PW LDP Graceful Restart
draft-jiang-pwe3-ldp-gr

Authors

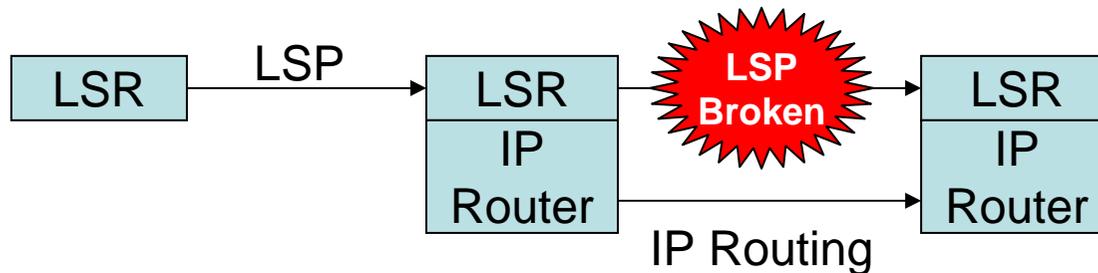**Albert Jiang (John)**
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Background

- RFC3478 defines MPLS LSP LDP GR
  - For HA Non-Stop-Forwarding
- PW is an important MPLS application
  - T-LDP is used for PW label distribution
- LDP GR for PW is required for HA-NSF

Control Plane Working	Control Plane Restart	Control Plane Restart
↕	↕	↕
Data Plane Forwarding	Data Plane Forwarding	Data Plane Restart
Working State	Graceful Restart	Non Graceful Restart
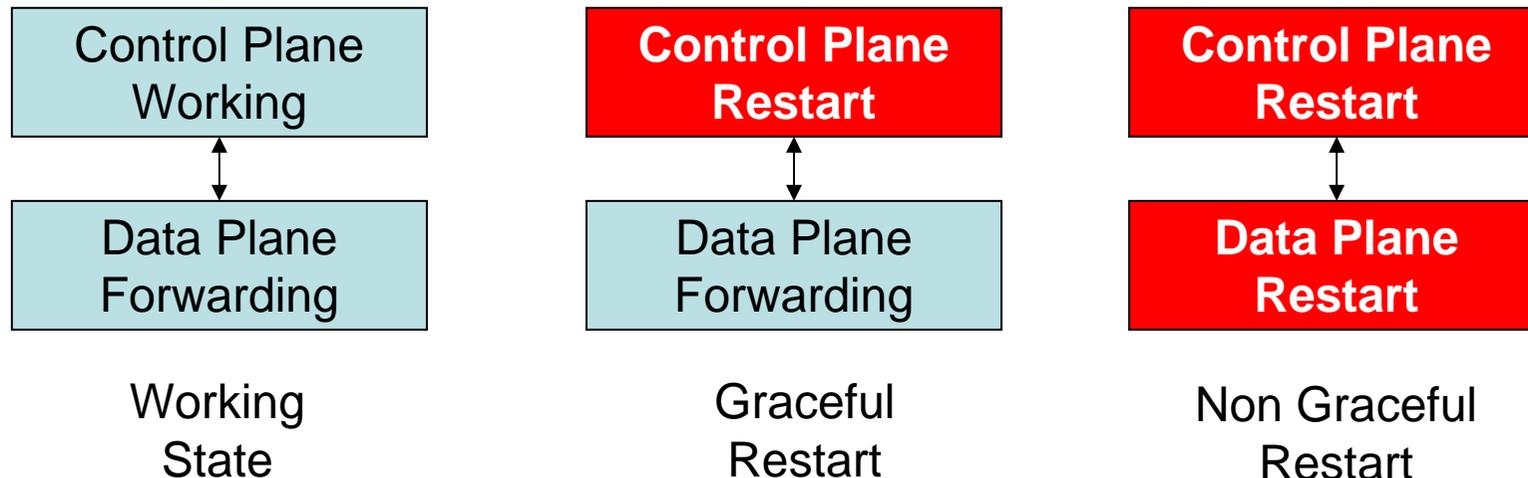
Related Works

