

Considerations for Protection of SR Networks

draft-liu-rtgwg-sr-protection-considerations-01

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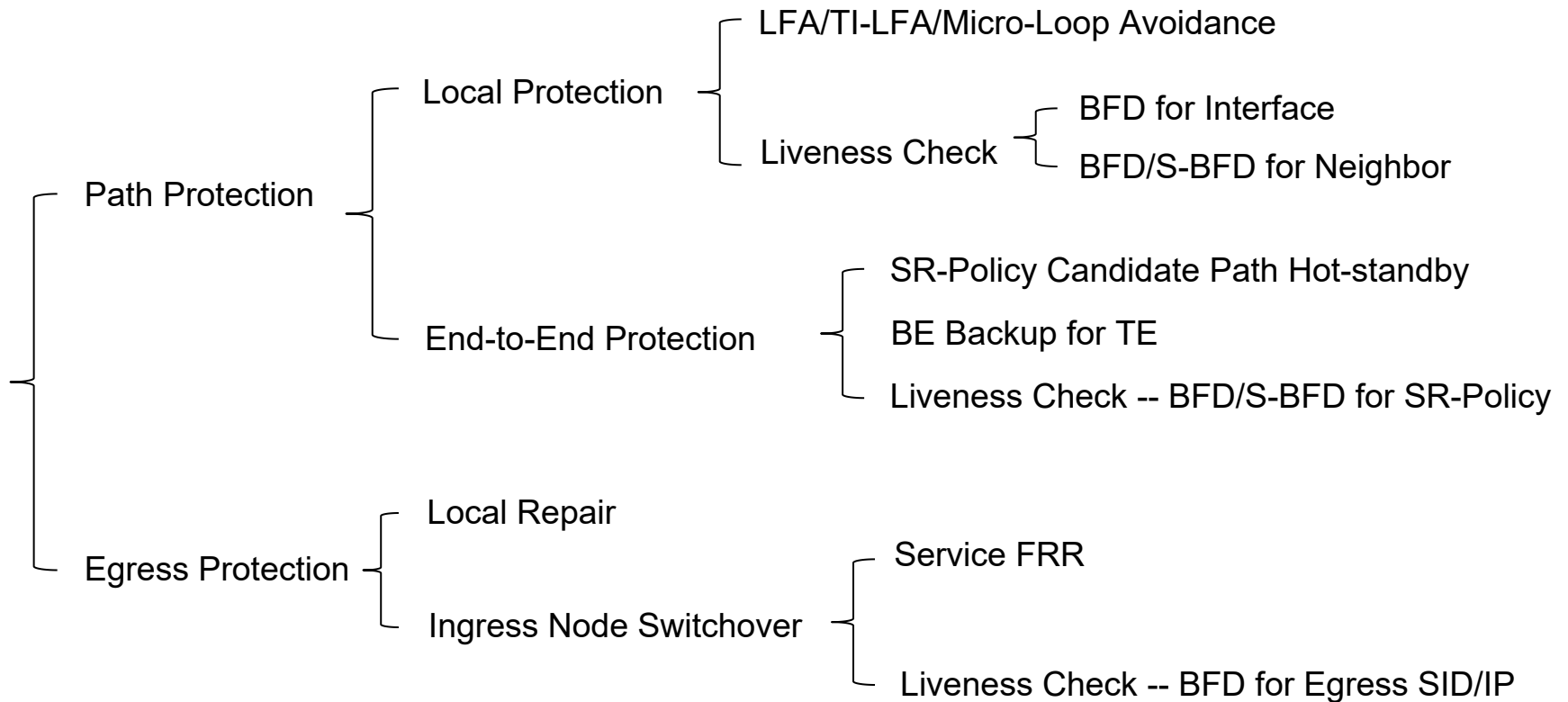
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IETF 117

