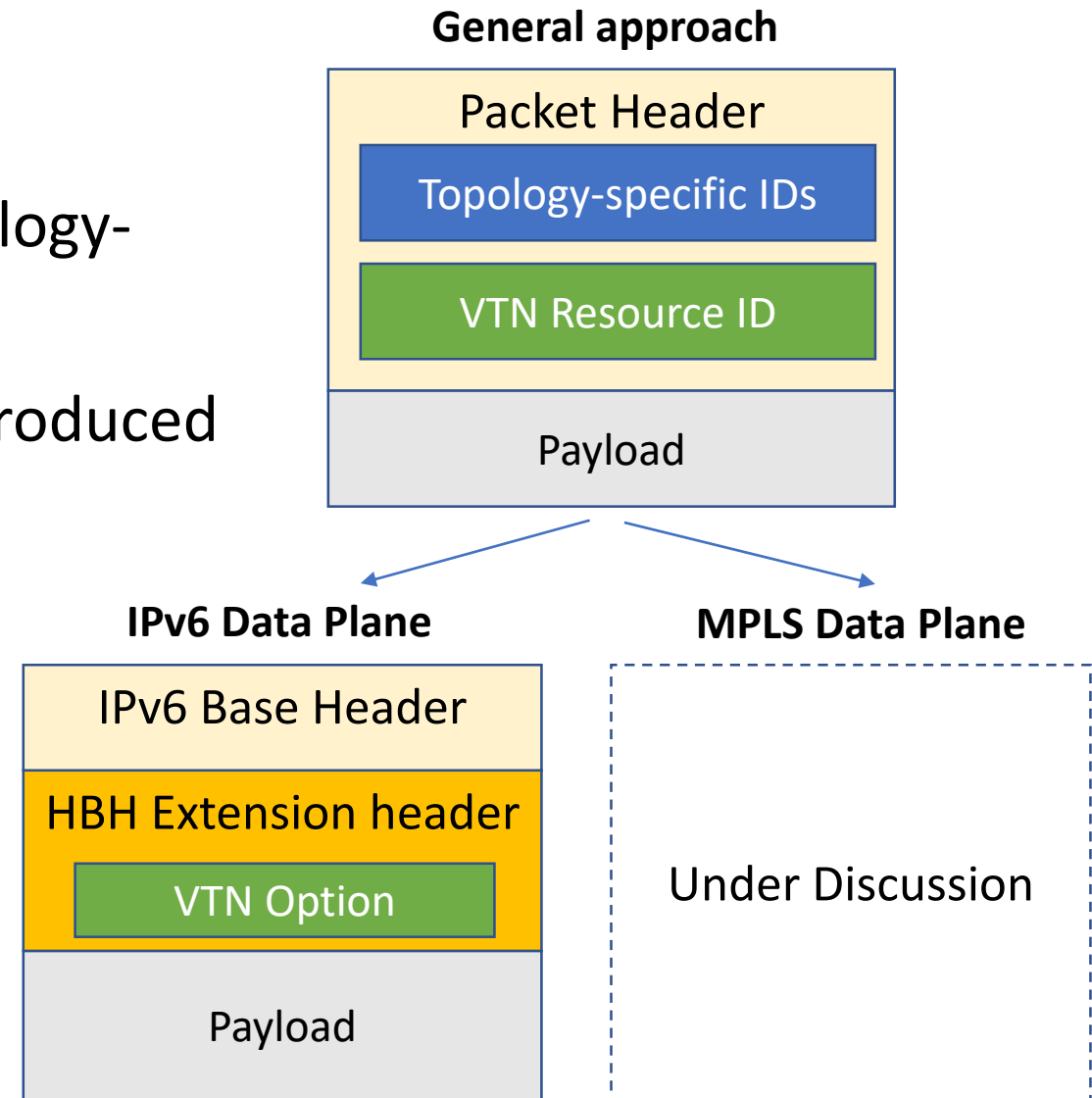


- Shared topology and SPF computation between multiple VTNs



# Proposed Scalability Optimizations (Cont.)

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

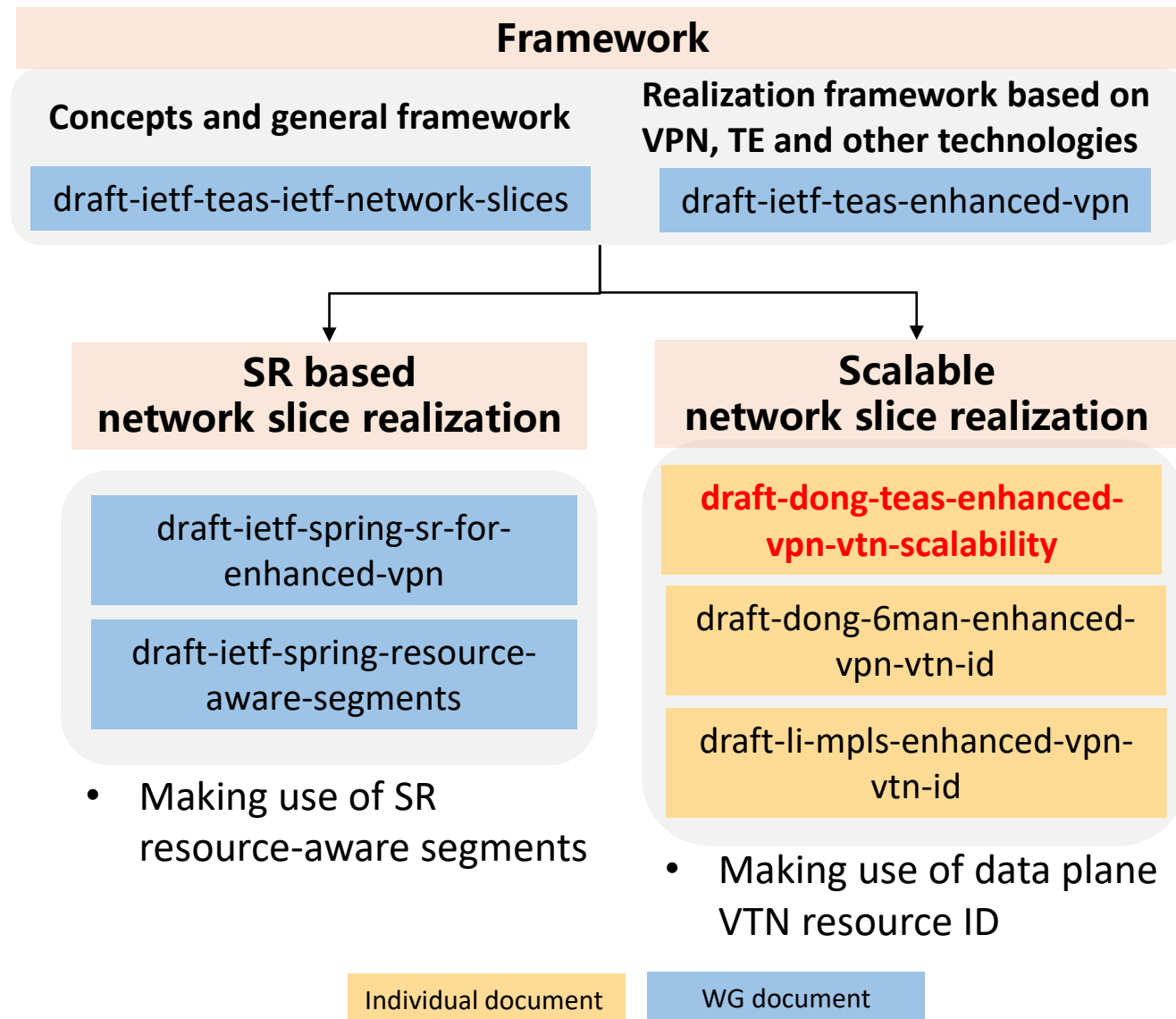


# Updates in -04 Version

- Updates the descriptions in the abstract and introduction to align with draft-ietf-teas-enhanced-vpn and draft-ietf-teas-ietf-network-slices
- Refines the descriptions about the scalability requirements on VPN+ services and the underlay VTN in section 2
- Refines the descriptions about data plane scalability in section 3.2.
- Refines the descriptions about data plane optimization in section 4.2
- Adds the security considerations section

# History of VPN+/VTN Documents

- Enhanced VPN (VPN+) framework
  - 00 version posted in Jul. 2017
  - WG adoption in Jan. 2019
- SR based VPN+/VTN mechanisms
  - 00 version posted in Mar. 2018
  - WG adoption in Feb. 2021
  - Suitable for small or medium scale network slice scenarios
- Scalability Considerations for VPN+ (this document)
  - 00 version posted in Feb. 2020, 4 updates in past 20 months
  - Solution work based on this document is ongoing



# Next Steps

- This document provides detailed scalability analysis and optimization for the control plane and data plane of VPN+/VTN
  - Complementary to the scalability considerations in VPN+ framework
  - Provides guidance to the protocol extension work
- Can refer to the generic term introduced in the IETF network slice draft
  - VTN is equivalent to the term “Network Resource Partition” in the context of IETF network slicing
- Collaborate on the protocol extensions based on this document
- The authors believe this version is stable, and would like to request for WG adoption

Thank You