Extensions to RSVP For Fast Reroute of Bidirectional Co-routed Traffic Engineering LSPs

draft-tsaad-ccamp-rsvpte-bidir-lsp-fastreroute-04.txt

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Outline

- **Requirements and Scope**
- **Summary and Update since Previous IETF**
- **Next Steps**

Requirements and Scope

- **Requirements:**
  1. **Service Providers currently using MPLS-TE technology would like to deploy bidirectional co-routed packet tunnels.**
  2. **Fast reroute [RFC4090] is widely deployed in packet MPLS-TE networks today and hence it is preferred for bidirectional co-routed packet tunnels.**
  3. **Motivation for FRR is also to leverage the existing mechanisms for failure detection and restoration.**
- **Scope of LSP:**
  1. **Bidirectional signaled using GMPLS [RFC3473]**
  2. **Co-routed primary and bypass**
  3. **Packet Switch Capable (PSC)**
  4. **Using FRR procedures [RFC4090]**

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Summary

1. **Need mechanism to obtain upstream merge-point label.**
   - **Upstream PLR obtains the upstream MP label from the recorded label in the RRO of the RSVP Path message.**
2. **The upstream and downstream PLRs may independently assign different (for NHOP/NNHOP) FRR bypass tunnels in the forward and reverse directions.**
   - **Coordinate the FRR bypass tunnel selections between downstream and upstream PLRs using Bypass Assignment RRO subobject.**
3. **After FRR activation (for NHOP/NNHOP bypass), downstream PLR may timeout RSVP soft state with in-band signaling. Signaling should follow the path of the traffic flow.**
   - **Upstream PLR needs to reroute Resv (and traffic) over bypass in reverse direction.**

Update since IETF-86 Orlando

1. draft-tsaad-ccamp-rsvpte-bidir-lsp-fastreroute-01 and draft-bhatia-mpls-rsvp-te-bidirectional-lsp-01 been merged into the latest draft.
2. Bypass Assignment is now a subobject in Record Route Object.
3. Removed unidirectional bypass tunnels based on WG discussions.

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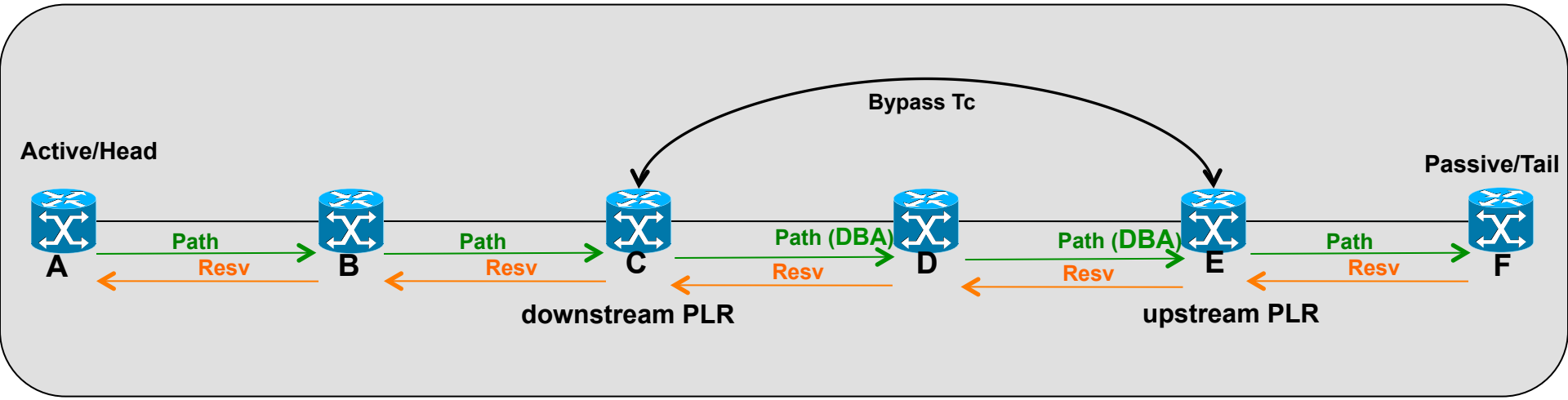
Next Steps

- **We would like to make this draft a WG Document.**

Thank You.

