2547 egress PE Fast Failure Protection

draft-minto-2547-egress-node-fast-protection-01

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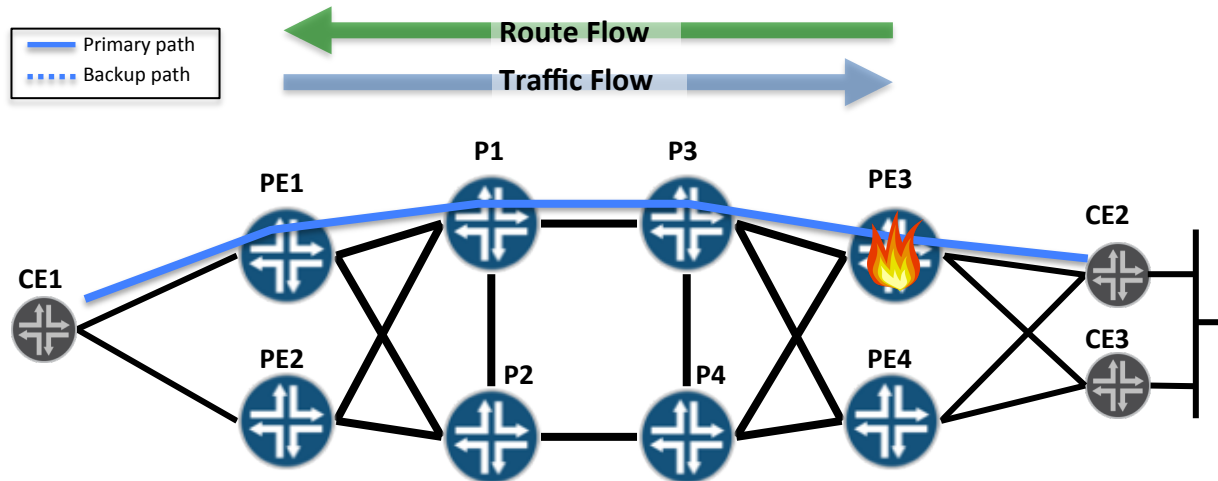
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Problem statement.

- MPLS provides fast service restoration for link and node failure *except* egress node failure.

- This draft proposes rfc 2547 service restoration when egress node goes down.

- This proposal could be extended other mpls based services.
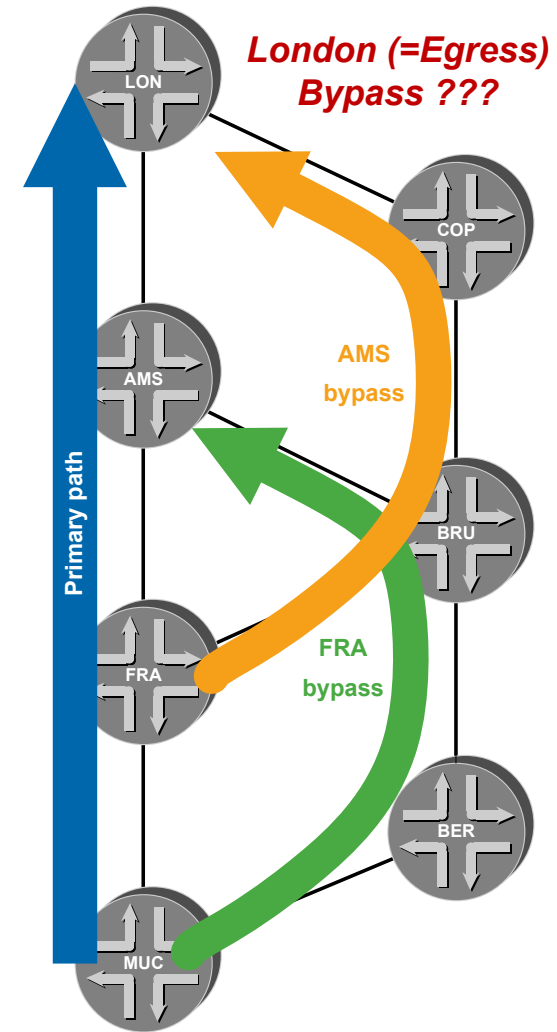
Egress PE node failure
# Local-repair – requirements

