A Framework for Service-Driven Co-Routed MPLS Traffic Engineering LSPs

draft-li-mpls-serv-driven-co-lsp-fmwk-01

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Updates

- More description on why introduce the solution.
- Detailed description on Framework and Procedures.

Massive MPLS TE Configuration Issue in MBB

- Typical Configurations: 66,000 command lines for MPLS TE configuration

  - 1,000 CSGs need to connect to one RSG

  - 3 types of bi-directional services. Each type of service needs one VPN and one TE

  - 10 command lines for typical MPLS TE tunnel configuration

- The operation is not only time consuming but also prone to mis-configuration for Service Providers.
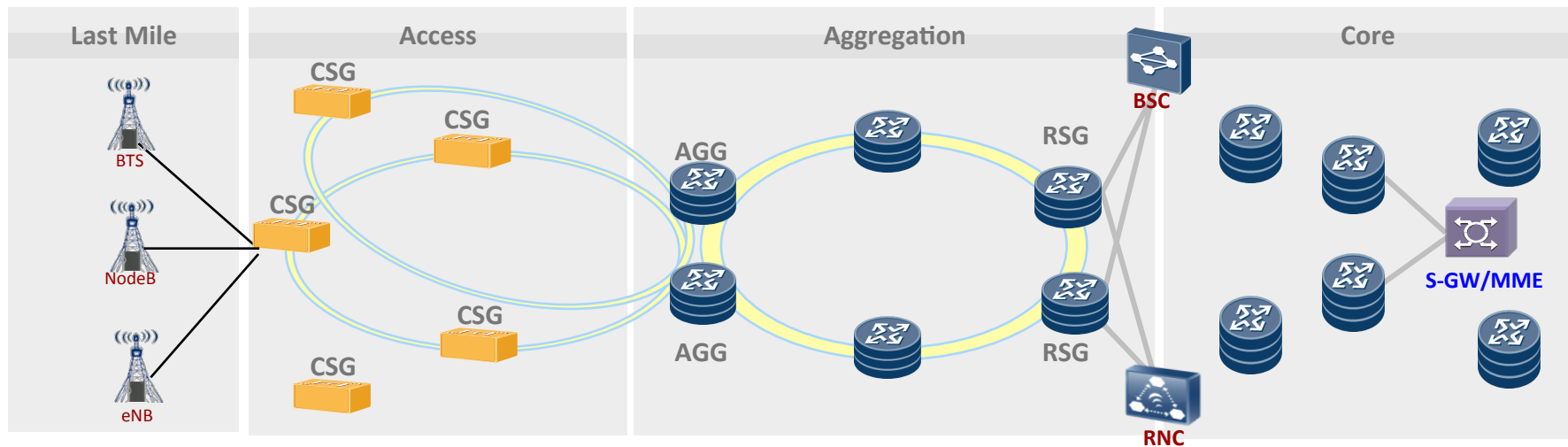
Return Path Issue of BFD for LSP
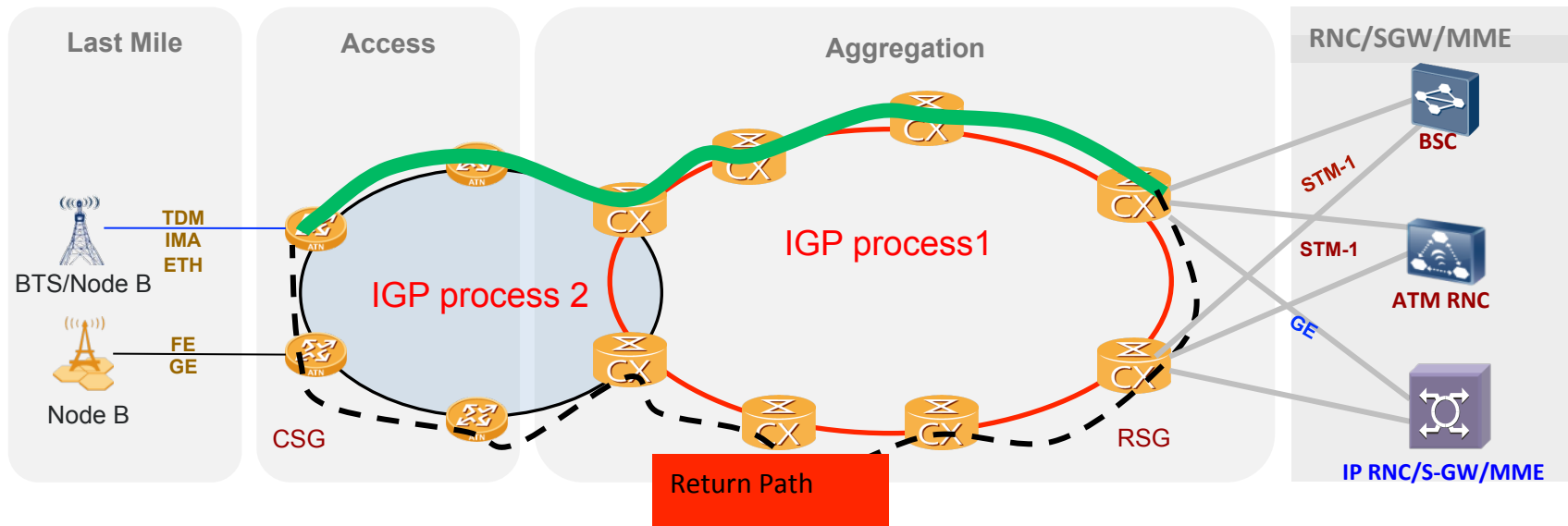
- **Return Path Issue for BFD: When BFD for LSP is deployed, the return path may take IP path which is different from the forwarding path. The failure that happens in the return path may trigger wrong traffic switch.**

