RSVP-TE Extensions For Fast Reroute of Bidirectional Co-routed LSPs

draft-tsaad-mpls-rsvpte-bidir-lsp-fastreroute-00.txt

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Outline

- Requirements and Scope
- Problem Statement
- Solution
- Next Steps

Requirements and Scope

- **Scope of Protected LSP:**
  - **Bidirectional**
  - **Co-routed**
  - **Packet Switch Capable (PSC)**
  - **Signaled using GMPLS signaling [RFC3471], [RFC3473].**
- **Requirements:**
  - **Service Providers should be able to share bypass tunnels for various types of services, including unidirectional and bidirectional (G)MPLS tunnels.**
  - **Bypass tunnels can be unidirectional or bidirectional.**
  - **Bidirectional bypass tunnels may be signaled using GMPLS signaling or using associated signaling procedures.**
  - **Bidirectional bypass tunnels may be co-routed or non-corouted.**
  - **PLR should be able to use any (existing) mechanism for failure detection.**

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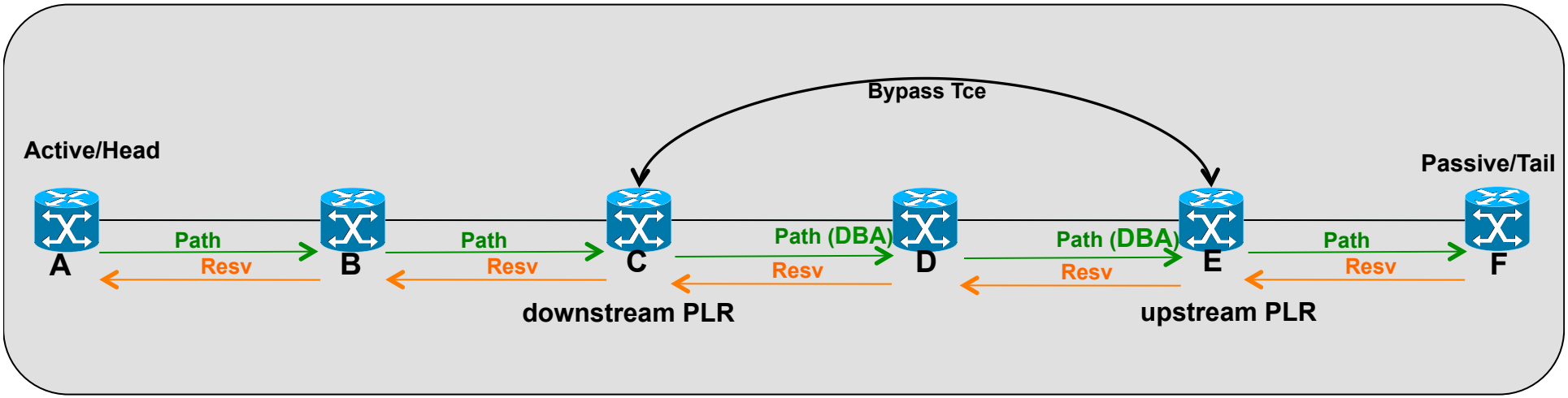
Terminology



and re-routes traffic/PATH when FRR becomes active, e.g., node C.

Problem Statement

1. **The upstream and downstream PLRs may independently assign different bypass tunnels in the forward and reverse direction**
   - **Need means to coordinate the bypass tunnel selection between downstream and upstream PLRs**
2. **After FRR activation data traffic and signaling may flow over asymmetric paths in the forward and reverse direction in the following use cases:**
   - **If upstream and downstream PLRs assign different bypass tunnels.**
   - **Even if we have upstream and downstream PLRs assign same (bidir) bypass tunnel, in case of NNHOP bypass and link failure.**

