Carrying VTN Information in IPv6 Extension Header

draft-ietf-6man-enhanced-vpn-vtn-id-03

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6man IETF 116 Meeting Mar. 2023
Background Recap

• This document introduces a new HBH option to carry VTN information in IPv6 packets
  • Can be used by transit network nodes to determine the VTN a packet belongs to
  • VTN-specific packet processing and forwarding can be performed

• The term VTN refers to a virtual transport (underlay) network
  • The basic semantics is a subset of network resources allocated in the underlay network
  • The semantics of VTN may cover other attributes of a virtual underlay network

• There is interest in generalizing the VTN option
  • It may be extended for other related functions in future
  • The recent version (-03) introduces the mechanisms to facilitate future extensions
Update of VTN Option Encoding

• Introduces the CT field in VTN option for future extensions

<table>
<thead>
<tr>
<th>Flags</th>
<th>CT</th>
<th>Reserved</th>
<th>Type</th>
<th>Length</th>
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</thead>
<tbody>
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<tr>
<td>VTN ID</td>
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</tbody>
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• Takes the data plane processing overhead into consideration
  • The format of the option is stable
  • For a specific CT, the length of the VTN ID is fixed

• Option Type: TBA
• Length: Length of the data fields in octets
• Flags: the first bit is defined as Strict Match (S)
• Context Type (CT): Indicate the semantics and length of the VTN ID
  • CT=0: The VTN ID is a 4-octet resource ID
  • Reserved field: leave for future extensions
  • VTN ID: The identifier of a Virtual Transport Network
Generalization of VTN Semantics

• The VTN ID can refer to a group of network-wide attributes maintained on network nodes which participate in the VTN, here are some examples:
  • Network resource attribute: the Resource ID
    • The resource semantics is needed for realizing network slicing
  • Network topology attribute
    • May be used to identify the logical topology a packet belongs to
  • Network function attribute
    • May be used to identify the network actions to be executed
• It is important to understand the boundary of generalization
  • The attributes of VTN should be network-wide rather than node-specific
  • It may not be a good practice to put everything into one HBH option
    • Making the option itself too complex to implement and deploy
Processing Procedures

• The processing of VTN Resource ID is specified in this document
  • Ingress node: encapsulates an outer IPv6 header and a HBH header with the VTN option
  • Transit nodes: uses both the Destination Address and the VTN Resource ID in determining the next-hop and the set of resources for packet forwarding
  • Egress node: decapsulates the outer IPv6 header and the HBH header which includes the VTN option

• The processing of VTN option with other Context Types will need to be specified in separate documents
Operational Considerations

• Operators need to make sure all the network nodes involved in a VTN can either process the HBH header in fast path, or ignore the HBH header
  • One approach is to put all the network nodes supporting the processing of the HBH header and the VTN option in a logical topology, and constrain the packet forwarding only in that logical topology

• draft-ietf-6man-hbh-processing specifies the modified procedures for the processing of HBH header
  • Network nodes complying with that document can forward packets with HBH header
Next Steps

• Use this document as the base of the VTN option specification
  • Stable basic encoding, ready for code point (early) allocation
  • Create the registry for VTN Context Types

• Future extensions to VTN semantics will be specified in separate documents

• Continue to collect feedbacks from the WG

• Move towards WG last call
Thank You