- **Configuration to guarantee the return path to be co-routed will deteriorate the configuration issue: explicit path and tunnel binding.**

- **Static Configuration Issue: if the forward path changes, the return path may not change accordingly.**

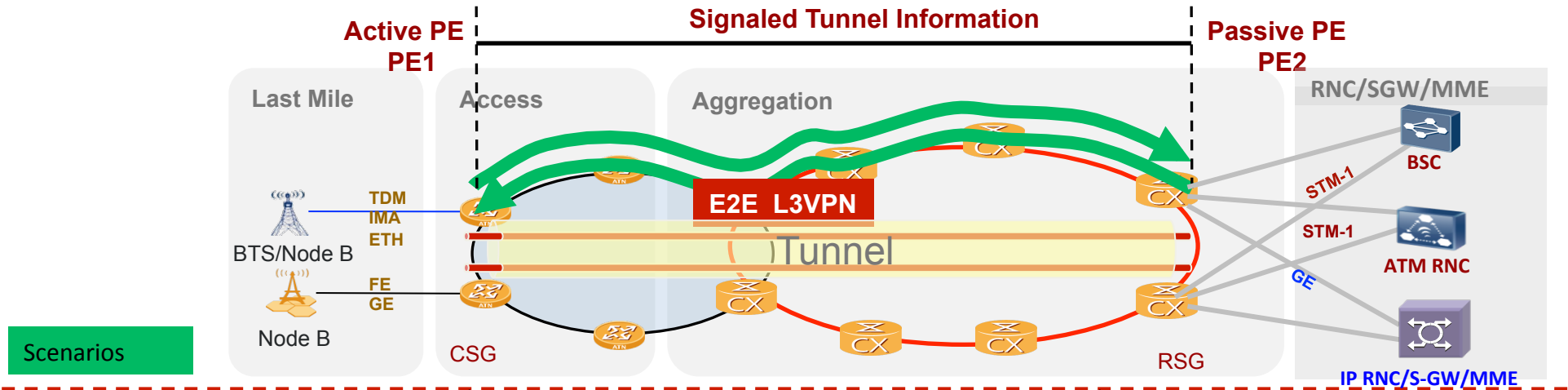# Upgrading Issue of Co-routed Bidirectional LSP
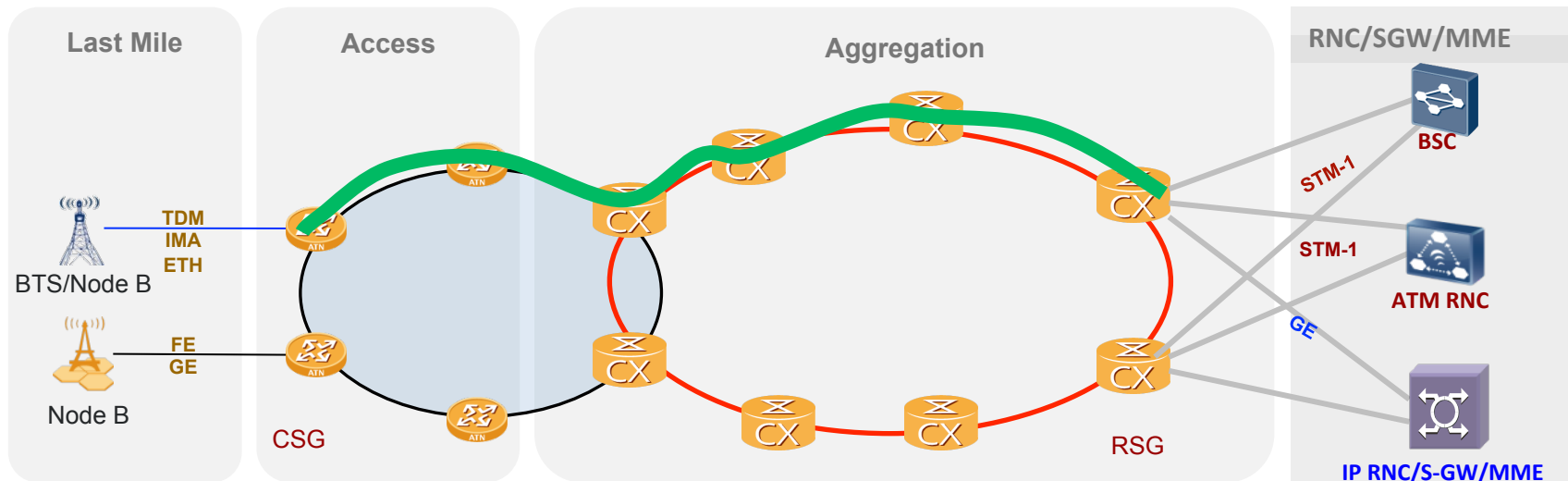
- **Upgrading Issue from GMPLS Co-routed Bidirectional LSP:**
  - **The unidirectional MPLS TE LSP has been deployed widely and it is difficult for   the service provider to upgrade all possible routers to support co-routed bidirectional LSPs.**