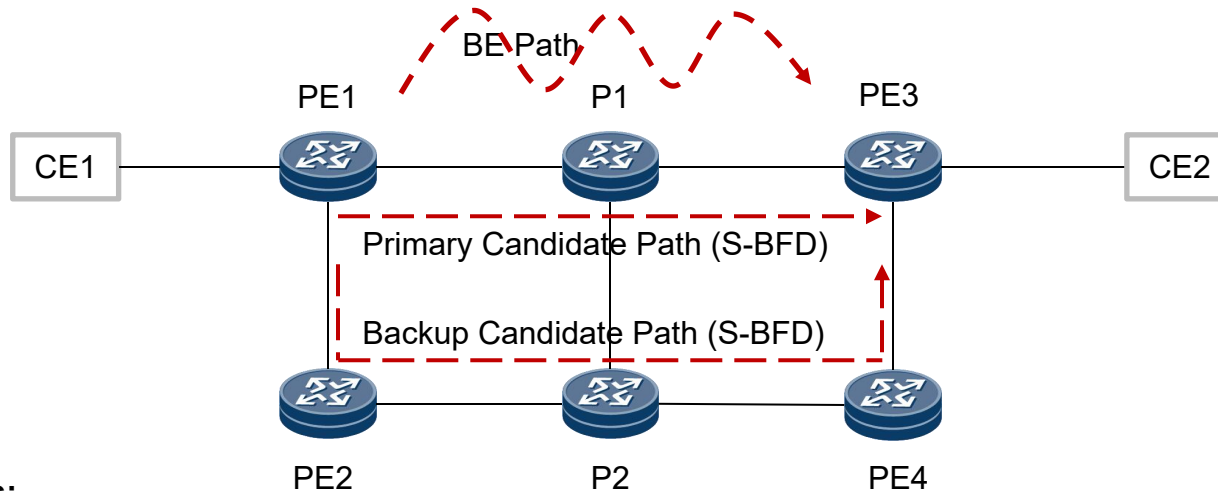
Protection of SR networks



Changes of the draft

- Update to 01 version after IETF-116
- 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

Protection Deployment for Single-homed Scenario



Deployments:

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

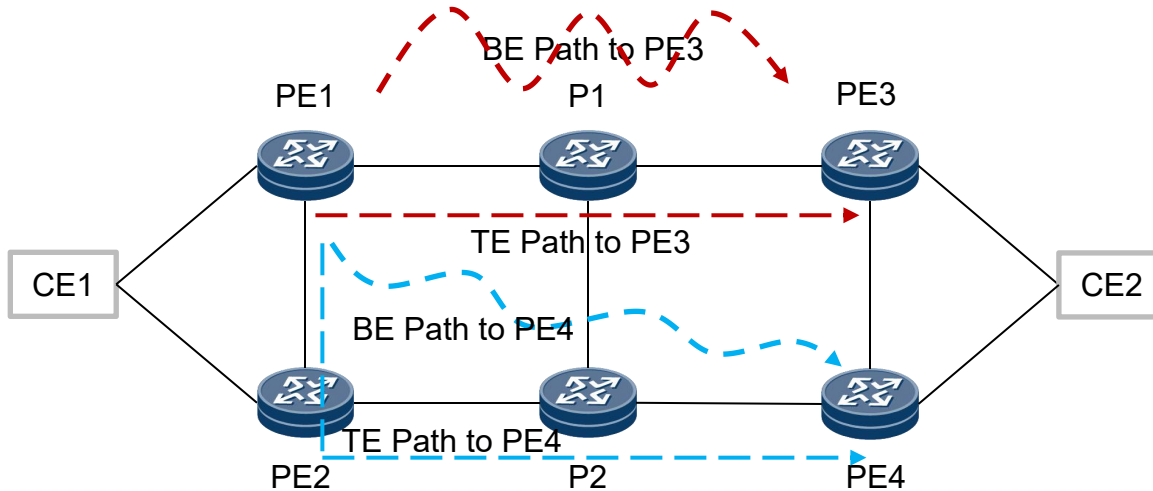
Protection of SR-BE traffics:

- 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):
 - First, TI-LFA, triggered by BFD for links and neighbors
 - Then, Candidate path switchover, triggered by BFD/S-BFD for SR Policy
- 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

Protection Deployment for Multi-homed Scenario



Deployments:

- 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 Node Switchover
 - Monitor the liveness of egress nodes: BFD for egress nodes, or validating IGP routes of egress nodes
 - Switchover among different egress nodes (for example, when PE3 fails, PE1 switch from SR-Policy-to-PE3 to SR-Policy-to-PE4)

Recommended BFD Time Interval

Trigger of TI-LFA:

Local protection $\leq 50\text{ms}$

- BFD for links and neighbors: $10\text{ms} * 3$

Trigger of candidate paths switchover (primary candidate path down):

- BFD for primary candidate path of SR Policy: $50\text{ms} * 3$

Trigger of BE backup for TE (all candidate paths down):