Requires protecting service (or LSP) endpoint on primary node (PE3)
- But PLR (P3) does not hold any service state
- Protecting failed node requires PLR to divert the outer (transport) LSP to another backup node (PE4)
- Backup edge node needs to be able to interpret labels allocated by the primary edge node
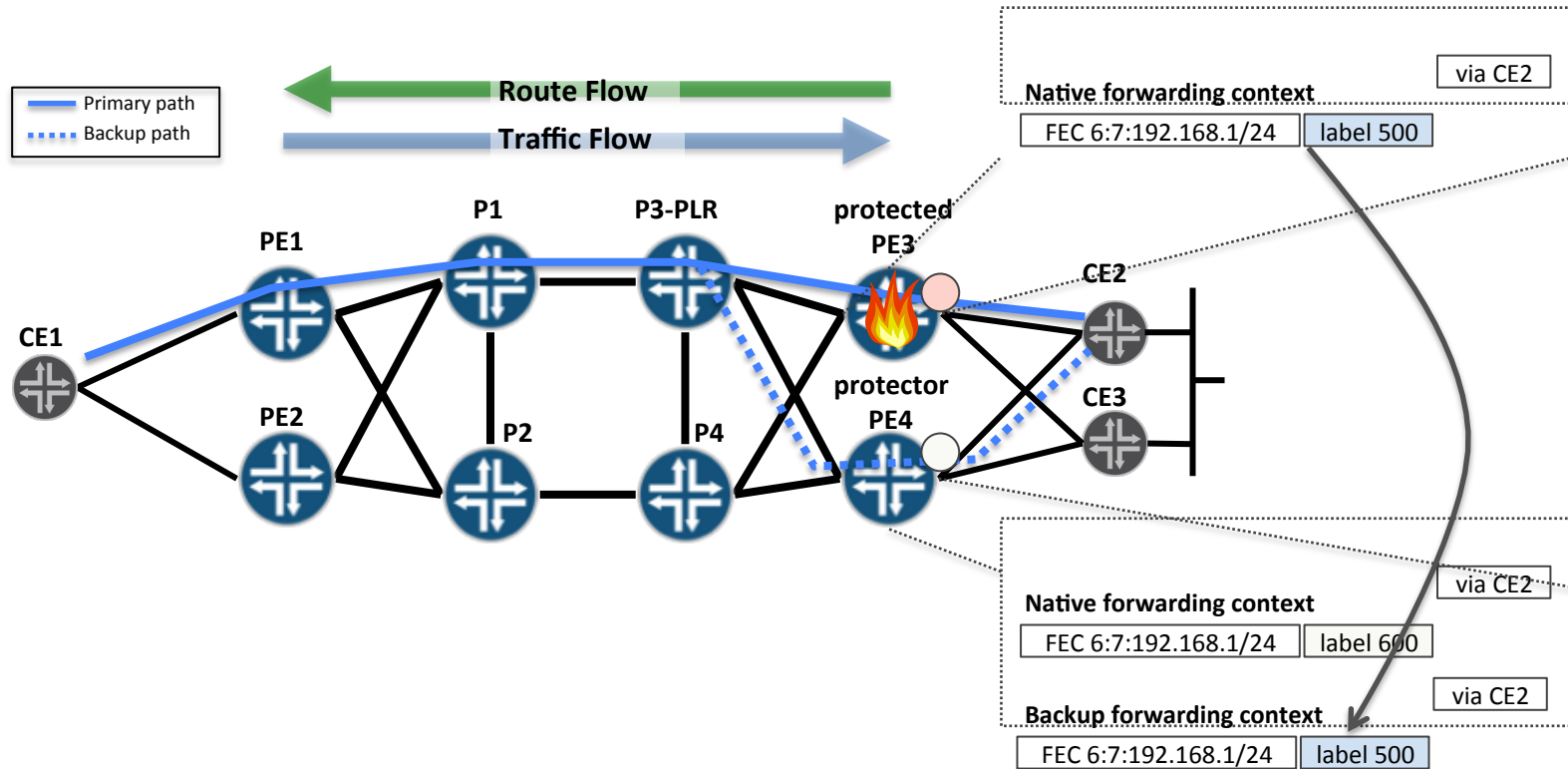
Egress PE node failure
Local-repair – LSP tailend protection
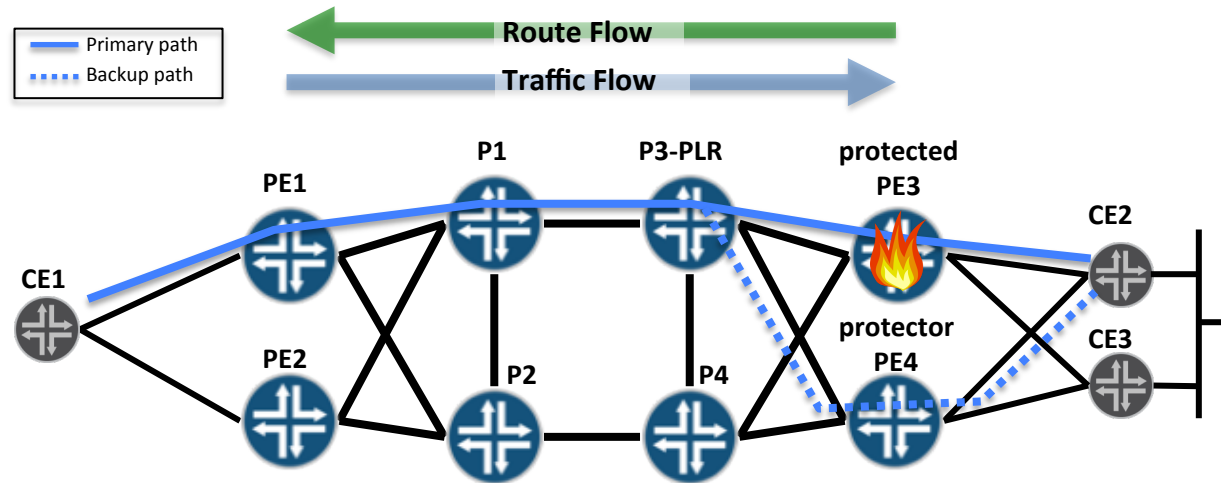
- Protector PE4 maintains a "mirror image" of the protected PE3 service label table
- a context specific label space identified by a context-id (an IP address) present on both protected and protector PEs
- Protected PE3 "owns" the context-id address, advertising it in the BGP Next_Hop attribute (context-id is never used for control plane peerings)
- In case of protected PE3 failure, P3-PLR diverts the traffic destined to the context-id address to the protector PE4 using TE FRR or IP FRR procedures
- Protector PE4 looks up received packets in the context-specific label table for PE3 (identified by the label associated with PE3 context-id), and forwards packets to the right destination

