Carrying VTN-ID in IPv6 Extension Header

draft-dong-6man-enhanced-vpn-vtn-id-06

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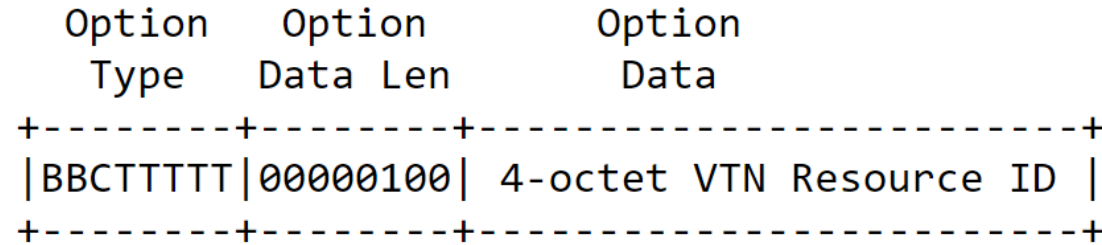
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Background

- A VTN is a virtual underlay network consisting of a set of dedicated or shared network resources, and is associated with a customized logical topology
    - Used as the virtual underlay network to deliver one or a group of enhanced VPN services
    - Please read the draft and draft-ietf-teas-enhanced-vpn for more about the background
- The identifier of the VTN needs to be carried in data packet, and parsed by each hop along the forwarding path
    - To steer packets to use the set of network resource allocated to the VTN for processing
    - IPv6 HBH header is the suitable approach for this application
- This document proposes a mechanism to carry VTN information in IPv6 HBH extension header

Proposal

- A new option type is defined to carry VTN resource ID in the HBH header

```
  Option      Option          Option
   Type      Data Len          Data
+--------+--------+----------------------------+
|BBCTTTTT|00000100|  4-octet VTN Resource ID |
+--------+--------+----------------------------+
```

  - **BB**: set to 00, if unrecognized, skip and continue processing
  - **C**: set to 0, can not change en route
  - **VTN Resource ID**: 4-octet identifier used to uniquely identify the set of network resources allocated to a VTN

- Procedures

  - **Domain ingress node**: encapsulates an outer IPv6 header and a HBH header with the VTN option, based on traffic classification and mapping policies of the operator
  - **Domain transit nodes**: uses destination IPv6 address to determine the next-hop, use VTN option to determine the set of local resources allocated to the VTN for packet forwarding
  - **Domain egress node**: decapsulates the outer IPv6 header, including the VTN option in the HBH header

Operational Considerations

- According to RFC 8200, network nodes may be configured to ignore the HBH header, some implementations may drop packets with HBH header or assign them to slow path

  - draft-hinden-6man-hbh-processing is working on solving this problem

- Operator needs to make sure that all the network nodes in a VTN can either process HBH header in fast path, or ignore the HBH header

  - It is practical to ensure that all the network nodes involved in the logical topology of the VTN support the processing of the HBH header and the VTN option

  - Packets will only be sent on paths computed within the logical topology

Thank You