

MPLS Fast Re-route using extensions to LDP

draft-kini-mpls-frr-ldp-00

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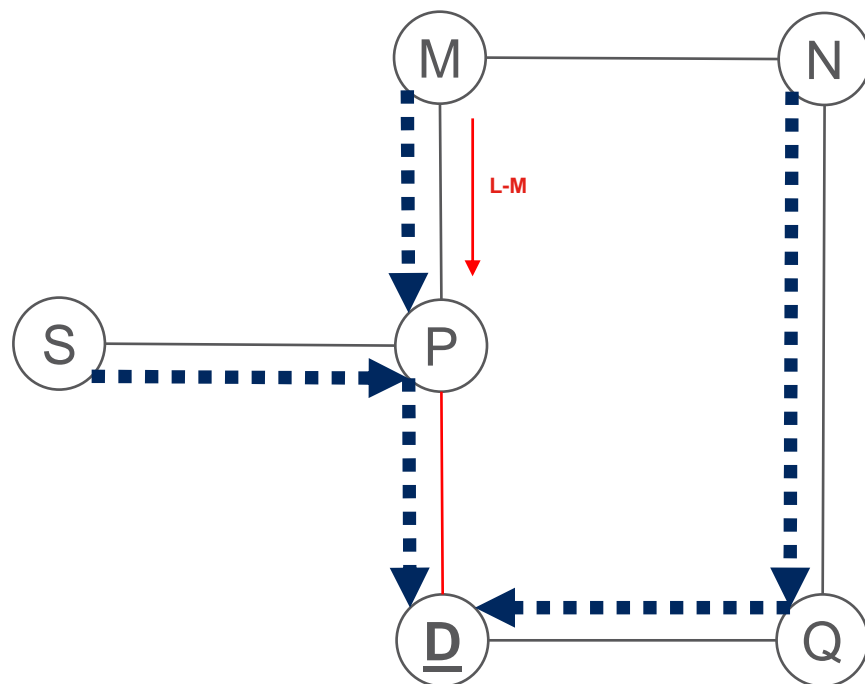
Motivation and Goal

- › LDP LSPs are widely deployed.
- › Goal of sub 50msec recovery for traffic on routed paths (IGP shortest path)
- › Solution independent of other protocols and mechanisms such as IP-FRR, RSVP-TE, IGP convergence etc

Solution summary

- › Defined for link-state IGP
- › Local repair mechanism
- › Backup shortest path (BSP) LDP LSP setup before failure
- › BSP LDP LSP starts from PLR
- › Fast re-route action on detecting failure – PLR label switches to pre-selected BSP LDP LSP
- › BSP LSP merges into shortest path LDP LSP (as soon as possible)