- RFC 3478-LDP GR for LSP
- Assumption for LSP: IP service inside
- Even if LSP broken, can do IP routing
- No routing for non-IP traffic inside LSP

Scope
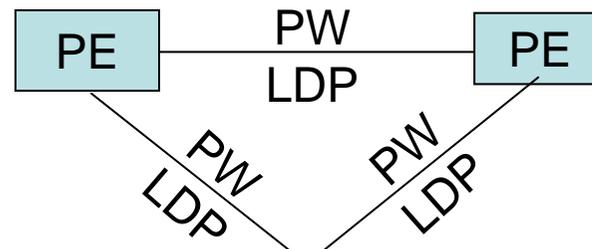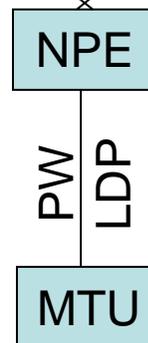
- LDP GR for Pseudo wire, including:
- SS-PW

| TPE | —— SS-PW LDP —— | TPE |

- MS-PW

| TPE | —— SS-PW LDP —— | SPE | —— SS-PW LDP —— | TPE |

- VPLS

| PE | —— PW LDP —— | PE |
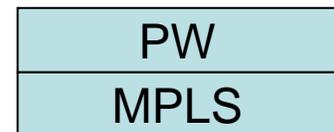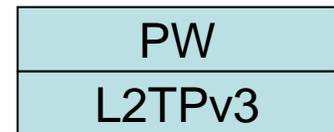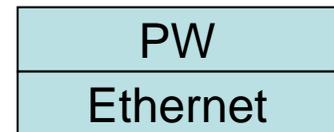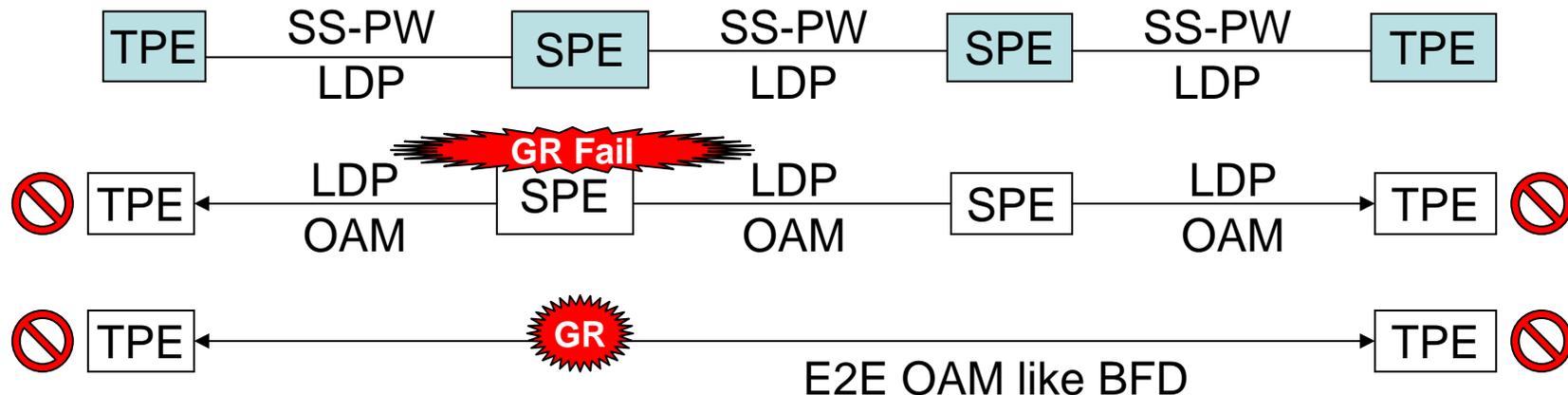with PW LDP links to NPE

| NPE |
| PW LDP |
| MTU |

- H-VPLS

SS-PW LDP GR

- Same mechanism as LDP GR defined in RFC 3478
- PW status UP and label preserved during GR
- Decoupled from LDP GR for MPLS LSP

