A Planning Tool to Improve the Resilience of MPLS Networks
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In the presence of local network outages, restoration and protection switching mechanisms redirect the traffic over alternative paths to mitigate the effect of failures. However, some failure combinations still lead to severe congestion due to rerouted traffic.

The poster presents a tool for the analysis of potential link congestion due to probable network failures and for the optimization of explicitly routed backup path.

The tool first generates all relevant failure scenarios characterized by single or multiple failure events and then evaluates the link utilization in the network under these conditions. The statistical processing of these results leads to a comprehensive view of the network's resilience. The analysis helps to anticipate potential congestion before failures and overload occur in a network or before planned modifications (new infrastructure, new routing, new customers) take effect. Thus, it detects weak points in the network and predicts the effectiveness of potential infrastructure upgrades.

The results from the link congestions analysis is taken as input for an optimization algorithm which calculates MPLS backup path layouts using explicit routing. The resulting explicitly routed backup paths may prevent link overload in case of network failures where rerouting on shortest paths fails. Therefore, the performance measure of our optimization is the link utilization relative to shortest paths routing like with OSPF and the number of explicitly rerouted backup paths in the MPLS network.