For in-band signaling this may cause RSVP soft-state timeout

- **Need mechanism to "re-coroute" LSPs after FRR activation.**

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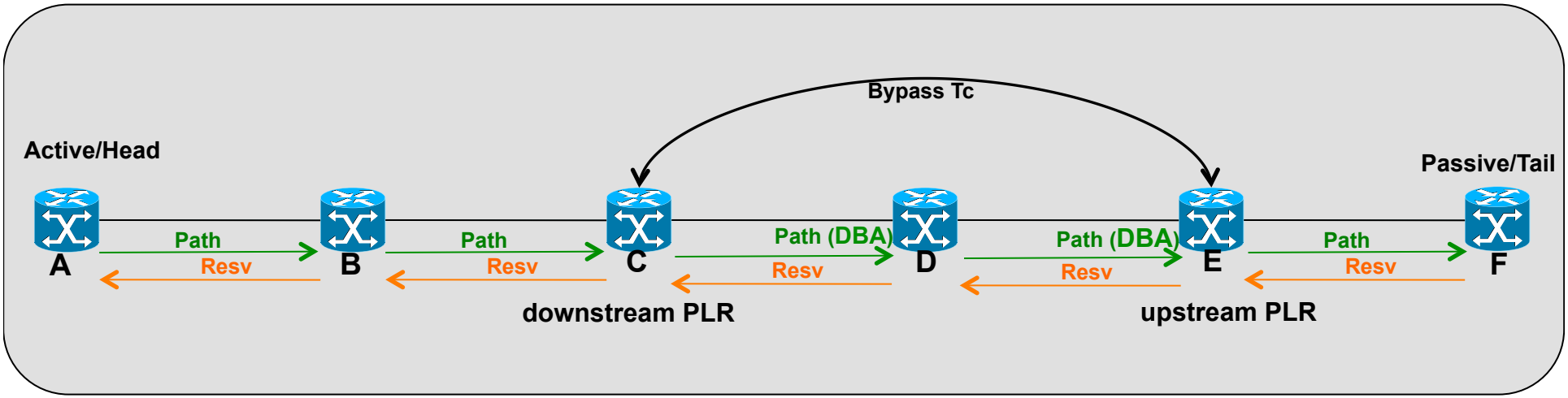
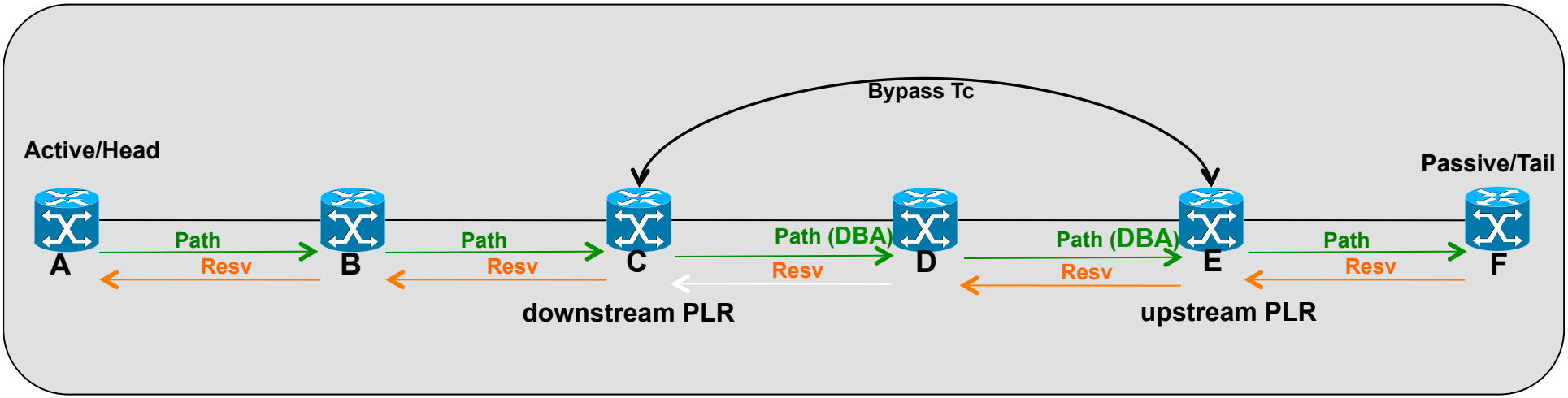
Upstream PLRs and MP Label