PW
Ethernet

- May have separate configuration
- No need for New TLV, reuse FT TLV

PW
L2TPv3

- Upon failure, tear down PW
  - (or block forwarding at TPE)

PW
MPLS

- OAM like BFD b/w TPE can also detect and block

MS-PW LDP GR

- SS-PW LDP GR in relevant MS-PW segment (s)
- PW Status UP and label preserved during GR
- Upon GR Failure, PEs in both end will send:
  - PW label withdraw message to upstream peer
  - PW label release message to downstream peer
- To tear down MS-PW or block forwarding at TPE
- But if SPE Ctrl Plane fail, will need e2e OAM

| TPE | SS-PW LDP | SPE | SS-PW LDP | SPE | SS-PW LDP | TPE |

GR Fail

| 🚫 | TPE | ← | LDP OAM | SPE | LDP OAM | SPE | LDP OAM | TPE | 🚫 |

GR

🚫 TPE ← E2E OAM like BFD → TPE 🚫

MS-PW Static-Dynamic LDP GR

- Some MS-PW segment are Statically

- Setup without LDP (LDP message cannot be relayed)

- For TPE to know LDP GR failure in the middle
  - E2E OAM like BFD is running b/w TPEs
  - SPE generates OAM message and passes it to TPE

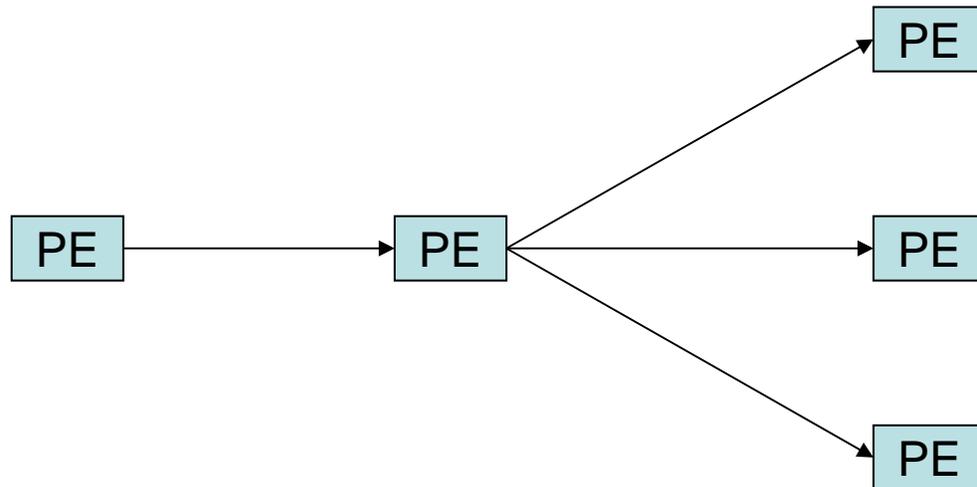- But if SPE Ctrl Plane fail, will need e2e OAM
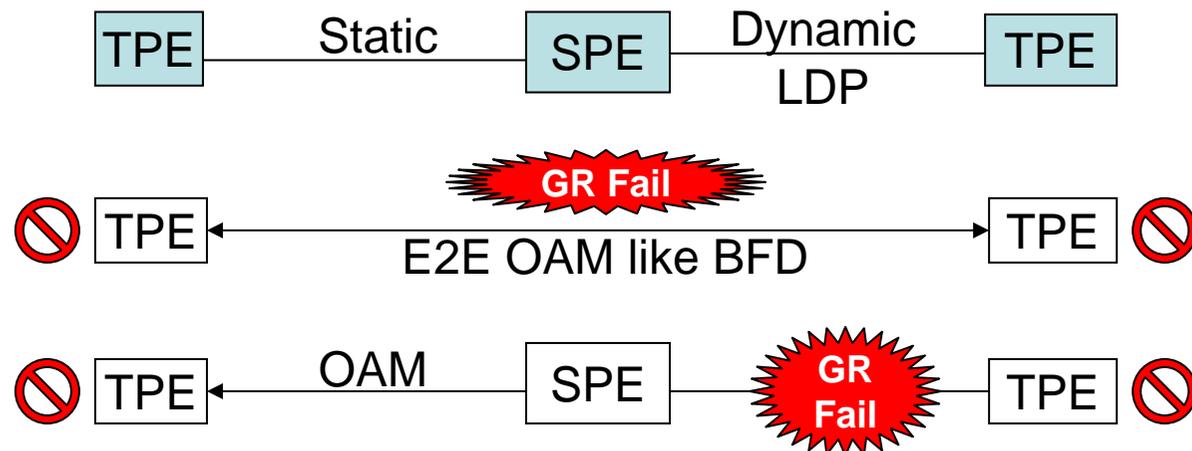
VPLS

