RSVP Extensions For Re-optimization of Loosely Routed Point-to-Multipoint Traffic Engineering Label Switched Paths (LSPs)

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Outline

• Requirement
• Recent Update
• Next Steps
Requirement

• P2MP-TE LSP [RFC4875]
• Loosely routed LSP re-optimization [RFC4736]
• As per P2MP-TE [RFC4875], an LSR may:
  
  - [ ] Re-optimize the entire P2MP-TE LSP by resignaling all its S2L sub-LSP(s), i.e. all destinations.
  
  - **Combine** multiple Path/PathErr messages using S2L sub-LSP descriptor-list to alleviate scale issue.

  - A combined message with large number of S2L sub-LSPs in the descriptor-list may be **fragmented** by the sender and arrive **out of order** at the receiver.
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S2L_SUB_LSP_FRAG Object Format

• **S2L_SUB_LSP_FRAG**: Class-Num 50, C-Type TBA by IANA

```
+------------------------------------------+--------------------------+--------------------------+--------------------------+
|          Len (12 bytes)                   |           Class_Num 50    |             SUB_LSP_FRAG |
+------------------------------------------+--------------------------+--------------------------+
|          Reserved                        |             Fragment ID   |                          |
+------------------------------------------+--------------------------+--------------------------+
|     Fragments Total                     |             Fragment Number |                          |
+------------------------------------------+--------------------------+--------------------------+
```

• **Fragment ID**: 16-bit integer in the range of 1 to 65535. This value is incremented for each new RSVP message that needs to be fragmented.

• **Fragments Total**: 16-bit integer in the range of 1 to 65535. This value indicates the number of fragments sent for the given RSVP message.

• **Fragment Number**: 16-bit integer in the range of 1 to 65535. This value identifies the specific fragment of the original packet.

• The **S2L_SUB_LSP_FRAG** Object is added before adding the S2L_SUB_LSP_IPv4 or S2L_SUB_LSP_IPv6 Object in the fragmented message.
Fragmented Path Messages with S2L_SUB_LSP_FRAG Object

<Path Message Frag-1> ::=  <Common Header> [ <INTEGRITY> ]
   <SESSION> <RSVP_HOP>
   [ <EXPLICIT_ROUTE> ] ....
   <sender descriptor>
   <S2L sub-LSP descriptor list-1>

<Path Message Frag-N> ::=  <Common Header> [ <INTEGRITY> ]
   <SESSION> <RSVP_HOP>
   [ <EXPLICIT_ROUTE> ] ....
   <sender descriptor>
   <S2L sub-LSP descriptor list-N>

Format of S2L sub-LSP descriptor-list:

<S2L sub-LSP descriptor list> ::=  <S2L_SUB_LSP_FRAG> <S2L sub-LSP descriptor>
   [ <S2L sub-LSP descriptor list> ]
<S2L sub-LSP descriptor> ::=  <S2L_SUB_LSP>
   [ <P2MP SECONDARY_EXPLICIT_ROUTE> ]
S2L_SUB_LSP_FRAG Object Usage

• LSR adds optional S2L_SUB_LSP_FRAG Object with a sub-set of S2L sub-LSP descriptor list(s) in each Path/PathErr message fragment.

➤ A mid-point LSR SHOULD wait to accumulate all fragments and put them in-order before attempting to re-evaluate preferable path when a Path message with "Path Re-evaluation Request" is received.

➤ An ingress node SHOULD wait to accumulate all fragments and put them in-order before attempting to trigger re-optimization when a PathErr message with "Preferable Path Exists" is received.
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Next Steps

- Document is updated to address review comments from Pavan
- Welcome comments from the WG on the document especially on the changes presented today

- IPR poll was completed for the WG LC
- Requesting WG LC
Thank You.