Operational Guidance for Protection Mechanisms in SRv6 Networks

draft-liu-srv6ops-sr-protection-04

Yisong Liu (China Mobile)
Wenying Jiang(China Mobile)
Changwang Lin (New H3C Technologies)
Xuesong Geng (Huawei Technologies)
Yao Liu (ZTE Corp.)

IETF 124

Key Updates History

Version-01

- Rewrite Section 4 (Implementation Recommendations)
  - Deployment for single-homed scenario & multi-homed scenario
  - Recommendations for BFD
- Add Section 5 (Considerations for SRv6 Segment List Compression)
  - Discuss the impact of SRv6 Segment-List compression on protection
  - TI-LFA with C-SID & micro-Loop avoidance with C-SID

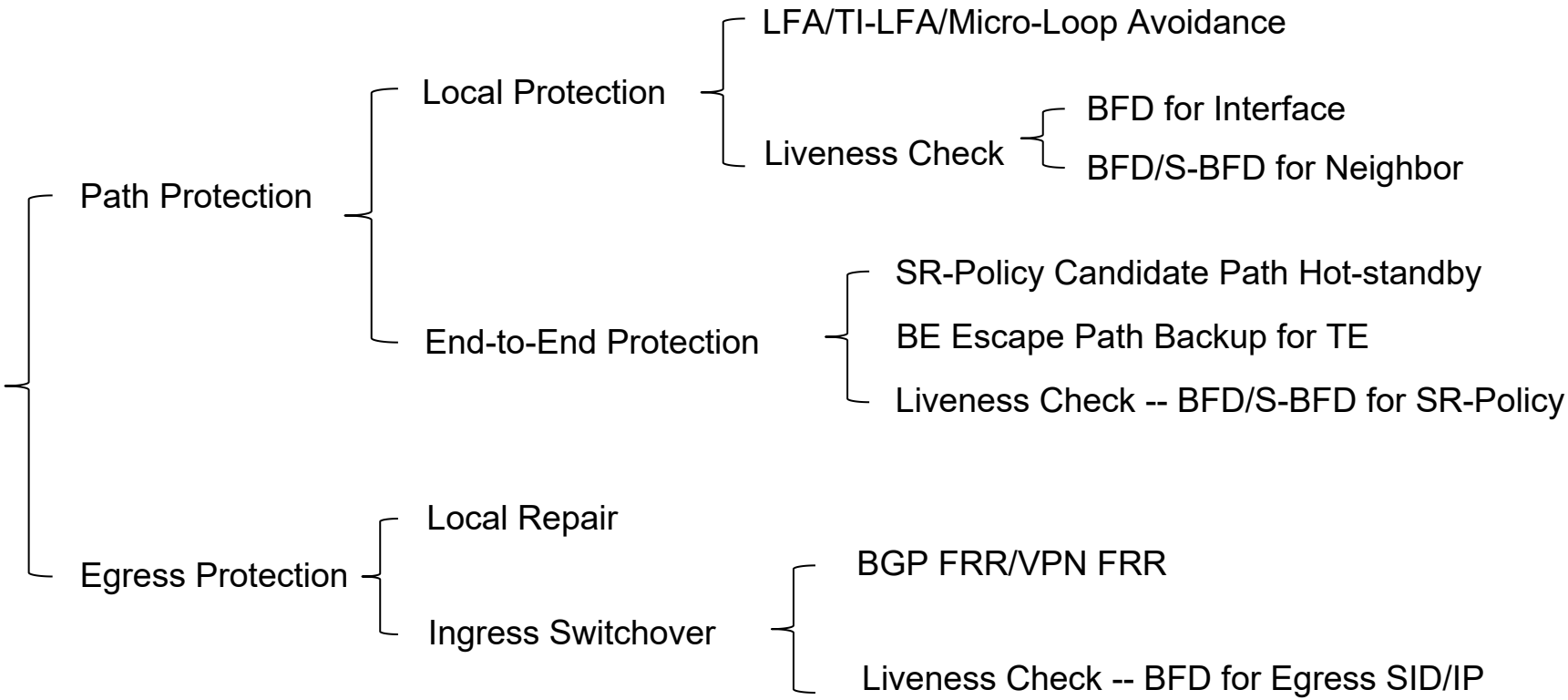
Version-02

- Changed "Best Practice" to "Operational Guidance“
- Added considerations and deployment recommendations for various protection mechanisms
- Included MSD (Maximum SID Depth) considerations for protection paths
- Incorporated MTU (Maximum Transmission Unit) considerations for protection paths

Version-04

