

CS-SR Policies with Optimized SID List Depth

draft-karboubi-spring-sidlist-optimized-cs-sr-00

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Circuit Style Characteristics

Circuit-style segment routing policy is SR policy with transport-based requirements:

- Strict bandwidth guarantee per path
- Persistent end-to-end TE paths reflecting service SLA constraints (BW, delay, etc.)
- End-to-end protection and restoration mechanisms
- Monitoring and maintenance of path integrity

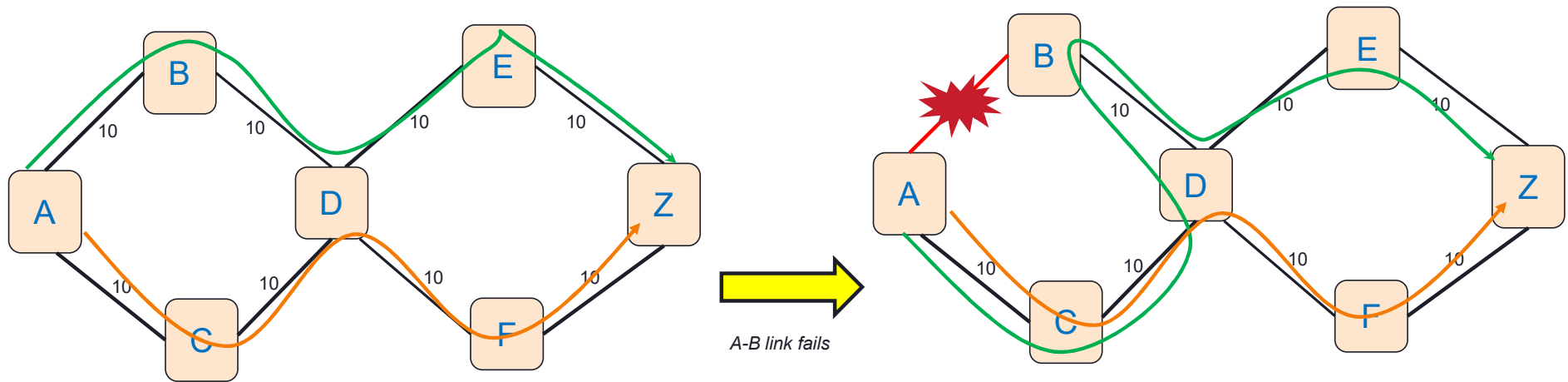
Current IETF Proposal : Only use persistent Adjacency SIDs for each link to express the path

- Issues for low-end devices: limited MSD
 - Binding SID workaround brings operational and troubleshooting complexity

Enhancement Proposal: allow SID List optimization (Node SIDs)

- How to deal with unintended paths under topology changes?