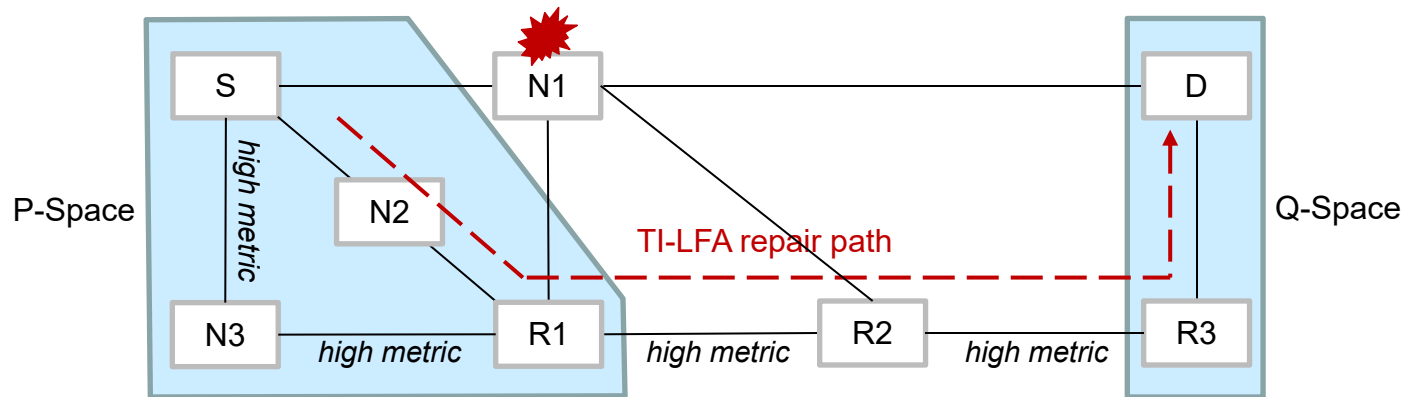
- BFD for backup candidate path of SR Policy: $100\text{ms} * 3$

Trigger of egress protection:

End-to-end protection $\leq 300\text{ms}$

- BFD for egress nodes: $50\text{ms} * 3$

TI-LFA with C-SID



When SRv6 Segment List compression is enabled, the repair node will check the compression capabilities of nodes along the repair path and try to use C-SIDs to encode the repair path.

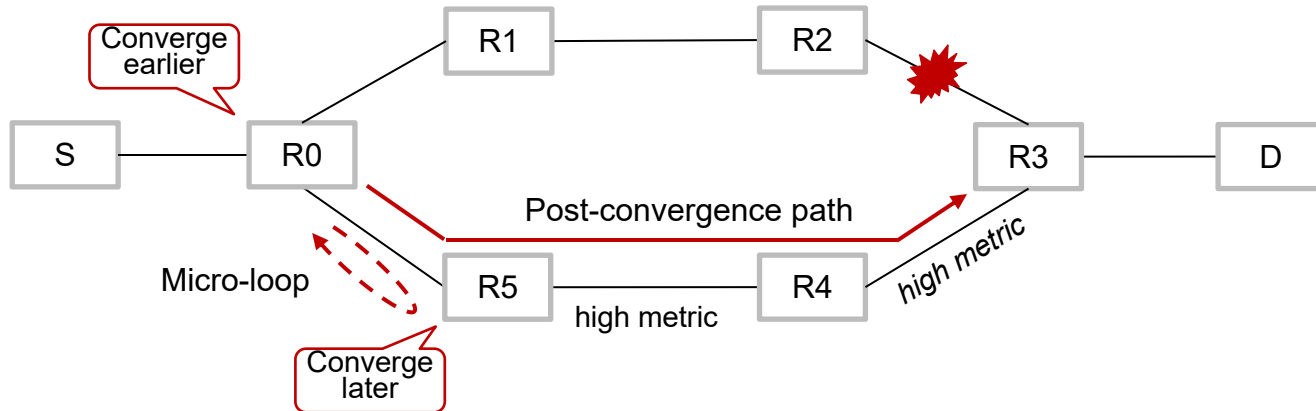
NEXT-C-SID:

| Repair List | |
|-------------|-------------|
| R1-R2-End.X | R2-R3-End.X |
| Next-C-SID | Next-C-SID |

REPLACE-C-SID:

| Repair List | |
|---------------|---------------|
| R1-R2-End.X | R2-R3-End.X |
| Replace-C-SID | Replace-C-SID |

Micro-Loop Avoidance with C-SID



When SRv6 Segment List compression is enabled, the converging node will check the compression capabilities of nodes along the post-convergence path and try to use C-SIDs to encode the path.

NEXT-C-SID:

| | |
|---------------------------------|-------------|
| Loop-free Post-convergence Path | |
| R5-R4-End.X | R4-R3-End.X |
| Next-C-SID | Next-C-SID |

REPLACE-C-SID:

| | |
|---------------------------------|---------------|
| Loop-free Post-convergence Path | |
| R5-R4-End.X | R2-R3-End.X |
| Replace-C-SID | Replace-C-SID |

Running Code

Lab Interop-test Status

Multiple vendors have passed SRv6 protection interoperability tests hosted by China Mobile in 2021 and 2022:

- China Unitechs Unified Controller
- Huawei NE40E and NE5000E
- H3C CR16010H-FA and CR19000-8
- ZTE M6000-8S Plus and M6000-3S
- Ruijie RG-N8010-R

Both single AS and Inter AS scenarios have passed interoperability testing.

Deployment Status

Trials of SRv6 protection in five branch networks of China Mobile in 2021 and 2022

- Beijing
- Zhejiang
- Fujian
- Guangdong
- Henan

Next Step

- Any questions or comments?
- Ask for adoption call