Egress PE node failure
Local-repair – LSP tailend protection

Primary path
Backup path

Route Flow
Traffic Flow

PE1
P1
P3-PLR
protected
PE3
CE2

CE1

PE2
P2
P4
protector
PE4
CE3

Native forwarding context

via CE2

FEC 6:7:192.168.1/24   label 500

Native forwarding context

via CE2

FEC 6:7:192.168.1/24   label 600

via CE2

Backup forwarding context

FEC 6:7:192.168.1/24   label 500

Egress PE node failure
Local-repair – LSP tailend protection

Primary path
Backup path

Route Flow
Traffic Flow

Native forwarding context

| FEC 6:7:192.168.1/24 | label 500 | via CE2 |

PE1   P1   P3-PLR   protected PE3   CE2

CE1

PE2   P2   P4   protector PE4   CE3

Upon receiving a packet with the outer label equal to the context label, protector PE4 pops the outer label and performs a recursive MPLS lookup in the context specific label space identified by the context label

| context label | service label | payload |

pop, recurse

mpls.0 → backup-mpls.0

pop, mpls->ipv4

backup-vrf1.inet.0

| NH 177 | IFL 17, via CE2 |

Native forwarding context

| FEC 6:7:192.168.1/24 | label 600 | via CE2 |

Backup forwarding context

| FEC 6:7:192.168.1/24 | label 500 | via CE2 |
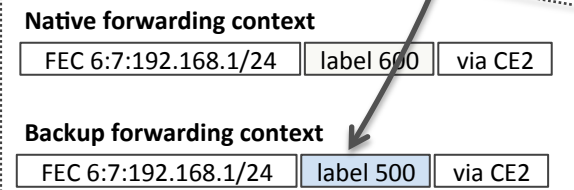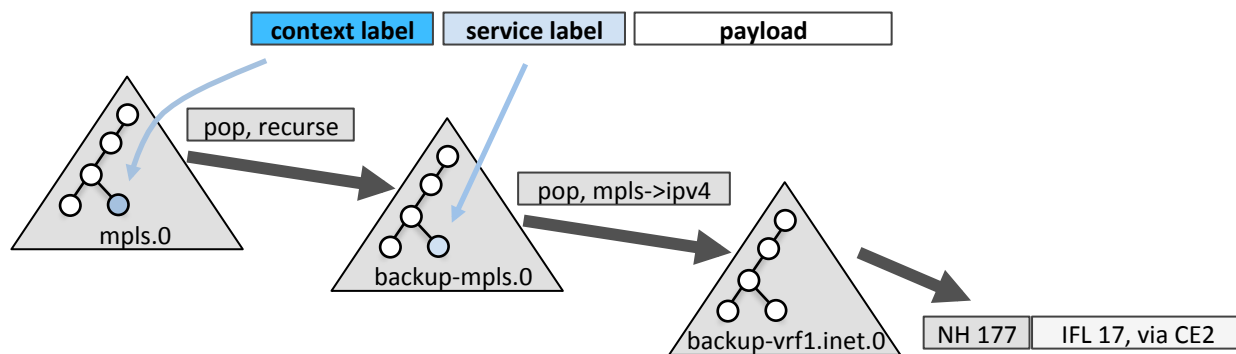
Protector model

- Co-located protector

    The alternate PE and protector is same.

- Centralized protector

    One protector protecting more than one PE.

Service mirroring

The backup nexthop selection uses following rules

1. Exact matching route-target set (RD may be different)

2. Exact matching layer-3 Prefix part (excluding RD)

PLR transport FRR

- RSVP

  Uses rsvp-egress-frr

- LDP

  Uses LFA with tunneling to protector.

What next ?

- Generalize to other Prefix based MPLS services (EVPN, BGP-LU)

- Questions and comments?