Extensions to RSVP-TE for P2MP LSP

Ingress Local Protection

draft-chen-mpls-p2mp-ingress-protection

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P2MP LSP Ingress Local Protection

-- Locally detect and repair ingress failure
Thus ingress failure recovers within 50ms

Ingress PE5 fails
➢ Traffic to backup LSP (from PE6 to NH of Ingress PE5)
➢ Traffic merged into main LSP at NH of ingress
Ingress PE5 sends **LSP Info Msg** to backup ingress PE6

- **PE6 constructs PATH msg** for creating backup LSP
- **PE6 creates FIB entry (inactive) after receiving RESV msg**
OSPF Extensions for Ingress Local Protection

**LSP Info sent from Ingress to Backup Ingress in LSA**

<table>
<thead>
<tr>
<th>LS Age</th>
<th>LS Type = 9</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Link State ID</td>
</tr>
</tbody>
</table>

**LSP Attributes TLV**

**RRO for LSP TLV**

**OSPF Opaque LSA**

- **OSPF in PE5 sends LSP Info in LSA to OSPF in PE6**
- **RSVP-TE in PE6 constructs PATH msg for backup LSP**
- **PE6 creates FIB entry (inactive) after receiving RESV msg**

This Option is killed.
Next Step

- Welcome comments
- Request to make it into a working group document
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Egress Local Protection

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-- Locally detect and repair egress failure
Thus egress failure recovers within 50ms

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Egress PE1 fails

- Traffic to backup LSP (from PH of PE1 to PE2)
- Traffic delivered to CE1 from PE2
RSVP-TE Extensions for Egress Local Protection

PATH Message

<table>
<thead>
<tr>
<th>Common Header</th>
<th>(Existing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label Request (Existing)</td>
<td></td>
</tr>
<tr>
<td>Sender Descriptor</td>
<td>(Existing)</td>
</tr>
<tr>
<td>Info for Backup Egresses (New)</td>
<td></td>
</tr>
</tbody>
</table>

For one egress to be protected:

- Backup Egress (+Egress)
- ERO for backup LSP

Previous Hop (PH) of Egress:
- Generates PATH msg based on Info and sends along backup LSP path
- Creates FIB entry (inactive) for backup LSP after receiving RESV msg
Next Step

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New P2MP LSP E2E Protection

- Ingress of P2MP LSP is locally protected (New)
- Every egress of P2MP LSP is locally protected (New)
- Every link and intermediate node of P2MP LSP is locally protected using FRR (Existing)

Thus

- All parts of P2MP LSP are locally protected
Advantages of P2MP LSP Ingress and Egress Local Protection + FRR

- All parts of P2MP LSP are locally protected
- Only one P2MP LSP is used to implement an E2E protection
  - Normally two P2MP LSPs are used
- Big saving on resource: 50% bandwidth saving
  - No need to reserve/use double bandwidth
- Faster recovery
  - Speed of local protection recovery
  - Traffic recovery within 50ms when a failure happens
- Easier to operate
Next Step

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