SID List Challenge: Deviation Due to Failures

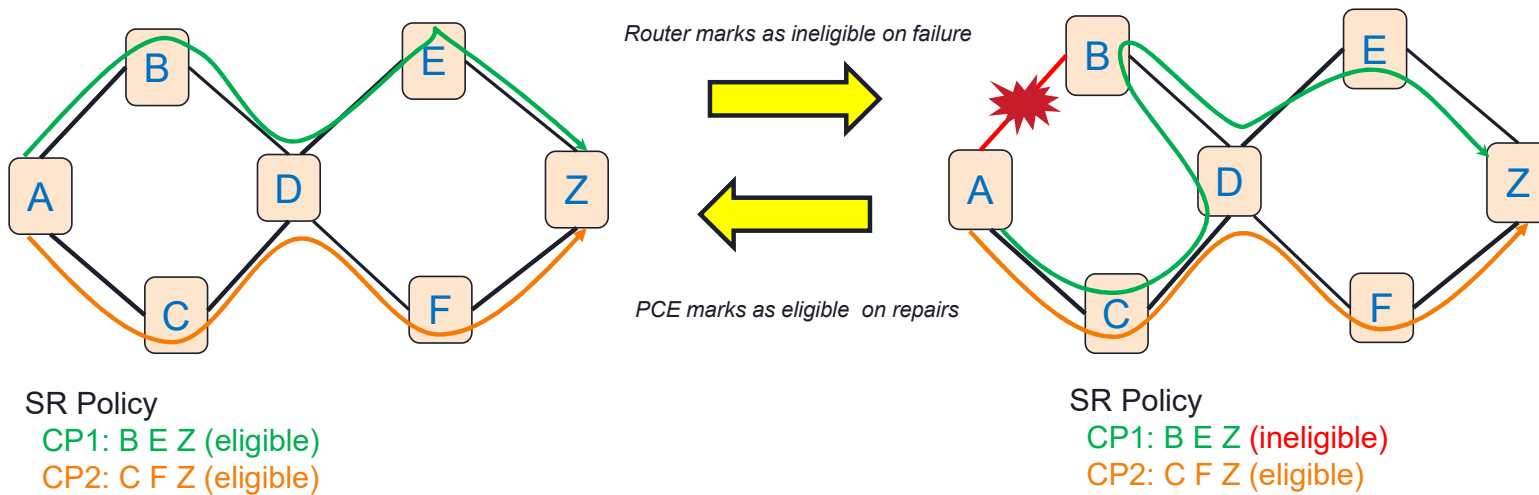


CP1
SID list: B E Z
Intended path: A B D E Z

CP1
SID list: B E Z
Path after failure: A C D B D E Z

The expanded SID list does not encode the intended path after IGP convergence

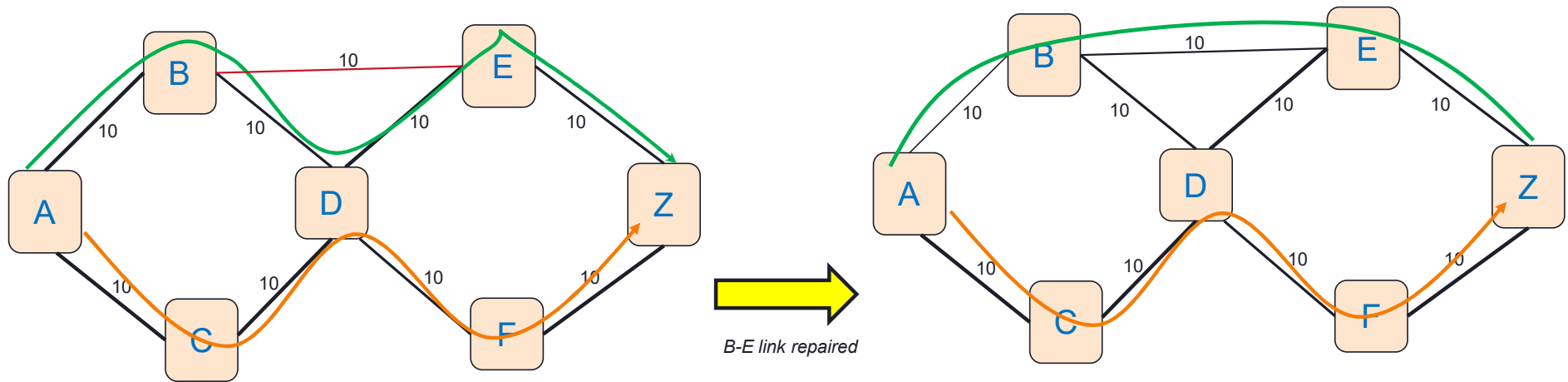
SID List Challenge: Deviation Due to Failures Solution



Rely on head-end router on *failures* and rely on PCE on *repairs*

- Each candidate path has an eligibility flag
 - When ineligible, the candidate path is not considered for SR policy candidate path selection
- When *connectivity check validation* (e.g. *STAMP*, *SBFD*) fails, the head-end router marks the CP as ineligible
 - In few milliseconds, before IGP converges
- Upon repair, PCE marks the CP as eligible again

SID List Challenge: Deviation due to Repairs

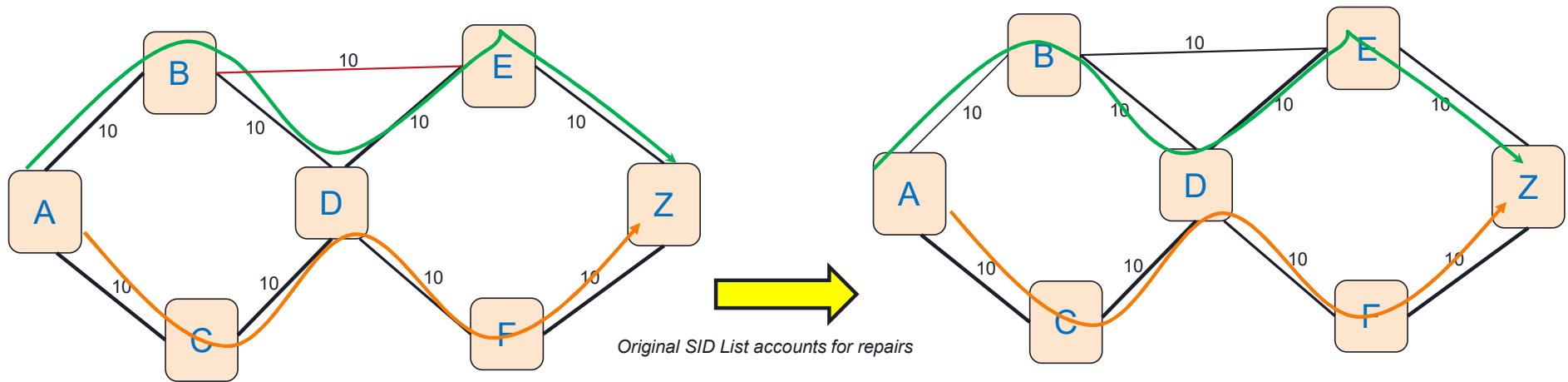


CP1
SID list: B E Z
Intended path: A B D E Z

CP1
SID list: B E Z
Path after failure: A B E Z

Expanded SID list does not encode the intended path after repair and IGP convergence

SID List Challenge: Deviation due to Repairs Solution



CP1
 SID list: B D E Z
 Intended path: A B D E Z

CP1
 SID list: B D E Z
 Path after failure: A B E Z

A Resilient-to-Repairs SID List :

- SID compression algorithm that is resilient to such repairs e.g
 - Paths are computed on current network State while SID List compaction algorithm ran on a fully restored network view

Summary

An SDN controller PCE and Router based solution :

- Deliver CS-SR Policy while allowing SID List optimization
- Introduces concept of eligibility of a candidate path that modifies the path selection algorithm of an SR Policy
- Proposes a repair-resilient SID compaction algorithm.

New properties that control the eligibility behavior to be added to various models (YANG/PCEP)

- SPRING: active candidate path selection change that takes eligibility concept into consideration
- PCEP: extensions to signal the eligibility flag / eligibility control flag
- YANG : new properties for eligibility

Seeking feedback on whether this draft shall be progressed independently or merged with existing CS-SR Policy