Extensions to RSVP-TE for LSP Ingress Local Protection

draft-ietf-teas-rsvp-ingress-protection-05

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• Address some comments
• Problem Summary
• Objectives and Scope
Address comments

• For ingress and backup ingress not adjacent
  Configure a tunnel between primary ingress and backup ingress if they are not one hop away

• Can Linear Protection protect ingress of LSP?
  – No

LER-A: Ingress of working LSP and Protection LSP

Linear Protection:
LER-A (Ingress) switches traffic to Protection LSP when failure happens on Working LSP.
Problem Summary

• Need for fast, efficient protection for ingress of LSP (P2MP or P2P LSP)

• Existing solution: Two end to end P2MP/P2P LSPs
  
  – Consumes lots of network resources (Double states need to be maintained in the network since two end to end TE LSPs are created. Double link bandwidth is reserved and used when both the primary and the secondary end to end TE LSPs carry the traffic at the same time)

  – More operations (configurations of two end to end TE LSPs and BFDs from each of the egress nodes to its corresponding ingress node)

  – Detection of ingress failure may not be reliable

  – Speed of protection against ingress failure may be slow
Objectives and Scope

• Objectives
  – Fast protection for ingress
    (minimize traffic interruption when ingress fails)
  – Efficient protection for ingress
    (minimize usage of network resources, including memory for states and link bandwidth)
  – Simple operations

• Scope
  – Local Protection/Repair for Ingress
  – (Not end to end protection)
  – (Not for links attached to ingress)
Thanks

• Any comments?
Existing P2MP LSP Ingress & Egress Protections

1. Two P2MP LSP carry data

2. P2P LSP (leaf → root) with BFD

3. P2P LSP as NH to SA, export route for SA to receiver (when PE1 fails, route withdrawn)

4. CE3 selects leaf according to route to SA
P2P LSP Ingress & Egress Protections

1. Two P2P LSP carry data
2. P2P LSP (egress → ingress) with BFD
3. P2P LSP as NH to SA, export route for SA to receiver (when PE1 fails, route withdrawn)
4. CE3 selects an egress according to route to SA
1. Two P2P LSP
One carries data

2. FRR for links and transit nodes

3. CE3 receives data from both

4. CE1 needs to detect egress failure and switch traffic to backup LSP

Primary P2P LSP

Backup P2P LSP
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• Re-use and extend SERO (to replace EGRESS_BACKUP object)
• Enhance on operations
Re-use and Extend SERO

Secondary Explicit Route object (SERO) in RFC 4873

• Its format is re-used
• Some contents are extended/changed

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<th>SERO for egress protection</th>
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<td>Backup egress node subobject</td>
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</table>

Contents of protection subobject is extended below
(PROTECTION object is extended in same way)

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|L|    Type     |     Length    |    Reserved   |   C-Type      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|S|P|N|O| Reserved  | LSP Flags |     Reserved      | Link Flags|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|I|R|    Reserved   | Seg.Flags |        Reserved       | E-Flags|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
~ Optional subobjects ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
Contents of protection subobject
```
Enhance on Operations

1. Configure Backup Egress on ingress

2. Configure same IP address on primary backup egress and backup egress

3. Configure Backup Egress on primary egress

Only one of three configurations is used (1 and 2: existing, 3: new)

- For 1, SERO w/ PE8 in Path to P2, creating backup LSP from P2 to PE8
- For 2, P2 determines backup egress PE8, creates backup LSP to PE8
- For 3, SERO w/ PE8 as backup egress in Resv to P2 from PE7, P2 creates backup LSP from P2 to PE8.
Thanks

• Any comments?
E-Flags and Optional Subobjects

E-Flags:
- x01: Egress local protection
- x02: Other sending UA label (existing in previous version)
- X04: S2L sub LSP backup desired (existing)

Optional Subobjects:

Primary Egress
P2P LSP ID (Existing in previous version)
Opaque Data (Generalized from previous version)

IPv4 Primary Egress subobject

IPv4 Primary Egress subobject

Opaque Data subobject