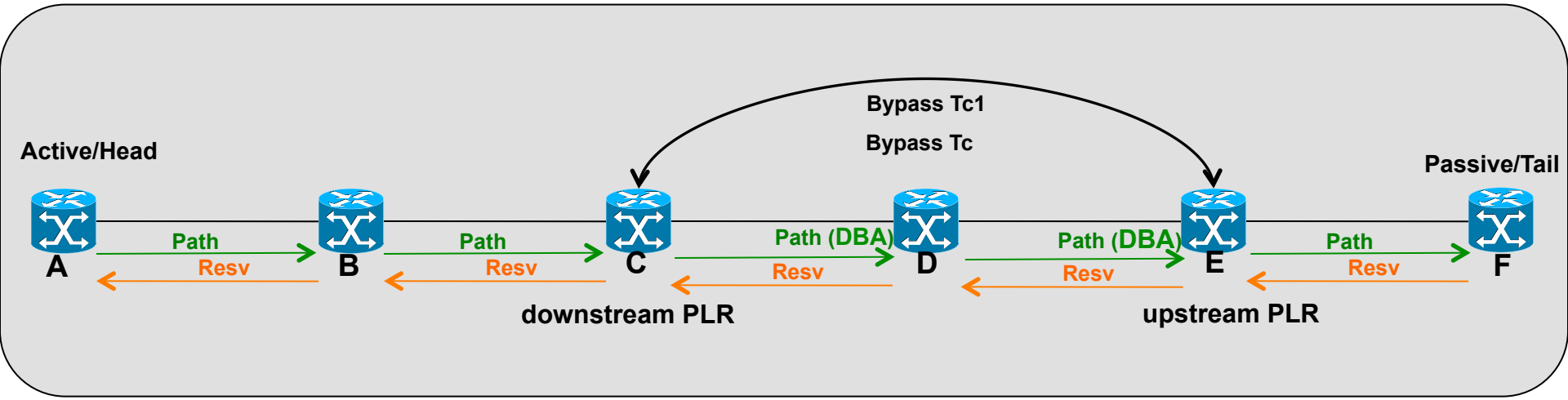
Backup Slides

Upstream PLR and Upstream MP Label



1. Upstream PLR obtains the upstream MP label from the recorded label in the RRO of the RSVP Path message.
2. Downstream PLR obtains the downstream MP label from the recorded label in the RRO of the RSVP Resv message [RFC4090].

Bypass Assignment Coordination (NHOP/NNHOP bypass)

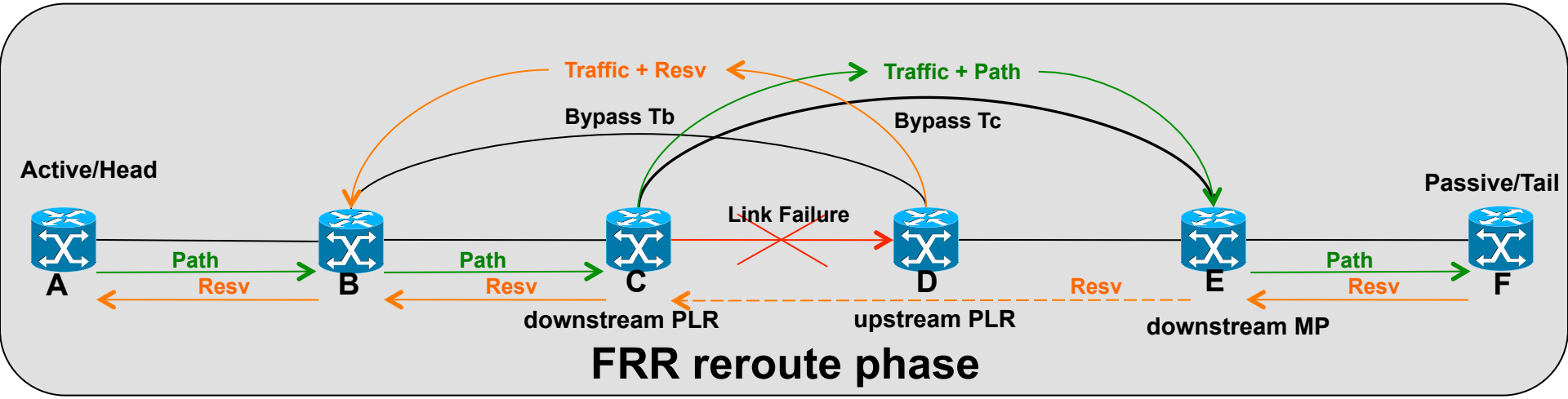


1. Define a new **Bypass Assignment (BA) subobject in RRO** that identifies a bidirectional bypass tunnel assigned by downstream PLRs:

