

Carrying VTN-ID in IPv6 Extension Header

draft-dong-6man-enhanced-vpn-vtn-id-02

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Background

- A VTN is a virtual underlay network with the topology and network resources required by one or a group of services
- The information of the associated VTN needs to be carried in data packet
 - To steer packet to the set of local network resource allocated to the VTN for packet processing
 - The VTN information needs to be processed on each hop along the path in packet forwarding
- This document proposes a mechanism to carry VTN information in IPv6 extension headers
 - Applicable to both IPv6 and SRv6 networks

Options of Carrying VTN ID in IPv6 Packet

- IPv6 destination address
 - Need to allocate different IPv6 addresses/SRv6 SIDs per node per VTN
 - May increase complexity in address management, and the amount of forwarding entries
- Traffic Class
 - Designed for differentiated QoS treatment and ECN
 - Value of the TC bits may be changed during packet forwarding
 - Within a VTN, may still need to use TC to specify different traffic classes
- Flow label
 - Designed for load distribution among ECMP paths or LAGs
 - While the steering of packet to VTN-specific resource needs to be deterministic
- Extension headers
 - Can be processed hop-by-hop in data plane (HBH options header)
 - A dedicated option type can be defined to carry VTN information

Mechanisms in this draft

- A new IPv6 option type is defined to carry VTN ID

Option Type	Option Data Len	Option Data
BBCTTTT	00000100	4-octet VTN ID

- **BB**: set to 00, if unrecognized, skip and continue processing
- **C**: set to 0, can not change en route
- **VTN ID**: 4-octet identifier of a VTN
 - match the length of network slice ID (S-NSSAI) defined in 3GPP for 5G
- The VTN option SHOULD be carried in IPv6 Hop-by-Hop options header
 - Per-hop forwarding behavior is based on both the destination IP and the VTN option

Updates in -02 version

- Clarify that HBH options header is used to carry the VTN option
 - The VTN ID needs to be processed on each hop along the path
- Remove the reference to RFC 8754 (SRH)
 - The processing of VTN option is independent from SRH
- Update the operational considerations
 - The processing behavior of network nodes on HBH header needs to be considered
 - VTN option SHOULD either be processed or ignored in packet forwarding
 - Need to avoid packet drop due to the existence of HBH header

Next Steps

- Comments and feedbacks are welcome
- Revise the draft accordingly

Thank You