SRv6 Point-to-Multipoint Path

draft-chen-pim-srv6-p2mp-path-00

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Introduction

MPLS TE in IETF for 20+ years

- Unicast, P2P TE LSP
- Multicast, P2MP TE LSP

SR in IETF for 7 years
no state, no signaling in core, …
scalability, simple OPs, …

- Unicast, SR P2P Path
Widely deployed

? Multicast, SR P2MP Path
Need SR P2MP Path solution, consistent with SR principle
Brief on Existing Solutions

I-D.shen-spring-p2mp-transport-chain, for a SR P2MP path/tree
Multiple SR P2P tunnels from ingress to leaf with some leaves as buds

I-D.voyer-pim-sr-p2mp-policy, for a SR P2MP path/tree
- State (Data Plane) in core (root, transit nodes and leaves of path/tree)
- State is instantiated by a controller such as PCE
Brief on a Proposed Solution

- Closer to No state in network core
- SR policy (SID list) to ingress
- Multicast SID
- SID List for SR P2MP path/tree
SRv6 P2MP Path Solution – Multicast SID

Multicast SIDs are special SIDs allocated from multicast SID block. 2 types Multicast SIDs: Multicast Node SID and Adjacency SID

Number of Branches  Number of SIDs in sub-tree

Format of Multicast Node SID with Branch and sub-tree Information

For node X
X-m: X’s multicast SID

Multicast Source
SRv6 P2MP Path Solution – SID List

- SID List (SL) represents SR P2MP path/tree or sub-tree
  e.g., SL = \{P1-m, P2-m, P3-m, L1-m, L2-m, P4-m, L3-m, L4-m\}
  arguments (such as N-Branches, N-SIDs) in SIDs indicate tree structure

- A SID List is pushed in a packet at Ingress R (Network Edge)
  e.g., DA=P1-m, SL1={P2-m, P3-m, L1-m, L2-m, P4-m, L3-m, L4-m} pushed at R

- Each transit copies, sends packet to its next hops using DA,SID List
  in packet received (No state in core)
  e.g., P1 copies, sends packet to P2 and P3; P2 copies, sends packet to L1 and L2

For node X
X-m: X’s multicast SID
SID List Example in Details

<table>
<thead>
<tr>
<th>0</th>
<th>B</th>
<th>L+B</th>
<th>127</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multicast Node SID Block</td>
<td>Node-P1-ID</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Multicast Node SID Block</td>
<td>Node-P2-ID</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Multicast Node SID Block</td>
<td>Node-P3-ID</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Multicast Node SID Block</td>
<td>Node-L1-ID</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Multicast Node SID Block</td>
<td>Node-L2-ID</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Multicast Node SID Block</td>
<td>Node-P4-ID</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Multicast Node SID Block</td>
<td>Node-L3-ID</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Multicast Node SID Block</td>
<td>Node-L4-ID</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

SID list encoding P2MP path/tree under R via P1 towards L1 to L4

SID P1-m indicates that there are 2 branches and 7 SIDs under P1. SID P2-m indicates that there are 2 branches and 2 SIDs under P2. SID P3-m indicates that there are 1 branch and 3 SIDs under P3.

SIDs L1-m and L2-m indicate that no branch under them.

SID P4-m indicates that there are 2 branches and 2 SIDs under P4. L3-m and L4-m indicate that no branch under them.
SRv6 P2MP Path Solution – Some Details

• P1 receives packet
  DA = P1-m, SID List (SL1) = \{P2-m, P3-m, L1-m, L2-m, P4-m, L3-m, L4-m\}

  2 branches

• P1 duplicates packet for P2 and P3

  P1 sends packet to P2, packet to P3
  DA = P2-m, SID List (SL2) = \{L1-m, L2-m\}  DA = P3-m, SID List (SL3) = \{P4-m, L3-m, L4-m\}

• P2 receives packet (DA = P2-m, SID List (SL2) = \{L1-m, L2-m\})

  P2 duplicates, sends packet to L1 and L2 (with DA = L1-m and DA = L2-m respectively, SL4/5={})

For node X
X-m: X’s multicast SID
Request for Adoption