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

Bypass assignment coordination



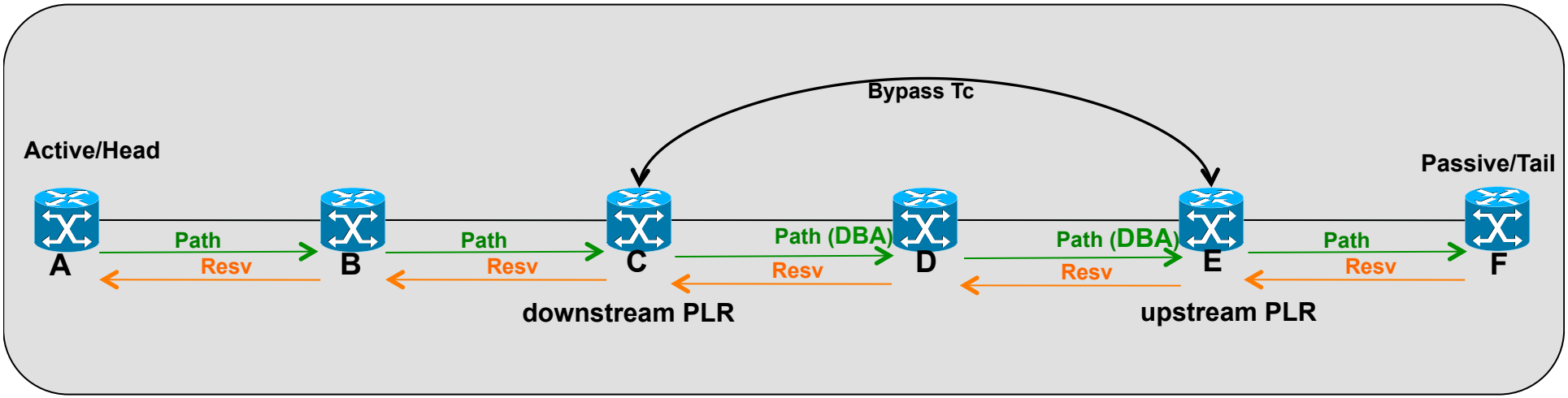
- Define a new Downstream Bypass Assignment (DBA) object that identifies a bidirectional bypass tunnel assigned by downstream PLR:

