

# **draft-ali-mpls-inter-domain-p2mp-rsvp-te-lsp-06.txt**

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# Agenda

- **Inter-domain P2MP-TE - Problem Statement**
- **RFC 4875 - P2MP-TE Remerge Handling**
- **Control-plane Method**
- **Data-plane Method**
- **Next Steps**

# Inter-domain P2MP-TE - Problem Statement

- **One requirement for P2MP-TE LSP is to avoid re-merges as these are inefficient and result in duplication of traffic**
- **The term "re-merge" refers to the situation when two S2L sub-LSPs branch at some point in the P2MP-TE Tree, and then merge back at another downstream node**
- **In case of inter-domain P2MP-TE LSP, re-merges can happen as different border nodes performing loose-hop ERO expansions do not have knowledge of the entire P2MP-TE LSP**
- **RFC4875 (RSVP-TE extensions for P2MP-TE) does not address inter-domain requirements**
- **RFC5151 (Inter-domain RSVP-TE extensions) does not address P2MP-TE**
- **RFC4920 (Crankback signaling extensions) does not address P2MP-TE signaling**

# RFC 4875 - P2MP-TE Remerge Handling

RFC 4875 specifies two methods to handle P2MP-TE re-merge conditions:

- 1. Control plane method:** the re-merge node initiates the **removal** of the re-merge branch(es) by sending a Path Error message.
- 2. Data plane method:** the re-merge node **allows** the re-merge to persist, but data from all but one incoming interface is dropped at the node. This ensures that duplicate data is not sent on any outgoing interface.

# Control-plane Method Extension

- Ingress selects the **same domain** border node for ERO expansion for all siblings transiting a given domain. Domain border nodes expand EROs for all siblings S2L such that the overall path taken by these siblings in the domain is remerge free.
- **Crankback Signaling:**
  - Crankback procedures defined in RFC 4920 can be applied to P2MP-TE LSPs to handle re-merge conditions.
  - Does not require selection of same domain border node for all siblings transiting a given domain.
  - For siblings that have failed the LSP setup, on receipt of a Path Error a domain border node may hold the Path Error for re-merge.
  - The domain border node may try to signal an alternate path through the domain, for siblings that have failed the LSP setup.
  - If a subsequent attempt is successful, the domain border node discards the held Path Error message.
  - If all subsequent attempts are unsuccessful, the domain border node forwards the Path Error to the head-end node.

# Data-plane Method Extension - Path Message

- In order to indicate transit nodes that P2MP-TE Re-merge Recording is requested, a new flag in the Attribute Flags TLV of the LSP\_ATTRIBUTES object defined in [RFC 5420] is defined as follows:

Bit Number (to be assigned by IANA): **P2MP-TE Re-merge Recording Request flag**

- The P2MP-TE Remerge Recording Request flag is meaningful on a Path message and can be inserted by the ingress node or a border node that understands the P2MP-TE Re-merge Present Flag (next slide) in RRO Attributes Sub-object.

# Data-plane Method Extension - Resv Message

- **When a node understands the "P2MP-TE Re-merge Recording Request" in the Attribute Flags TLV of the LSP\_ATTRIBUTES object of the Path message, the node SHOULD set the newly defined "P2MP-TE Re-merge Present" flag in the RRO Attributes sub-object defined in [RFC 5420] in RRO:**

**Bit Number (same bit number assigned for P2MP-TE Re-merge Recording Request flag): P2MP-TE Re-merge Present flag**

- **The presence of P2MP-TE Re-merge Present flag indicates that the S2L is causing a re-merge. The re-merge has been accepted but the incoming traffic on this S2L is dropped by the reporting node.**
- **Proposed extension allows a border node and/or a head-end to optimize bandwidth at some later time in future while immediately starting the traffic to all possible destinations of the inter-area P2MP-TE LSP**

# Next Steps

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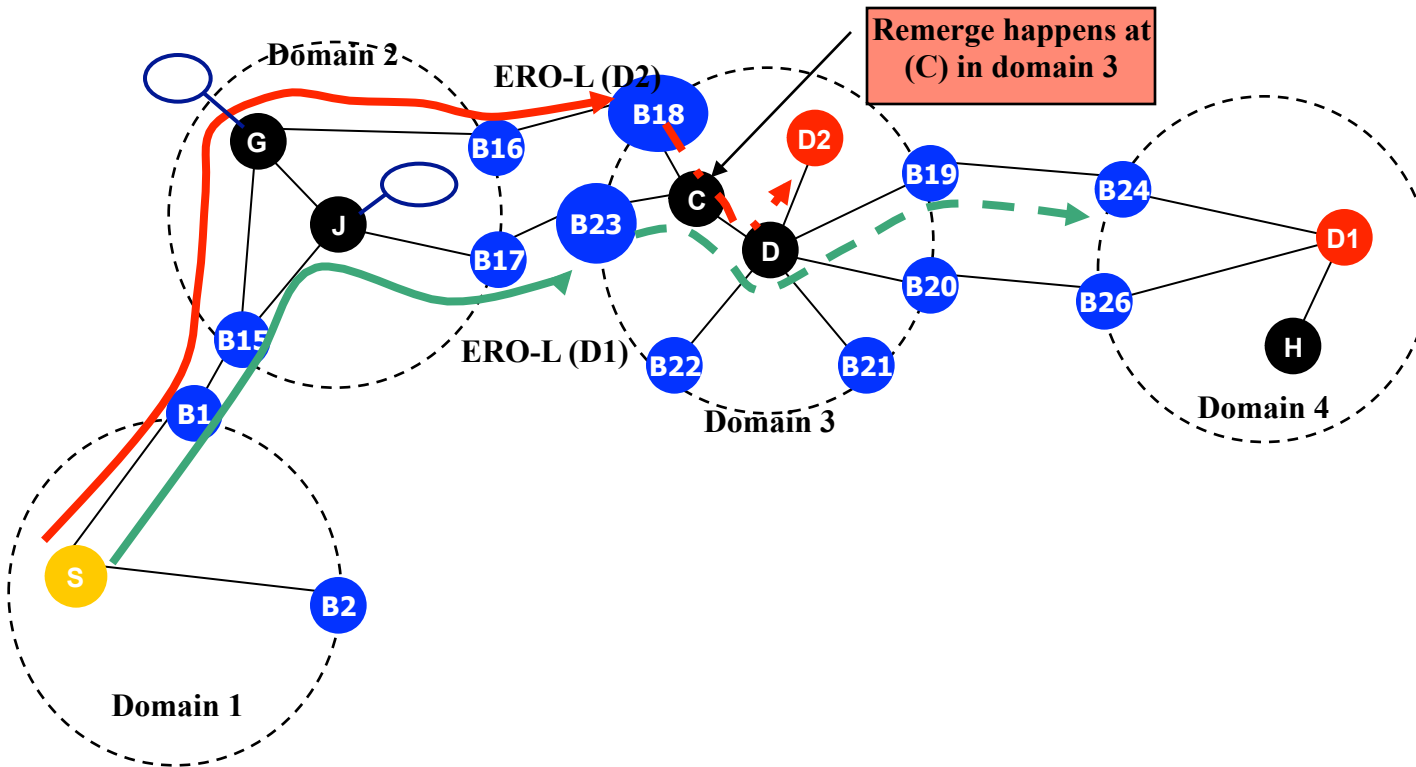
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**Thank You.**

# P2MP-TE Remerge



- **RSVP-TE signaling based solutions to address these requirements are not defined in RFC4875.**
- **The above mentioned situation can even lead to infinite signaling loop, some destinations will never receive traffic.**