Segment Routing
Fast ReRoute use case

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Fast ReRoute

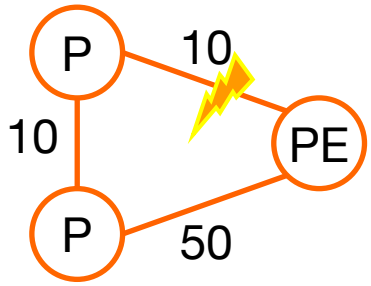
- IGP Convergence performance sometimes not enough for apps
- Fast ReRoute (FRR) required to fill the gap
- We are looking for a Simple, Scalable, Full coverage FRR solution.
- Current State for LDP networks
  - Adding RSVP-TE is sometimes too complex / not scalable
  - We successfully deployed LFA thanks to its simplicity…
  - More is needed to increase the coverage

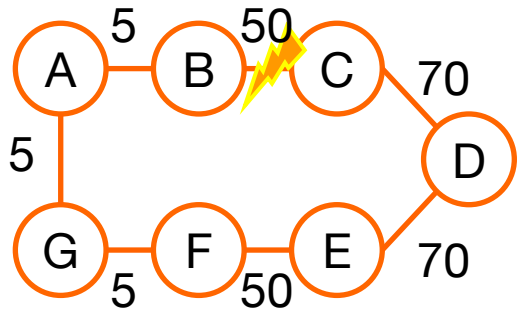
Remote LFA

- draft-ietf-rtgwg-remote-lfa
  - Extends LFA coverage through non-connected protecting nodes.
  - Requires the stacking of tunnels to “*source route”* packets via a specific node
- Completely matches STATUS « Stacked Tunnels for Source Routing »
- Currently requires dynamically established T-LDP sessions
  - Overhead and Inter-op issues
  - Troubleshooting is complicated due to transient session establishment
- IGP-learned labels would be simpler

Directed LFA

- Remote LFA provides 100% coverage in most real live networks, but does not cover some specific topologies:





- Directed LFA (DLFA) is proven to give 100% coverage
  - for link protection provided links have symmetric costs
  - draft-francois-sr-frr
- DLFA requires the advertisement of a label for each IGP adjacency.
  - to enforce a directed forwarding over the adjacency.

FRR Egress node protection / Service protection

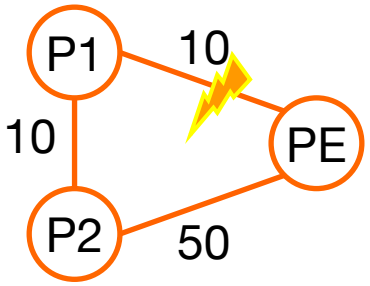
- Egress node protection addresses the failure of the egress node
  - draft-ietf-mpls-seamless-mpls-01#section-5.1.8.4
  - draft-minto-2547-egress-node-fast-protection
  - draft-filsfils-rtgwg-segment-routing-use-cases-01#section-3.3
- The protector node advertises its ability to mirror/protect the BGP routes advertised by the primary ASBR
- Requires a context label for de-multiplexing at the protector node
  - to distinguish the specific failure.

Protocol extensions for FRR purposes

- Simplifies RLFA (no T-LDP sessions)
- Required for DLFA and Egress node protection
- Having a single generic tool for all applications is beneficial
  - Avoids N specific extensions for N features
  - Allows other features to benefit from it
    - Niche use cases tend to not justify extensions
    - All use cases benefit from easier interoperability
    - Incremental deployments are more likely feasible
- Segment Routing covers all those FRR uses cases
  - draft-previdi-isis-segment-routing-extensions
  - draft-psenak-ospf-segment-routing-extensions
  - draft-filsfils-rtgwg-segment-routing-use-cases

Incremental deployment in a LDP network

- As first step, Segment Routing use may be restricted to FRR backup path.
  - Keeping LDP for nominal traffic, like the way it currently is.
- If nodes are already SR capable, SR FRR can be deployed incrementally on a per PLR basis. (with incremental benefit).
  - i.e. enabling SR FRR on P1



- In the absence of SR capable node in the network, SR FRR can be deployed incrementally on a per PLR + (last) P + (first) Q basis.
  - i.e. enabling SR FRR on P1 (PLR) & SR on P2 (P) and PE (Q)
  - Note that on the Q, SR may be replaced by a T-LDP session (which is natively the case in the above example)
- More details in draft-filsfils-rtgwg-segment-routing-use-cases-01#section-6.4

Thank you