SRv6 BGP based overlay services

draft-dawra-bess-srv6-services-00

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High Level Updates

• Presented L3VPNNoSRv6 in IDR at IETF98
• Presented EVPNoSRv6/Global AFs in IDR at IETF101
• SRv6 Services document have matured significantly:
  • Multiple deployments and implementations across multiple vendors
  • Relevant documents progressing in individual WGs
• Minor updates to this document to cover SRv6 BGP Services:
  • Slight modification of SRv6 SID TLV(s) to be more flexible
  • Optional SRv6 Service data sub-sub-TLV
  • No other major changes in the document
What we want to do

- Enable segment routing over IPv6 Dataplane
- Advertise segments IDs (SIDs) and associated functions for VPN(s)/Global AF(s)
- Reduce overhead in migration of brownfield deployments.
SRv6 Services TLV

<table>
<thead>
<tr>
<th>TLV Type</th>
<th>TLV Length</th>
<th>RESERVED</th>
</tr>
</thead>
</table>

// SRv6 Service Sub-TLVs //

SRv6 Service Sub-TLVs

<table>
<thead>
<tr>
<th>SRv6 Service</th>
<th>SRv6 Service</th>
<th>SRv6 Service //</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-TLV</td>
<td>Sub-TLV</td>
<td>Sub-TL          //</td>
</tr>
<tr>
<td>Type</td>
<td>Length</td>
<td>value           //</td>
</tr>
</tbody>
</table>

• **TLV Type**: TBD1 for SRv6 L3 Service TLV, TBD2 for SRv6 L2 Service TLV

• **TLV Length**: 16bit field. The total length of the value portion of the TLV.

• **RESERVED**: 8 bit field. SHOULD be 0 on transmission and MUST be ignored on reception.
SRv6 SID Information Sub-TLV

<table>
<thead>
<tr>
<th>0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

- **Type**: 1 for SRv6 SID Information Sub-TLV
- **SRv6 SID Value**: Encodes an SRv6 SID as defined in [I-D.filsfils-spring-srv6-network-programming]. For instance:
  - **L3 SIDs**: End.DX4 / DT4, End.DX6 / DT6
  - **L2 SIDs**: End.DX2, End.DX2V, End.DT2U, End.DT2M / Arg.FE2
- **SRv6 Service Data Sub-Sub-TLV** (variable): This field contains optional properties of the SRv6 SID
SRv6 Service SID Information

• An SRv6 SID is a 128-bit IPv6 address structured in 3 parts
  • Locator: Node IPv6 address will be encoded
  • Function: VPN Label or L2VPN / EVPN or Global functions are encoded
  • Argument: Optional
  • Flexible bit-length allocation between the three parts
SRv6 EVPN Services

• RFC7432 baseline procedures were not modified

• SRv6-VPN SID corresponding to EVPN (L2/L3) is attached to EVPN NLRIs

• Reduce overhead in migration of brownfield deployments.
# EVPN L3 Services Encoding

<table>
<thead>
<tr>
<th>BGP RT-5</th>
<th>value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESI</td>
<td>ZERO</td>
</tr>
<tr>
<td>IP address</td>
<td>IP address</td>
</tr>
<tr>
<td>GW IP address</td>
<td>ZERO</td>
</tr>
<tr>
<td>Label</td>
<td>MPLS L3VPN label</td>
</tr>
</tbody>
</table>

**SRv6 SID Info Sub-TLV**

<table>
<thead>
<tr>
<th>Type-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SID → End.DT6 / DT4 / DX6 / DX4</td>
</tr>
</tbody>
</table>

**SRv6 BGP based overlay services**

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SRv6 Global Services Encoding

• MP_REACH_NLRI for IPv4/IPv6 is Encoded with AFI/SAFI with IPv6 NH

• Motivation to achieve BGP free core with Global SIDs

• Function END.DX6/END.DX4 (or END.DT6/END.DT4) are encoded using SRv6 Global SID
Implementation Status

- Three Cisco Hardware-forwarding platforms: ASR 1K, ASR 9k and NCS 5500
- Two Cisco network operating systems: IOS XE and IOS XR
- Huawei Hardware-forwarding platforms: ATN, CX, ME, NE5000E, NE9000, NG-OLT
- Huawei network operating systems: VRPv8
- Barefoot Networks Tofino on OCP Wedge-100BF
- Linux Kernel officially up streamed in 4.10
- fd.io
Draft: Next Steps

• Seeking WG adoption!
• Suggestions/comments are welcome!