Service-driven Co-routed MPLS TE LSP

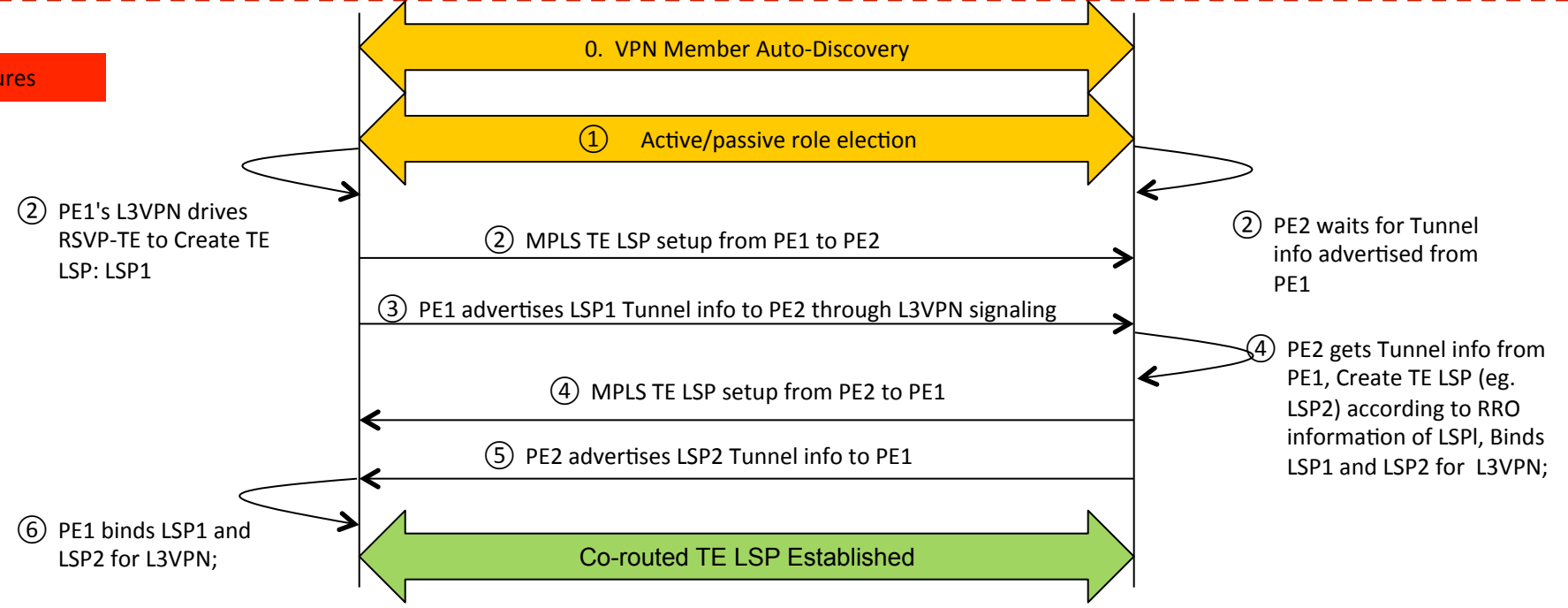- Topology-Driven: LDP LSP: LSP.
  - LSP can setup automatically to save much effort and achieve higher scalability.

- Service-Driven: MPLS TE LSP
  - MPLS TE LSPs always co-exist with the service (L2VPN/L3VPN) beared by these LSPs
  - Service-driven is a natural way to setup LSP on demand. It can save the unnecessary LSP setup comparing with topology-driven method.
  - Only the edge nodes are involved.

Service-Driven Co-Routed Unidirectional LSPs for L3VPN

Signaled Tunnel Information

Active PE PE1

Passive PE PE2

Last Mile | Access | Aggregation | RNC/SGW/MME

TDM / IMA / ETH
BTS/Node B
FE / GE
Node B

E2E L3VPN
Tunnel

CSG
RSG

BSC
STM-1
STM-1
ATM RNC
GE
IP RNC/S-GW/MME

Scenarios

Procedures

0. VPN Member Auto-Discovery

① Active/passive role election

② PE1's L3VPN drives RSVP-TE to Create TE LSP: LSP1

② MPLS TE LSP setup from PE1 to PE2

② PE2 waits for Tunnel info advertised from PE1

③ PE1 advertises LSP1 Tunnel info to PE2 through L3VPN signaling

④ PE2 gets Tunnel info from PE1, Create TE LSP (eg. LSP2) according to RRO information of LSPl, Binds LSP1 and LSP2 for L3VPN;

④ MPLS TE LSP setup from PE2 to PE1

⑤ PE2 advertises LSP2 Tunnel info to PE1

⑥ PE1 binds LSP1 and LSP2 for L3VPN;

Co-routed TE LSP Established

Summary

- Service-driven co-routed MPLS TE LSP has following advantages:
  - Setup LSP on demand and save massive configuration effort:
    - 33 command lines vs. 66,000 command lines.
  - Guarantee co-routed for the forwarding path and return path and be able to change dynamically
  - Reuse current mechanism instead of whole network upgrading.
- Auto Mesh Group (RFC4972)
  - IGP-based Solution: the internal nodes are involved unnecessarily.

Next Steps

- Solicit more comments and feedback

- More scenarios will be taken into account

- Determine which WG to move forward: MPLS/L3VPN/L2VPN/ CCAMP