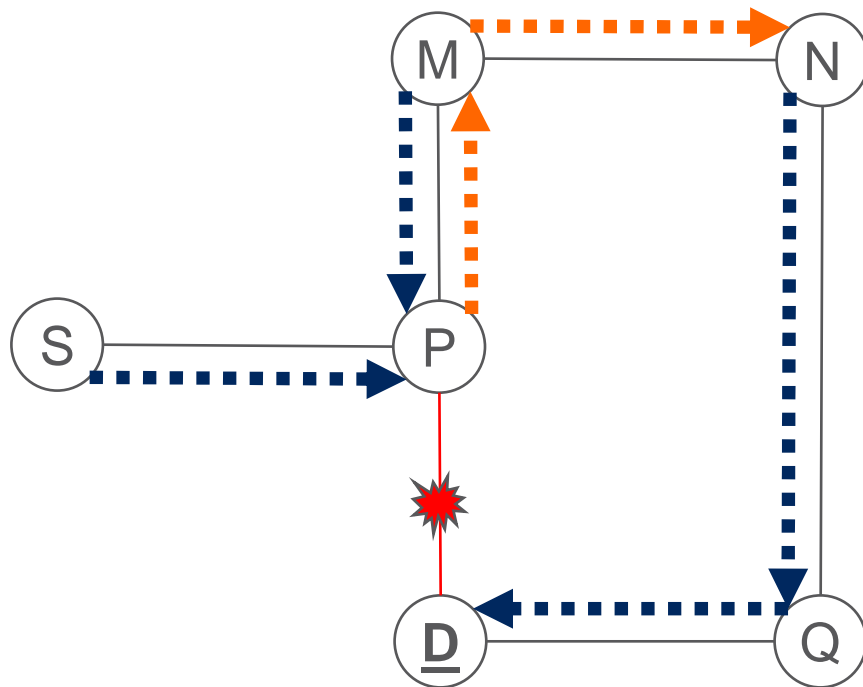
Link failure protection example



- › Protect link P-D failure
- › Destination D
- › P is PLR
- › M is merge point
- › M advertises label **L-M** to P for the backup shortest-path LSP

.....➔ Traffic flow over shortest path LSP

Link failure protection fast re-routed traffic

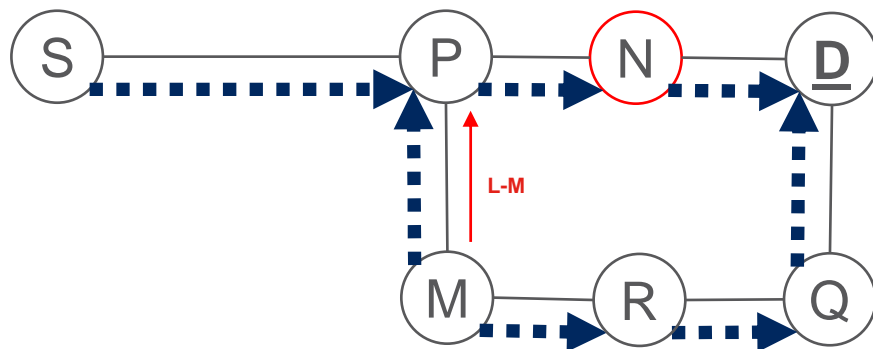


FRR traffic paths to D
when link P-D fails

- › P, M, N, Q, D
- › S, P, M, N, Q, D
- › M, P, M, N, Q, D

.....➔ Fast re-routed traffic

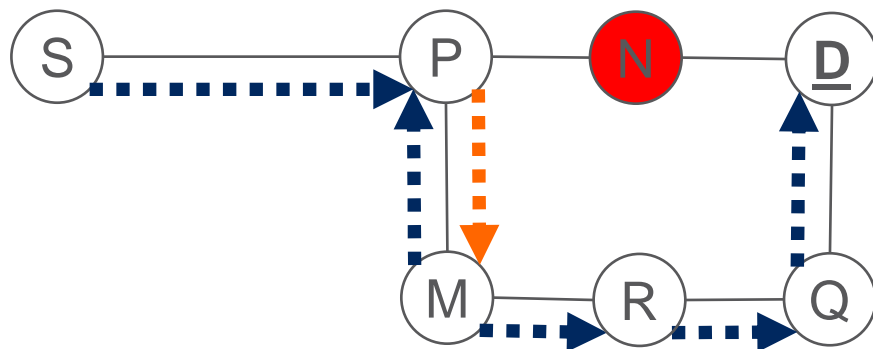
Node failure protection example



- › Node N failure
- › Destination D
- › P is PLR
- › M is merge point
- › M advertises label **L-M** to P for the backup shortest-path LSP

