

Best Practices for Protection of SRv6 Networks

draft-liu-srv6ops-sr-protection-02

Presenter: Changwang Lin (New H3C Technologies)

Yisong Liu (China Mobile)

Wenying Jiang(China Mobile)

Changwang Lin (New H3C Technologies)

Xuesong Geng (Huawei Technologies)

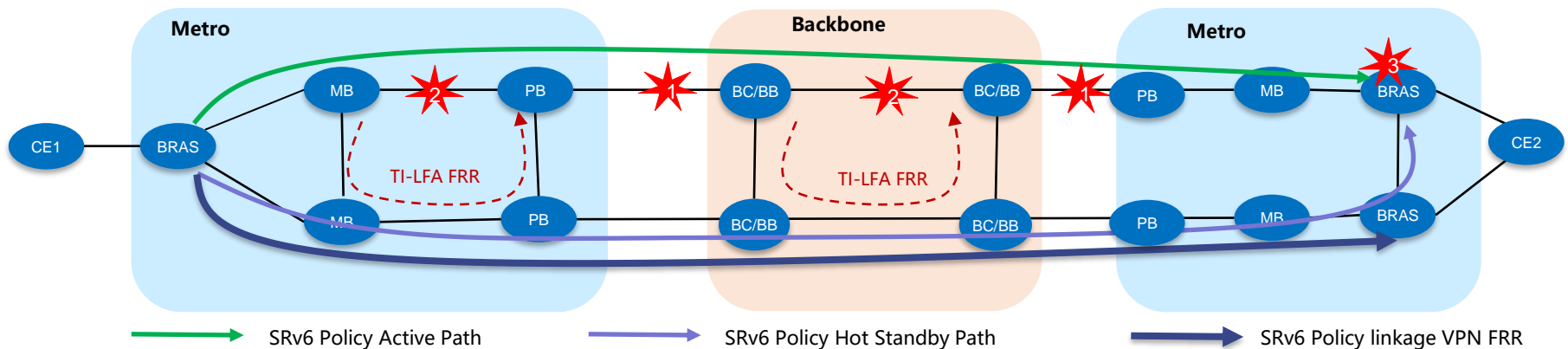
Yao Liu (ZTE Corp.)