- Reduce the description of protection mechanisms, increase deployment options
- Add Section 4.1 considerations for protection
  - Protection deployment strategies
  - Location considerations for protection
  - Multi-layer protection considerations
  - Recommended protection deployments

Operational Guidance Summary



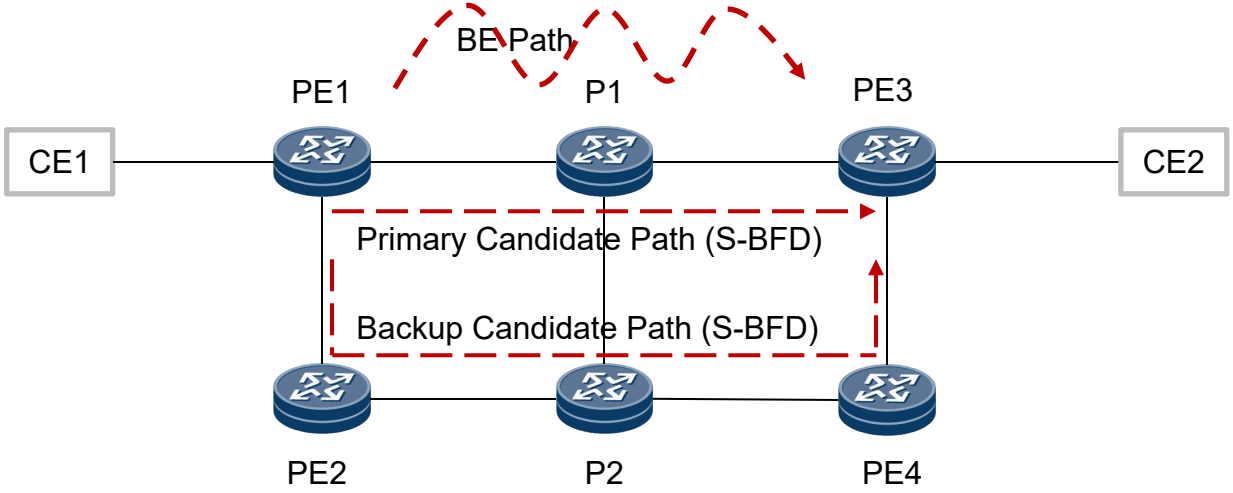
Local Protection Operations

- LFA/TI-LFA
  - The scope of prefixes to be protected
  - LFA, TI-LFA configuration options
  - Control the interfaces to be protected
  - Delay calculation time avoid temporary congestion: 5 to 30 seconds.
  - Shared risk groups configuration for multipoint failures
- Micro-loop Prevention
  - Default Duration: recommended 5s
  - Adjusting Duration for Larger Networks: align with the extend convergence time
- Consideration for Liveness Check
  - If detection requirement < 100ms, recommended to configure BFD
  - BFD configuration reuse to reduce overhead
  - Alternative detection protocols by TWAMP or STAMP etc.

