RSVP-TE P2MP Signaling Optimization for RMR

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Traditional RSVP-TE P2MP Signaling

• One sub-LSP for each leaf
  – Lots of redundant PATH/RESV state near the ingress
  – Each leaf is explicitly listed
• Each sub-LSP optionally has its own Explicit PATH
• Extra state for tunnel protection

All these could be optimized away in case of RMR
Optimizations for RMR

• A single LSP
  – A single pair of PATH/RESV state on each node of the tunnel
  – Ingress could decide to use a single LSP in one direction for all leaves
• Or optionally two sub-LSPs in opposite directions
  – To reach different set of leaves
  – Not for protection purposes
• No explicit path needed
  – Just send along the ring in the specified direction
Optimizations for RMR

• Implicitly allowed leaves
  – PATH messages sent along the ring back to ingress
    • Ingress itself listed as a leaf
  – Leaves decide by themselves
    • Send RESV to PHOP

• Both explicitly listed leaves and implicitly allowed leaves are allowed

• Traffic stops at the last leaf in each direction
  – The last leaf does not have RESV state from downstream
Optimizations for RMR

• No additional signaling or state for protection

• Before global repair finishes after a failure:
  – Don’t send RESV tear on failure
  – On link failure, PLR tunnels traffic to next node via a unicast ring LSP in the other direction
  – On node failure, PLR tunnel traffic to next next node
  – Traffic then continues from there on
Live-live Protection

• Live-live protection not needed in most situations
  – Traffic tunneled via Ring LSP upon failure

• Live-live protection can be easily achieved for mission-critical scenarios
  – If duplication removal is done by application
  – Just set up two opposite-direction sub-LSPs to reach all leaves and send traffic in both directions
  – Each leaf will deliver duplicate traffic (received in two directions) to application
  – No switchover upon failure detection; just global repair
MP2MP with RMR

• PATH message could carry a label used for downstream nodes to send traffic upstream
• Ingress node sends received upstream traffic downstream in the other direction
  – If two sub-LSPs in different directions are used
Related RSVP Objects

- RMR Object in PATH messages indicating RMR optimization is used:
  - Ring ID
  - Ring direction
- `<S2L Sub-LSP Descriptor List> lists:
  - Explicit leaves
  - Ingress itself in case of implicit leaves
- PATH messages could carry a label object for MP2MP tunnels
Next Steps

• Seek comments
• Polish the document then request adoption
  – TEAS?