  <Downstream Bypass Assignment> ::=

  <Bypass Tunnel ID><Bypass Source Address><Bypass Destination Address>

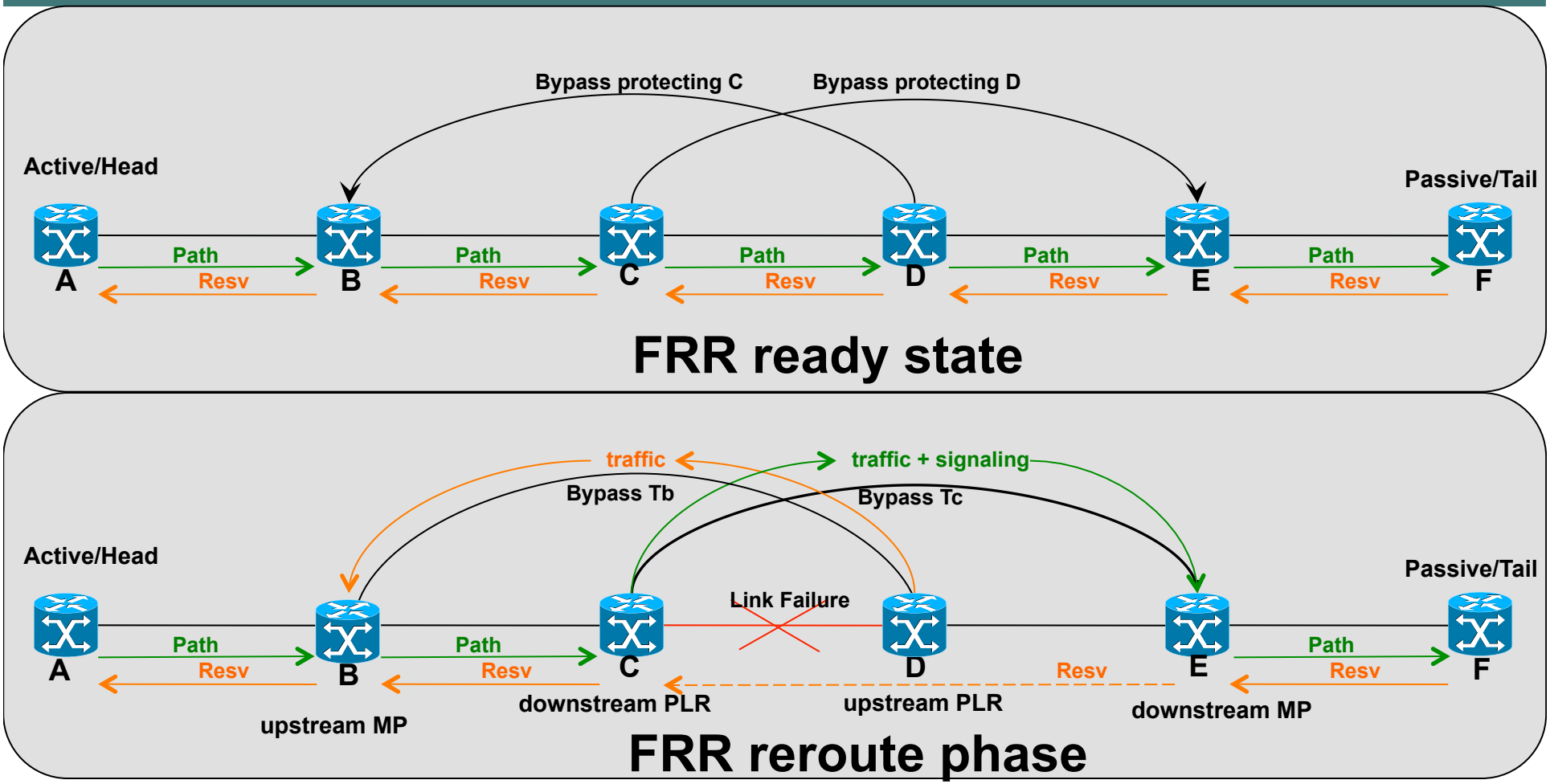
- DBA object is sent in the RSVP Path message every time the downstream PLR assigns or updates the bypass tunnel assignment so the upstream PLR may reflect the assignment too

Bypass assignment coordination (Cont.)



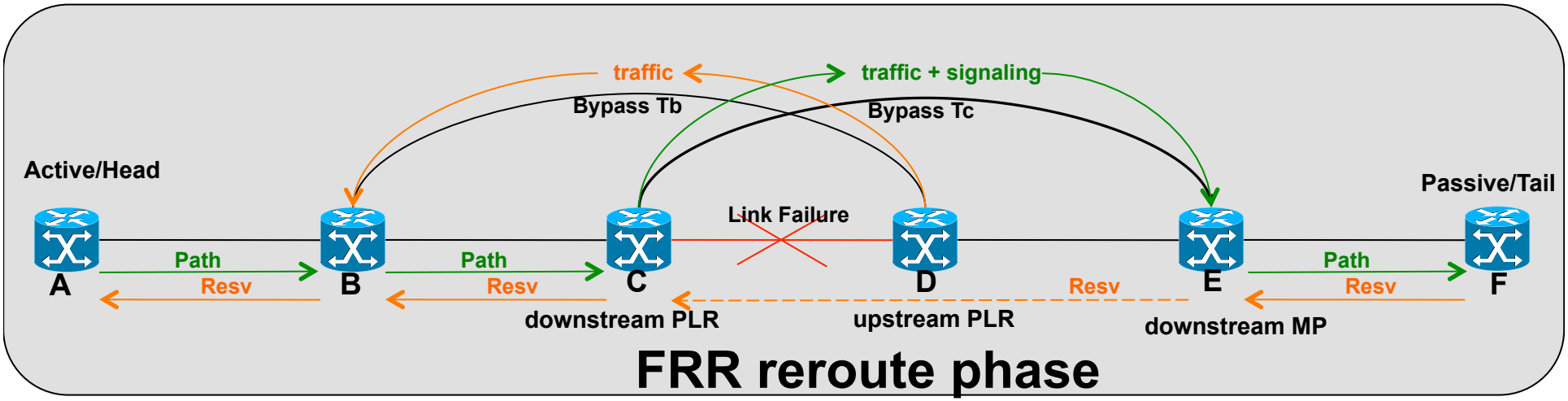
- Upstream PLR assigns the matching bidirectional bypass tunnel (from DBA) in the reverse direction and removes the object before forwarding message downstream
- In absence of DBA object, a upstream PLR can independently assign a bypass tunnel in the reverse direction