IETF 120

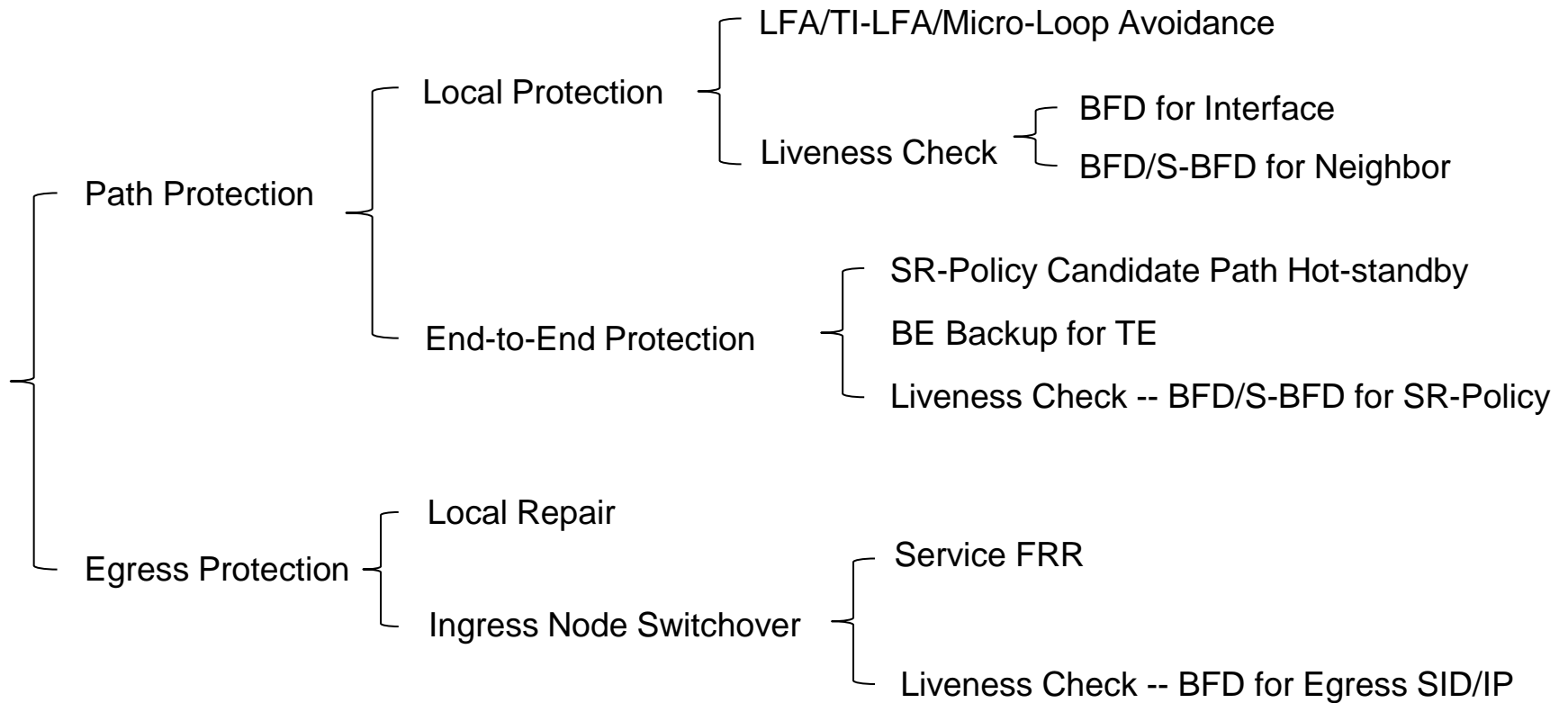
Background

Different deployment practices suitable for different SRv6 protection scenarios.

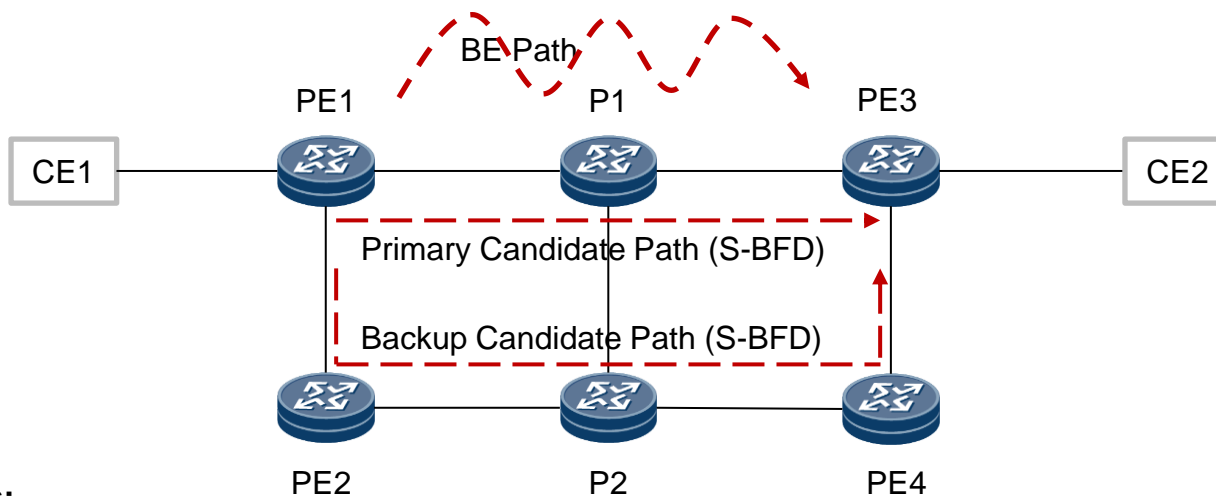
- Protection deployment can improve network stability and performance, enhance fault handling capabilities, optimize management and monitoring, and enhance deployment experience.
- Protection includes path protection, local protection, and egress service protection etc., which require different deployment strategies .



SRv6 protection strategies



Operational Guidance for Single-homed Scenario



Deployments:

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

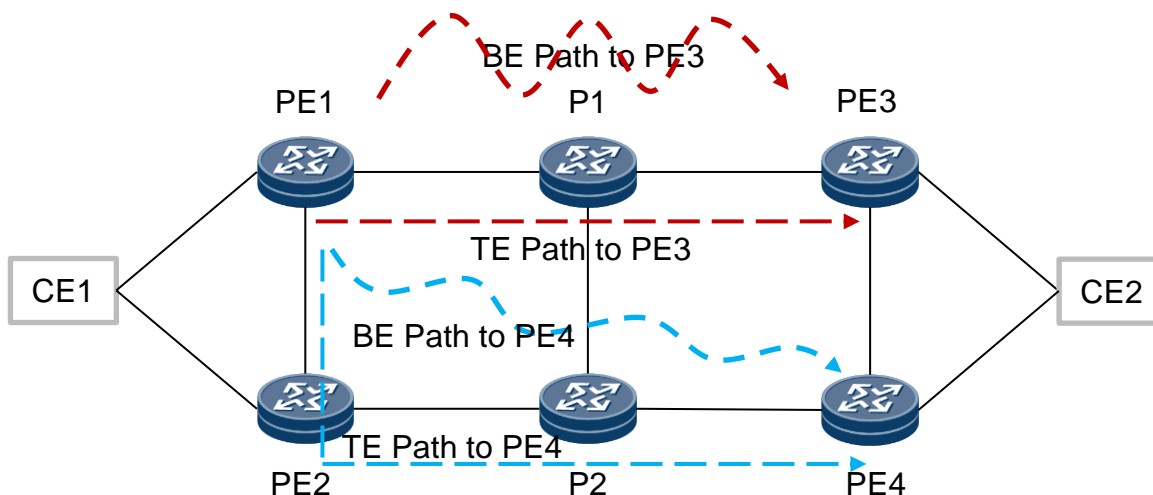
Protection of SR-BE traffics:

- 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

Operational Guidance 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):

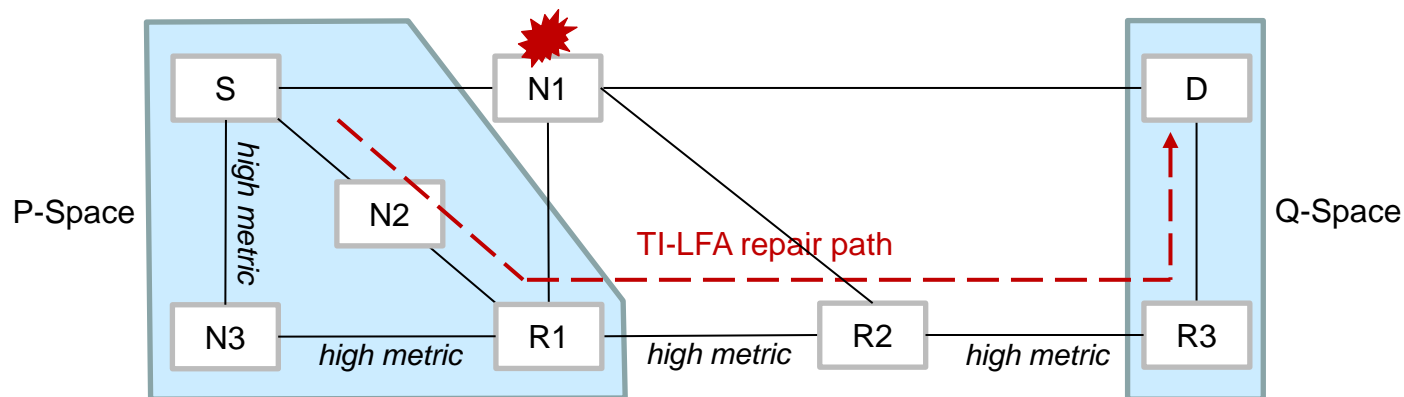
- BFD for backup candidate path of SR Policy: $100\text{ms} * 3$

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.

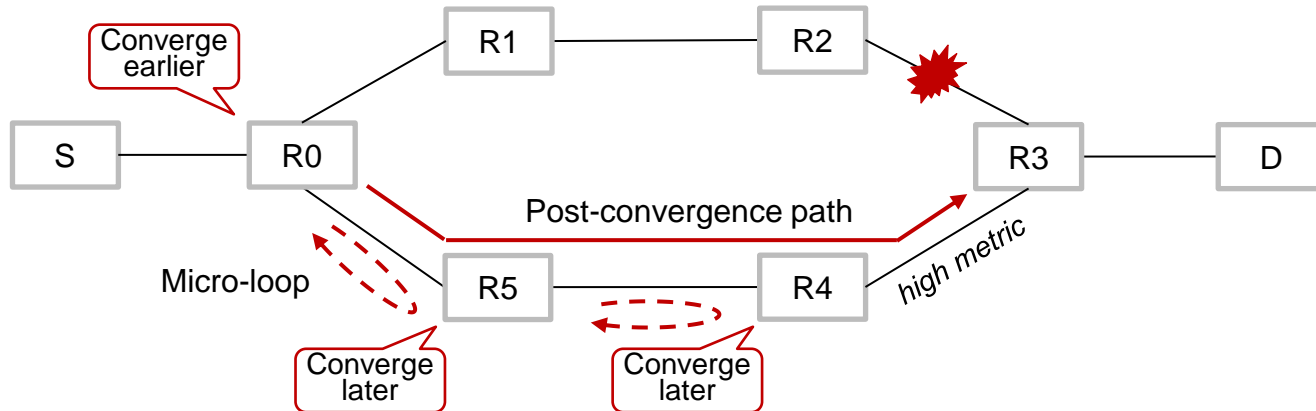
NEXT-C-SID flavor:

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

REPLACE-C-SID flavor:

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

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 flavor:

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

REPLACE-C-SID flavor:

Loop-free Post-convergence Path	
R4-R3-End.X Replace-C-SID	D-End

Running Code

Lab Interop-test Status

Hardware devices and software implementations which have passed SRv6 protection interoperability tests hosted by China Mobile in 2021 and 2022:

- China Unitech's 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 domain and Inter-AS domain 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?
- Seeking an adoption call after revision.