.....➔ Traffic flow over shortest path LSP

Node failure protection fast re-routed traffic

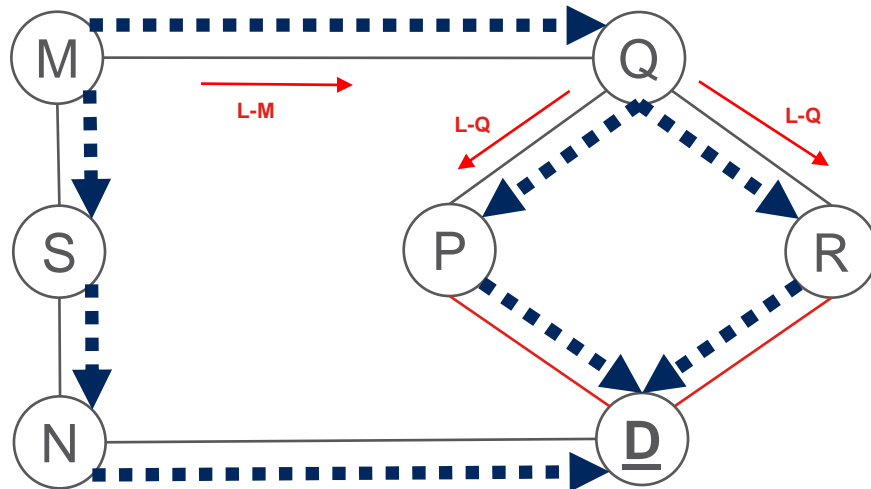


FRR traffic paths to D
when node N fails

- › P, M, R, Q, D
- › S, P, M, R, Q, D
- › M, P, M, R, Q, D

.....➔ Fast re-routed traffic

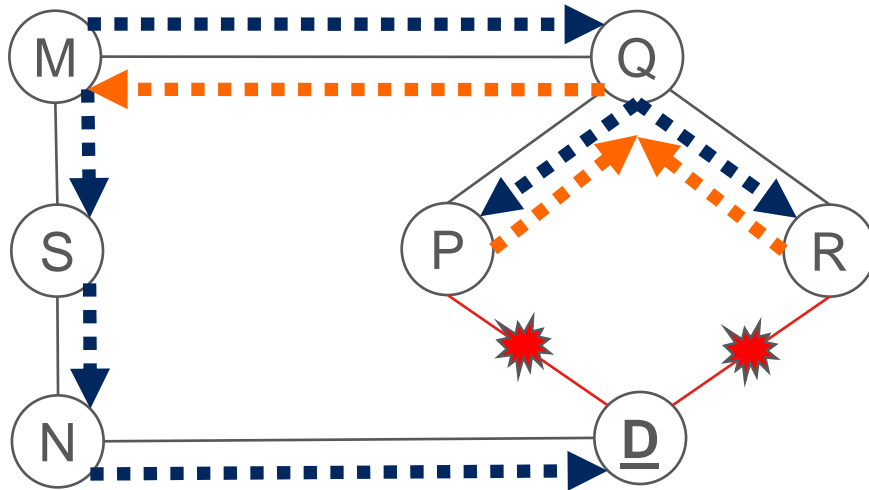
SRLG failure protection example



- › SRLG (link P-D, link R-D) failure
- › Destination D
- › P, R are PLRs
- › M is merge point
- › M and Q advertise labels **L-M** and **L-Q** respectively for the backup shortest-path LSP