- Application of SS-PW LDP GR
- For H-VPLS, may involve MS-PW LDP GR in spoke link
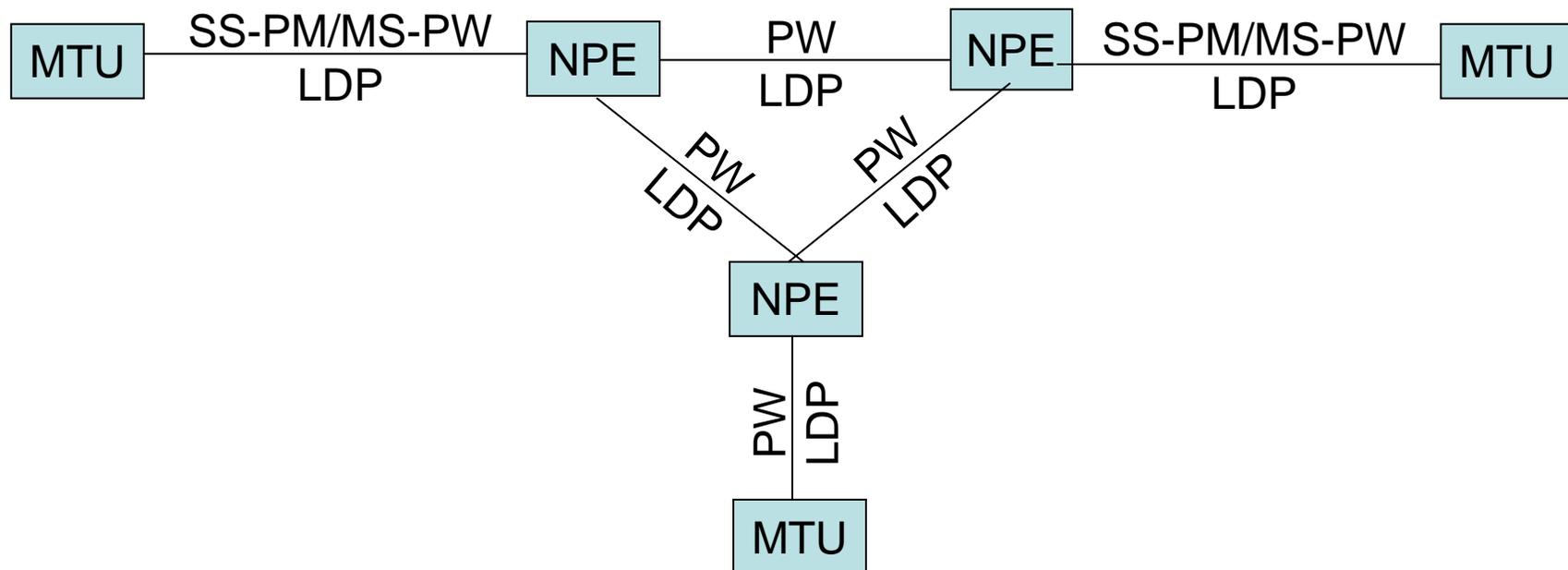
Next Step

- Open for community review
- Extend to P2MP PW and Multicast VPLS

Summary

- Extend MPLS LDP GR to PW level
- SS-PW/MS-PW included
- Unicast VPLS/H-VPLS included

Please comment, thank you.