Applicability of Path Computation Element (PCE) for Fast Reroute (FRR) Boundary Node protection.

draft-kondreddy-pce-frr-boundary-node-app-00

Venugopal Reddy Kondreddy (venugopalreddyk@huawei.com)

Dhruv Dhody (dhruv.dhody@huawei.com)

Motivation

- [RFC4090] **Fast ReRoute (FRR)** protection – a mechanism to establish backup LSP tunnels for local repair of primary LSP. These mechanisms enable the re-direction of traffic onto backup LSP in the event of a failure.

  - The one-to-one backup method creates detour LSPs for protected LSP at a potential point of local repair (PLR).
  - The facility backup method creates a bypass tunnel at a PLR to protect a potential failure point by finding a backup path to Merge Point (MP).

- PCE can be used for backup path computation. Especially needed in inter-domain scenario for boundary node protection (ABR / ASBR) .

- In case of facility-backup, MP needs to be identified. This document explains the mechanism to find MP in inter-domain scenario.

- If Path-key (confidentiality) is enabled, new mechanisms are needed.

FRR Protection

- R2 (PLR) can determine the MP by RSVP Path Resv's RRO
  - Explicitly identified via NODE-ID subobject [RFC4561]
  - Determined from RRO IPv4/IPv6 subobject (because it has complete TED visibility)
- PLR can unambiguously identify
  - MP address
  - Backup tunnel intersecting primary at a downstream LSR exists
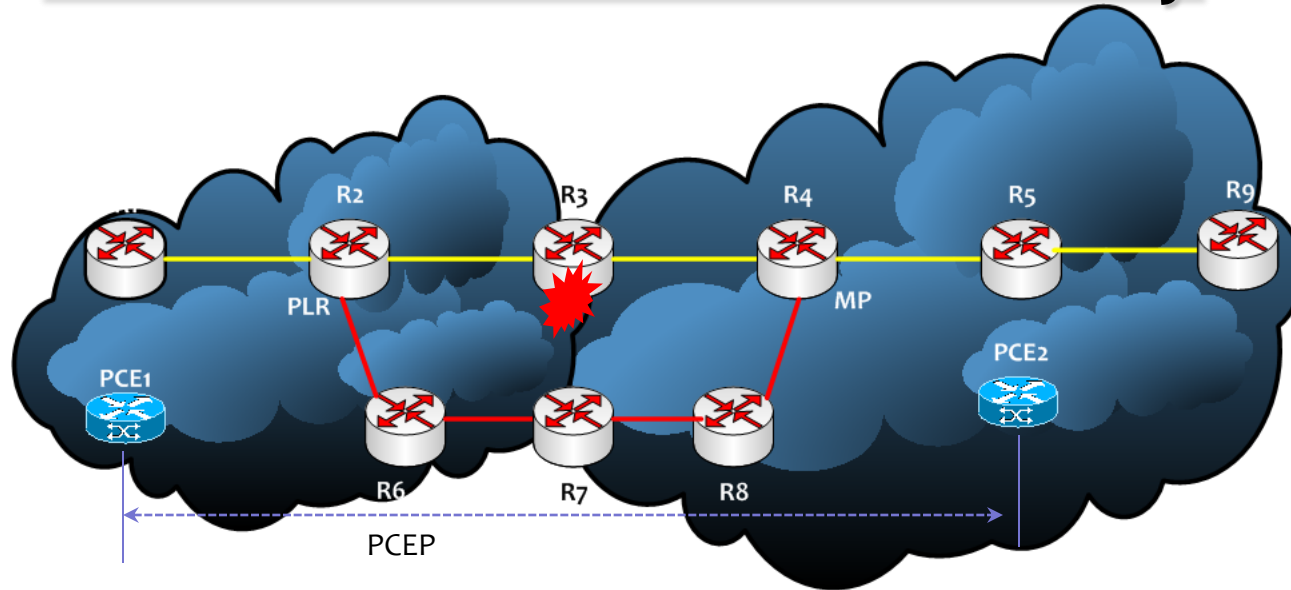- PCE may be used for backup path computation.
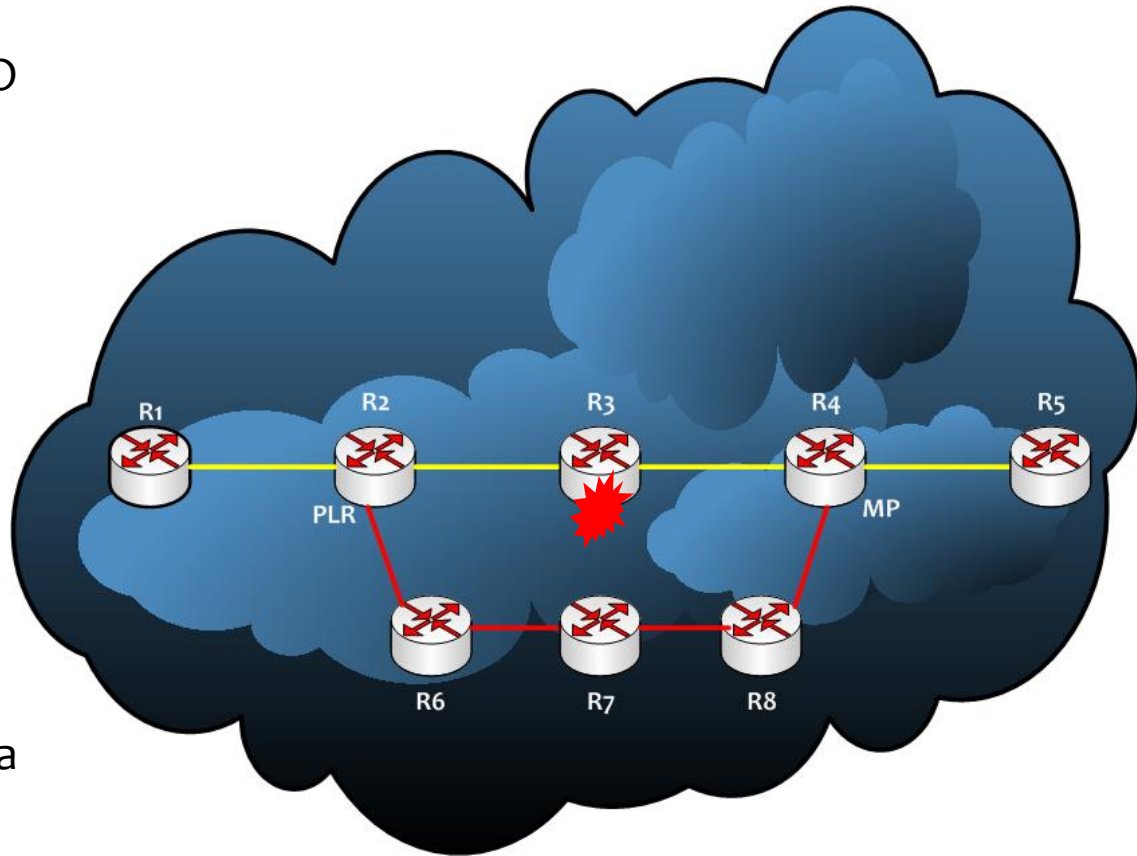
Boundary Node FRR Protection
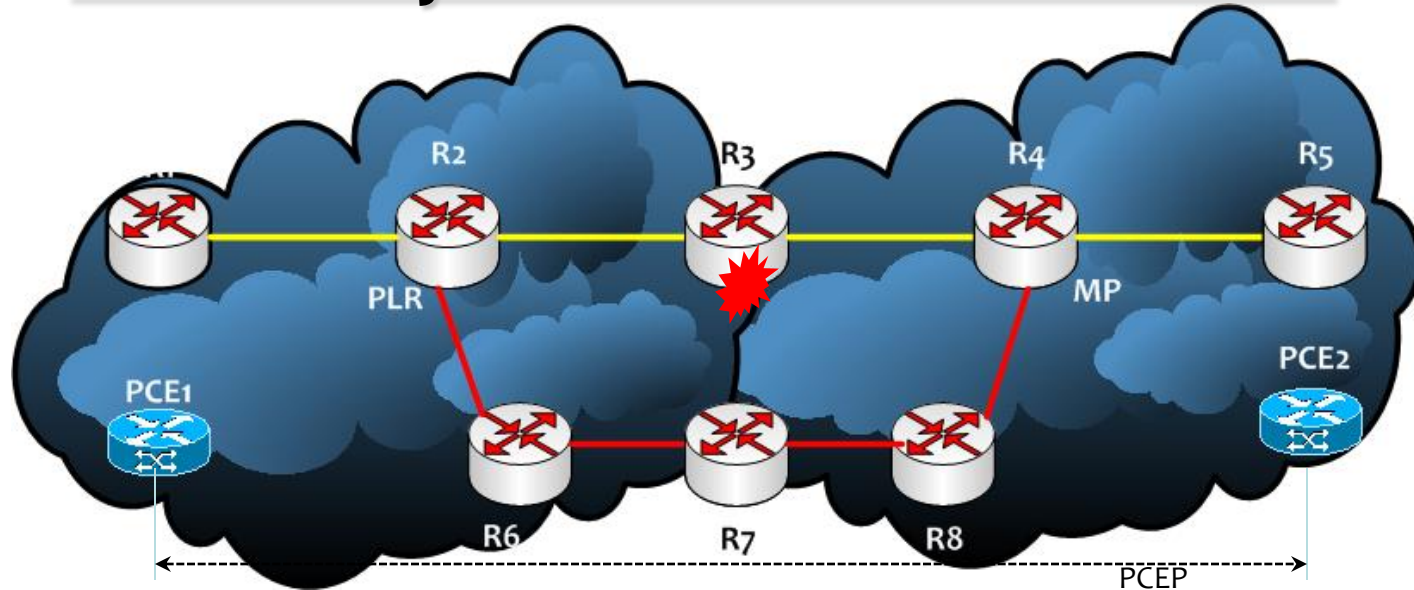
- R2 has to build a bypass tunnel that protects against the failure of Boundary Node ABR (R3)

