segment-routing-proxy-forwarding

draft-hu-spring-segment-routing-proxy-forwarding-01

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Introduction

• Existing SR-TE path fast protection
  – local repair on direct neighbors of failed node
  – local repair not working once IGP converges
• This draft resolves this issue
  – It allows traffic to continue on SR-TE path for a extended time after a node on path fails
  – Neighbor (proxy forwarding node) forwards traffic around the failed node
What is problem

- Step 1: P detects N failure, P as PLR does FRR to node C.

- Step 2: Node B IGP converges. Delete route to node N. (Traffic drops)

- Step 3: Node A computes a SR-TE path from A to C and installs it, traffic recovers.
Segment Routing: At ingress, segment list is added into packet, which is forwarded along SR-TE path.

Proxy forwarding node P for node N is a node, which forwards packet for node N.

When node N fails, the proxy forwarding node P for N will forward packet for node N.
Protocol Extensions

• Each neighbor P of a possible failed node N
  – Get ready for proxy forwarding for node N
  – Advertise its SR proxy forwarding capability

• A node receiving the capability from P
  – Know that P will do proxy forwarding for SID of N
  – Send traffic to P after N fails
Proxy Forwarding Capability

- Node P advertises it when P can do proxy forwarding for all its neighbors
- Node X learns that each of these neighbor nodes is protected by P through proxy forwarding
- In normal operations, node X prefers to use SID of node N to direct traffic
- When node N fails, node X prefers to use proxy P of node N to direct traffic

Figure 1: Router Informational Capabilities TLV
Extensions to OSPF (2/2)

Binding Segment on node N (binding SID and a list of segments)

- Node N advertises it only to its neighbor nodes using TLV in link-scope LSA
- When node N fails, node P (neighbor of N) does proxy forwarding for node N using the binding information

```
|          Type (TBD2)          |             Length            |
|-------------------------------------------------------------------|
| Reserved                                                        |
|BindingSID Type| SIDs Type                        |
|-------------------------------------------------------------------|
~ Binding SID Sub-TLV/value                                      ~
~ SID Sub-TLVs/values                                           ~
```

Figure 4: OSPF Binding Segment TLV
Similar to OSPF for Proxy Forwarding Capability

- Node P advertises it when P can do proxy forwarding for all its neighbors in SR proxy forwarding capability in its LSP
- Node X learns that each of these neighbor nodes is protected by P through proxy forwarding
- In normal operations, X prefers to use SID of node N to direct traffic
- When node N fails, X prefers to use proxy P of node N to direct traffic

Figure 7: SR Capabilities sub-TLV
Extensions to IS-IS (2/2)

Binding Segment on node N (binding SID and a list of segments)
- Node N advertises it only to its neighbor nodes using TLV in Hello or link-scope LSP
- When node N fails, node P (neighbor of N) does proxy forwarding for node N using the binding information

<table>
<thead>
<tr>
<th>Type</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binding SID</td>
<td>Sub-TLV</td>
</tr>
</tbody>
</table>

Figure 9: IS-IS Binding Segment TLV
Next Steps

- Welcome comments