Link Failure With Node-protection Bypass Tunnels (Reroute Phase)



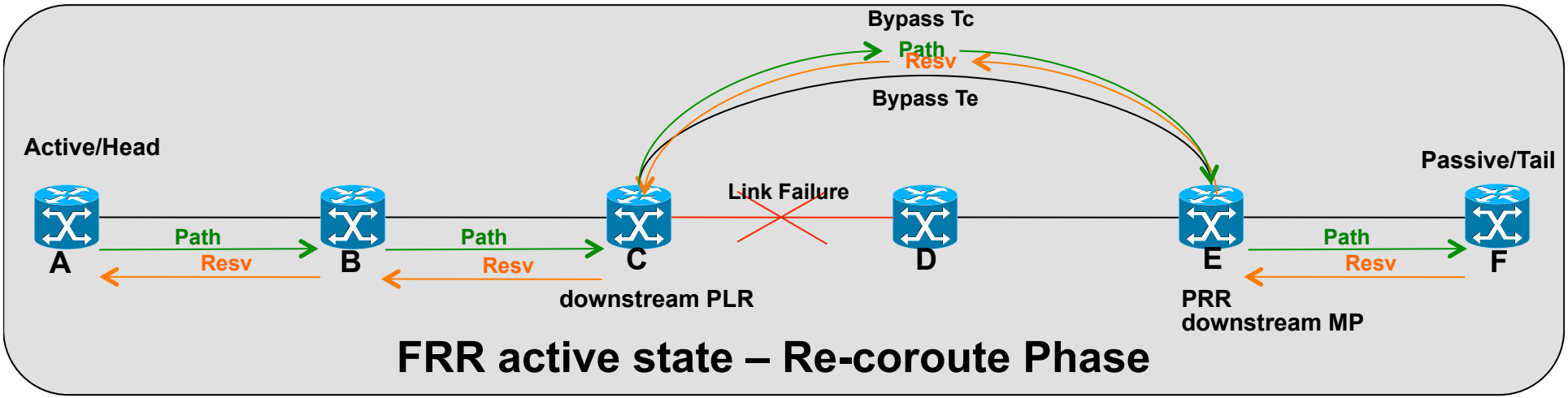
The downstream PLR C and upstream PLR D independently trigger fast reroute procedures to redirect traffic onto respective bypass tunnels

Reroute Phase – cont.



- The downstream PLR C also reroutes RSVP Path state onto the bypass tunnel Tc [RFC4090].
- At this point, router D stops receiving RSVP Path refreshes for the protected bidirectional LSP.
- This eventually lead to state timeouts for the protected LSP.

Re-coroute phase



FRR active state – Re-coroute Phase

- Once the traffic is protected (fast FRR switched), now need a way to get the primary LSP symmetrical in both directions.
- Node E assumes the role of Point of Remote Repair (PRR).
- Finds or provisions a reverse tunnels (Te) that terminates on downstream PLR, C.
- Moves the traffic in reverse direction to Te.
- Node D is now completely out of the LSP path (bypassed)

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

Thank You.