End-to-End Protection Operations

- End-to-End Protection
  - Hot Standby for SRv6 policy
  - End-to-End detection for both primary and backup paths
  - Reversion delay after fault recovery: recommended 5s
  - Multiple suboptimal paths for sequential backup
  - Escape to BE path if SRv6 policy all paths fail
- Consideration for Liveness Check:
  - Detection time for inconsistent paths : e.g. primary 50ms, backup 100ms
  - No-Bypass for Detection Packets for E2E

Single-homed Scenario Protection



Protection Deployments

- TI-LFA as local protection
- Multiple candidate paths switchover as end-to-end protection
- BE backup for TE

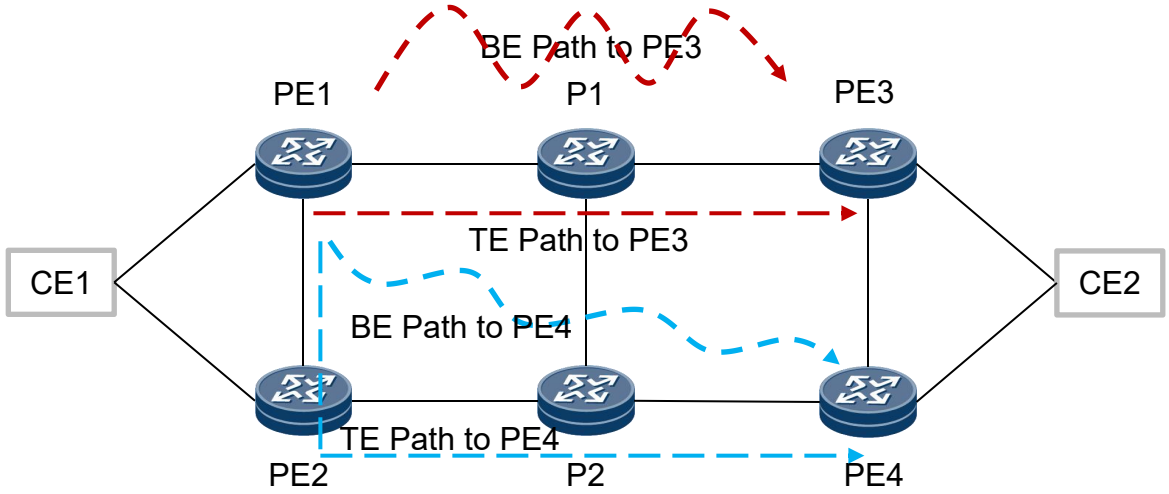
Protection of SR-BE traffics

- TI-LFA, triggered by BFD for links and neighbors

Protection of SR-TE traffics

- High SLA cases (end-to-end protection preferred)
  - Only candidate path switchover
- Fast traffic restoring cases (local protection preferred)
  - TI-LFA, triggered by BFD for links and neighbors
  - Candidate path switchover, triggered by BFD/S-BFD for CP
- BE backup for TE
  - Operate when multi-point faults (When link PE1-P1 & P2-PE4 both fail, SR BE path can still reach PE3)
  - Exceptions (dropping preferred): strong SLA requirements

Multi-homed Scenario Protection



- For each egress PE, same with Single-homed Scenario
  - TI-LFA as local protection
  - Multiple candidate paths switchover as end-to-end protection
  - BE backup for TE
- Ingress Switchover
  - Monitor the liveness of egress nodes: BFD for egress nodes recommended
  - Switchover among different egress nodes (for example, when PE3 fails, PE1 switch from SR-Policy-to-PE3 to SR-Policy-to-PE4)

Considerations for MSD and Path MTU

MSD Check

- Enable MSD Strict Check: make the current node rigorously verify the MSD supported by path nodes
- Impact of MSD Strict Check: Incompatible MSD of any path node prevents label stack formation after enabling
- Benefit of MSD Strict Check: Ensures label stack compatibility with all path nodes, avoiding forwarding failures and enhancing network reliability

SRv6 Path MTU

- Reserve Additional SRH Length : TI-LFA FRR, micro-loop prevention, or egress protection, which introduce extra space in SRH
- Active Path MTU Calculation: derived by subtracting the reserved value from configured SRv6 Path MTU

Next Steps

- Seeking broader review and feedback from WG
- Ask for adotpion call

Thanks!