.....➔ Traffic flow over shortest path LSP

SRLG failure protection fast re-routed traffic

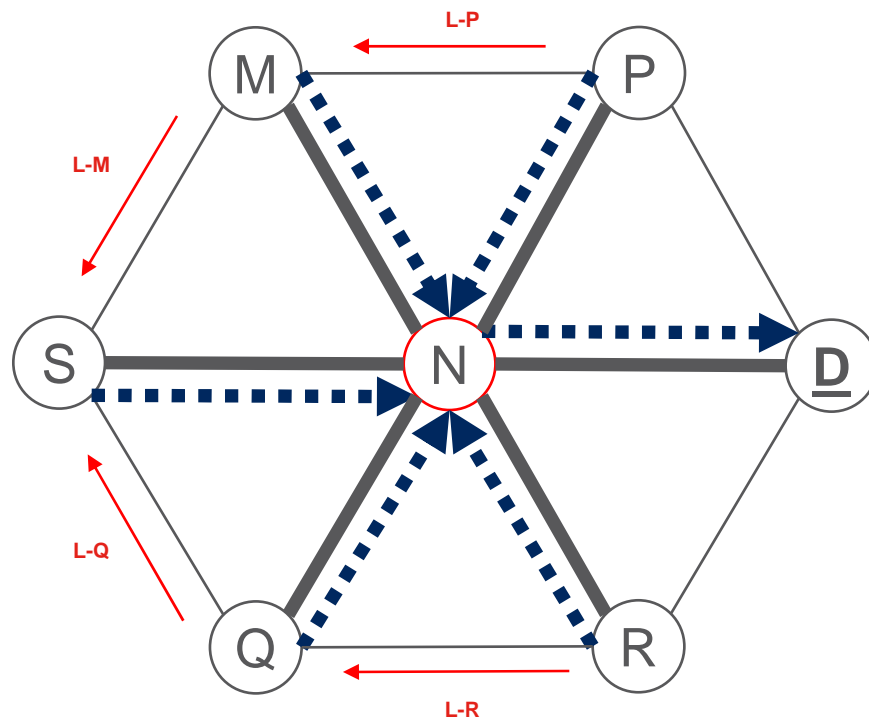


FRR traffic paths to D
when SRLG fails

- › P, Q, M, S, N, D
- › Q, P, Q, M, S, N, D
- › Q, R, Q, M, S, N, D
- › M, Q, P, Q, M, S, N, D
- › M, Q, R, Q, M, S, N, D

-----> Fast re-routed traffic

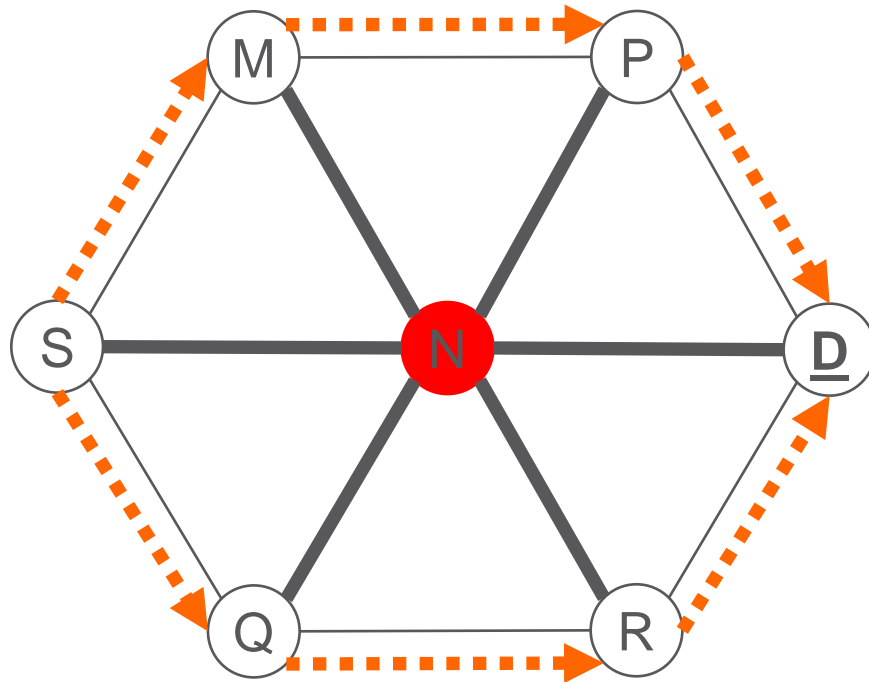
Node failure protection example 2



- › Node N failure
- › Destination D
- › P, R are merge points
- › P, M, Q, R advertise labels **L-P**, **L-M**, **L-Q** and **L-R** respectively for the backup shortest-path LSP

- High bandwidth links
- Low bandwidth links
- ⋯➔ Traffic flow over shortest path LSP

Node failure protection exmpl 2 FRR traffic



FRR traffic paths to D
when node fails

- › S, M, P, D
- › S, Q, R, D

.....➔ Fast re-routed traffic

Comparison with using LDP over RSVP

- › Less OpEx (managing one less protocol)
- › Less protocol state
- › Simplicity
- › Multi-path on backup

Comparison with using LFA & not-via

- › Full coverage
- › Re-uses MPLS FRR infrastructure
- › No IP address management issues
- › Not dependent on IGP

Future Work

- › Specify signaling extension packet encodings
- › Describe use-cases with multi-homing
- › Specify usage of label-stacking

Questions/Comments
