LISP Control-Plane for SRv6 Endpoint Mobility

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LISP WG – IETF 102 (Montreal)
LISP for Loc/ID split in SRv6

- LISP for “where to go"
  - Control plane to support Loc/ID split aspects in SRv6
  - Maps **Endpoint + VNI** to **SRv6 egress + VPN segment** (End.DT, End.DX function)

- SRv6 for “how to go”
  - Flexible data-plane with support for Traffic Engineering, Network Slicing, FRR and Service Programming.
  - Path computation (if necessary) provided by SR-PCE
Use-Cases

• SRv6 for Overlay, Mobility and Traffic Engineering
  • Covered in -00

• SRv6 for Overlay and Mobility
  • To be covered in -01
Endpoint registration

- Egress SRv6 nodes register endpoints into the MSMR

- New SR LCAF to register:
  - Egress VPN-SID at egress SRv6 node
  - Egress SRv6 node
  - Endpoint’s Traffic Steering Tag
    - To decapsulate traffic into the proper VRF / Interface
    - To retrieve the appropriate SRv6 path from the PCE
Endpoint resolution

• Disjoint resolution
  • Ingress SRv6 node request endpoint info to the LISP MSMR
  • MSMR returns egress VPN-SID for the endpoint to the ingress SRv6 node (along with egress SRv6 node and endpoint tag)
  • Ingress SRv6 node uses egress node and endpoint tag to retrieve SRv6 policy from PCE

• Joint resolution
  • Ingress SRv6 node request endpoint info to the LISP MSMR
  • LISP MSMR uses egress node and endpoint tag to retrieve SRv6 policy from PCE
  • MSMR returns complete SRv6 path to the ingress SRv6 node
Disjoint resolution
Local EID database has been configured

My Local SID table has been configured

<table>
<thead>
<tr>
<th>IID</th>
<th>EID</th>
<th>RLOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>W</td>
<td></td>
</tr>
</tbody>
</table>
Map-Register messages from A and C populate the MSMR
Traffic at A going to X triggers Map Cache resolution
Traffic at A going to X triggers Map Cache resolution

Map-Request from A to the MSMR: “Where’s X?”

Map-Reply from the MSMR to A: “X is at C::D33 with color Red”
Traffic at A going to X triggers Map Cache resolution

Map-Request from A to the MSMR: “Where’s X?”

Map-Reply from the MSMR to A: “X is at C::D33 with color Red”

A retrieves SRv6 Policies via PCE for {C::, Red}

Note: The “Color” gives a hint to the PCE on which SLA it should apply for the path computation. i.e. uRLLC network slice.
Traffic flows from V to X via the SRv6 path <A::, B::1, C::D33>
X moves from C to E

**MSMR**

<table>
<thead>
<tr>
<th>IID</th>
<th>EID</th>
<th>RLOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>V</td>
<td>A::D11, Red</td>
</tr>
<tr>
<td>1</td>
<td>X</td>
<td>C::D33, Red</td>
</tr>
<tr>
<td>2</td>
<td>W</td>
<td>A::D22, Blue</td>
</tr>
<tr>
<td>2</td>
<td>Y</td>
<td>C::D44, Blue</td>
</tr>
</tbody>
</table>

**LISP Local EID DB**

<table>
<thead>
<tr>
<th>VRF</th>
<th>IID</th>
<th>EID</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>1</td>
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<td>Red</td>
</tr>
<tr>
<td>22</td>
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<td>W</td>
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**LISP Map Cache**

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>1</td>
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**SRv6 My Local SID table**

<table>
<thead>
<tr>
<th>SID</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>A::D11</td>
<td>Decap – VRF 11</td>
</tr>
<tr>
<td>A::D22</td>
<td>Decap - VRF 22</td>
</tr>
</tbody>
</table>

**SRv6 policies**

<table>
<thead>
<tr>
<th>NextHop</th>
<th>Color</th>
<th>SID list</th>
</tr>
</thead>
<tbody>
<tr>
<td>C::</td>
<td>Red</td>
<td>&lt;B::1&gt;</td>
</tr>
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</table>
X moves from C to E

E sends a Map-Register with X’s new location to the MSMR, this triggers:

1. Notification of new location to old location (to enable redirects) [draft-ietf-eid-mobility]
2. Notification of new location to previous requesters [draft-ietf-lisp-pubsub]
X moves from C to E

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1. Notification of new location to old location (to enable redirects) [draft-ietf-eid-mobility]
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A retrieves SRv6 Policies via PCE for {E::, Red}
Traffic flows from V to X via the SRv6 path <A::, E::D55>
Joint resolution
Traffic at A going to X triggers Map Cache resolution
Traffic at A going to X triggers Map Cache resolution

Map-Request from A to the MSMR: “Where’s X?”
Traffic at A going to X triggers Map Cache resolution

Map-Request from A to the MSMR: “Where’s X?”

MSMR retrieves SRv6 Policies via PCE for {C::, Red}
Traffic at A going to X triggers Map Cache resolution

Map-Request from A to the MSMR: “Where’s X?”

MSMR retrieves SRv6 Policies via PCE for {C::, Red}

Map-Reply from the MSMR to A: “Path to X is <B::1, C::D33>”
Traffic flows from V to X via the SRv6 path <A::, B::A, C::D33>
X moves from C to E

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**Local EID DB**

**LISP Map Cache**

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**My Local SID table**

**SRv6 policies**

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**NextHop | Color | SID list**

PCE

VRF 11

VRF 22

VRF 33

VRF 44

VRF 55

VRF 11

VRF 22

VRF 33

VRF 44

VRF 55
X moves from C to E

E sends a Map-Register with X’s new location to the MSMR, this triggers:

1. Retrieval of SRv6 Policies via PCE for {E::, Red}
2. Notification of new path to previous requesters [draft-ietf-lisp-pubsub]
Traffic flows from V to X via the SRv6 path \(<A::, E::D55>\)
Open questions

- Encoding for SRv6 path in LISP control-plane messages
  - Reuse ELP or define new subtype within the new SR LCAF?
Next steps

- Extend and refine for version -01
- Present draft to SPRING WG and gather feedback
- Experimental implementation in FD.io (VPP)