   <Bypass Assignment subobject> ::= <Bypass Tunnel ID>

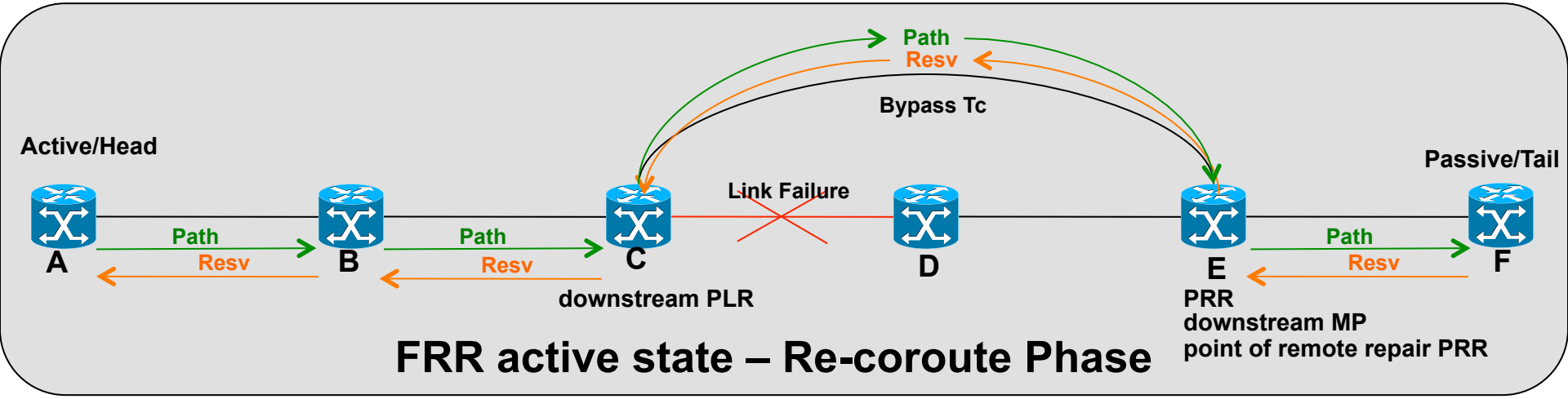
2. Source address for bypass is derived from node-id subobject in RRO [RFC4561].
3. BA subobject is added in the **RRO of the Path** message every time downstream PLR assigns or updates the bypass tunnel.
4. Upstream PLR uses the recorded bypass to match the assignment.

FRR Reroute Phase (NNHOP bypass)



1. The downstream PLR C and upstream PLR D independently trigger fast reroute procedures to redirect traffic onto respective bypass tunnels.
2. The downstream PLR C reroutes RSVP Path state onto the bypass tunnel Tc [RFC4090]. The upstream PLR D reroutes RSVP Resv state onto bypass tunnel Tb.
3. At this point, node D stops receiving RSVP Path and node C stops receiving RSVP Resv refreshes for the protected bidirectional LSP.
4. This eventually leads to Path and Resv state timeouts for the protected bidirectional LSP.

FRR Re-coroute Phase (NNHOP bypass)



1. Once the traffic is protected (fast FRR switched), now need a way to get the primary LSP co-routed in both directions to avoid timeouts.
2. Downstream MP node E assumes the role of Point of Remote Repair (PRR) (upon receiving Path message over bypass tunnel Tc).
3. Node E finds the reverse tunnels (Tc) that terminates on downstream PLR, node C.
4. Node E moves traffic in the reverse direction and Resv to bypass tunnel Tc.
5. Node D is now completely out of the LSP path (bypassed).