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

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SID List Challenge: Deviation due to Repairs

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

Expanded SID list does not encode the intended path after repair and IGP convergence
SID List Challenge: Deviation due to Repairs Solution

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