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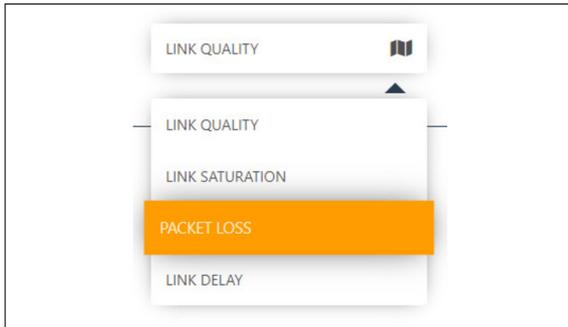
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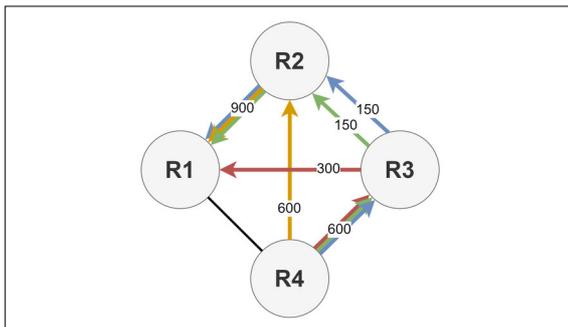
Subject Area

Software Engineering - Core Systems

SR-App Analytics



Maps
Own presentment

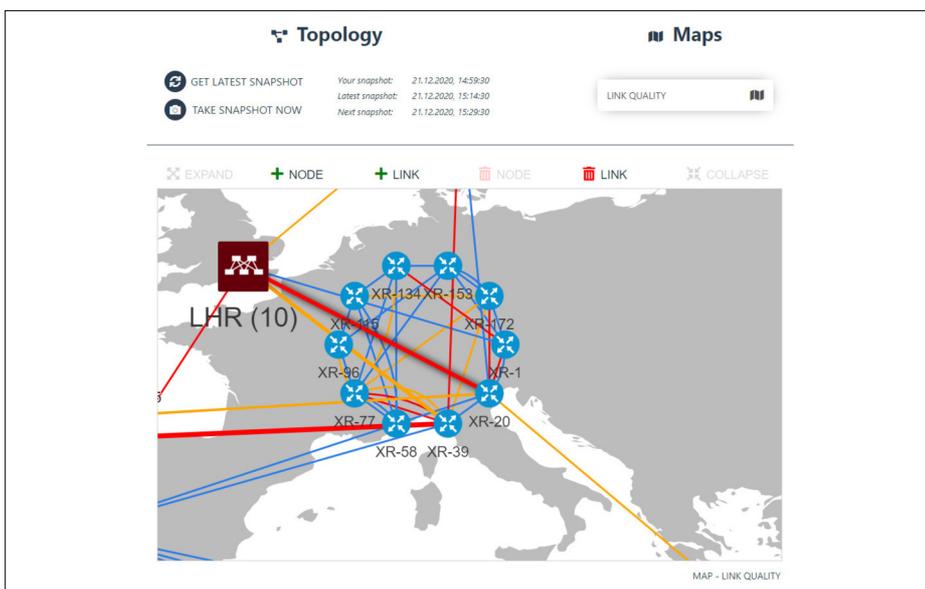


Link Saturation Prediction
Own presentment

Initial Situation: With the emergence of the segment routing technology and the development of the "Jalapeño" data collection framework by Cisco, there are many opportunities for application development that offer a benefit to network engineers and network operators. By using the network data provided by the framework, a variety of different features and use cases may be implemented. This thesis focuses on the development of an application in the field of analytics to provide information about the general network health state and link saturation in case of topology changes.

Approach / Technology: To be able to display a map of a network in the web browser a graph visualization library was required. Different such libraries and toolkits were considered and compared before the library vis.js was chosen. It offers many features, its documentation is clear and easy to use and the community seems quite active. After having implemented a rudimentary UI prototype that was capable of displaying the topology, the focus was switched to the business logic. In order to calculate of the link saturation in case of topology changes, the traffic between any two routers had to be redistributed on the network. This is possible thanks to the traffic matrix provided by the SR protocol. The traffic matrix contains information on how much traffic flows between any two SR routers. Since traffic in a SR network flows along the shortest paths, the Dijkstra algorithm was implemented to calculate them. Afterwards, a custom algorithm was implemented to redistribute the traffic along those paths and with that, calculate the saturation of each link in the topology. The final step, now that the core business logic was implemented, was to improve the UI and adding some additional features.

Result: The application built during this thesis covers all requested features and use cases. It is scalable for topologies consisting of up to one thousand routers.



WebUI
Own presentment