- R2 (PLR) can determine the MP by RSVP Path Resv's RRO identified via NODE-ID subobject [RFC4561]

- PCE should be used for inter-domain backup path computation

FRR Protection with Pathkey

- When path-key is enabled on PCE2, the primary LSP Path

  [R1->R2->R3->PKS->R9]

- R2 (PLR) cannot determine the MP via any existing mechanism

- Following mechanism are suggested –
  - A new MP subobject in RSVP RRO
  - Change in PCE Path-key handling

FRR Protection with Pathkey

New MP Subobject	Change in Path-Key Handling
•This sub-object should be added by the boundary node (R3) during the RRO Path key processing. The PLR(R2) can use the MP sub-object to identify the MP. To avoid the looping issue, PLR should remove this sub-object from the RRO at the time of RRO processing. •For the IPv4 and IPv6 RRO subobjects a new flag: • MP-id: 0x40 (TBA)	•Scope of confidential path segment is relaxed to immediate downstream node i.e. [R3->R4->PKS->R9] is returned during path-key expansion instead of [R3->PKS->R9]. Note that path-key expansion should be done by R4 now. • R4 now will insert node-id sub-object [RFC4561] in the RRO object and aids the PLR in previous domain to determine MP •Since there is no node-id sub-object in RRO beyond R4, R3 may not be able to find R5 as MP without expansion of PKS. Multiple Path-key expansion are needed.

Next Steps

- Get WG feedback on FRR protection with Path-Key

- Managebility and security considerations needs analysis.

Questions
&
Comments?

Thanks!

84th IETF @ Vancouver