Applicability of PCE for Computing Protection Paths

draft-chen-pce-protection-applicability

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Introduction

- Discussions initiated by Daniel King on List.
- Applications such as Cloud drive increasingly more traffic across longer ranges over LSP crossing domains
- It is very important to provide protections for the traffic against failures
- PCE is used for computing paths for LSP crossing domains
- PCE COULD also be used for computing protection paths for LSP crossing domains
Many Application Scenarios

- End to end disjoint path
  - P2P disjoint path from an ingress to an egress
  - P2MP disjoint path from an ingress to a number of egresses

- Multi-homing end to end disjoint path
  - P2P disjoint path from a backup ingress to a backup egress
  - P2MP disjoint path from a backup ingress to a number of backup egresses

- One to one Local Protection Path
  - P2P
    - Path for link protection
    - Path for intermediate node protection
    - Path for ingress and egress protection
  - P2MP

- Facility Local Protection Path
  - P2P
    - Path for protecting a set of LSPs over a link
    - Path for protecting a set of LSPs through an intermediate node
    - Path for protecting a set of LSPs via ingress and egress
  - P2MP
PCE for Computing E2E Disjoint Path

- P2P disjoint path from an ingress to an egress

Primary path from A to U

Backup path from A to U, disjoint with the primary path, disjoint link, node, domain except for ingress A and egress U
P2MP disjoint path from an ingress to multiple egresses

Primary path from A to U, Y, Z

Backup path from A to U, Y, and Z, disjoint with the primary path
Possible disjoint link, node, domain except for ingress A and egresses U, Y, and Z
PCE for Multi-homing E2E Disjoint Path

- P2P disjoint path from a backup ingress to a backup egress

Primary path from A to U

Backup path from A’ to U’, disjoint with primary path
disjoint every link, every node, domain
PCE for Multi-homing E2E Disjoint Path

- P2MP disjoint path from an ingress to multiple egresses

- Primary path from A to U, Y, Z

- Backup path from A' to U', Y', and Z', disjoint with the primary path
  Disjoint as many link, node, domain as possible
PCE for P2P Detour Local Protection Path

- Link protection

P2P LSP from A to U

Detour path for protecting link C--F

Ingress

Detour path for protecting link J--R

Egress
PCE for P2P Detour Local Protection Path

- Intermediate node protection

P2P LSP from A to U

- Ingress
- Detour path for protecting node F

Detour path for protecting node J

Egress

PCE1

PCE2

PCE3

PCE4
PCE for P2P Detour Local Protection Path

- P2P path for protecting ingress and egress

P2P LSP from A to U

Backup path from A' to B (NH of A) for protecting ingress A

Backup path from R (PH of U) to U' for protecting egress U
PCE for P2MP Detour Local Protection Path

- Path for protecting link
- Path for protecting intermediate node
- Path for protecting ingress and egress
PCE for P2P Facility Local Protection Path

- **Link protection**

- **P2P LSP from A to U**
- **P2P LSP from A to V**

- **Facility path for protecting link C—F for 2 LSPs**
- **Facility path for protecting link J—R for 3 LSPs**
PCE for P2P Facility Local Protection Path

Intermediate node protection

P2P LSP from A to U

P2P LSP from A to V

Facility path for protecting node C for 2 LSPs
PCE for P2P Facility Local Protection Path

- P2P path for protecting ingress and egress

P2P LSP from A to U

Backup path from A’ to B (NH of A) for protecting ingress A for 2 LSPs

Backup path from R (PH of U) to U’ for protecting egress U for 2 LSPs

P2P LSP from A to V
PCE for P2MP Facility Local Protection Path

- Path for protecting link
- Path for protecting intermediate node
- Path for protecting ingress and egress
Summary/Next Step

- Document highlights best practice, use cases and gaps.
  - Where needed recommendations for further extensions and procedures.
- Would this be a useful document for WG?
- Please provide input and examples
- Thank you!