SR-App FlexAlgo

Students

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Objective: Segment Routing is used to engineer traffic on a specific path in the network. The characteristics of the path are manually written in the configuration of the routers and each path has to be encoded specifically. This approach doesn't scale. FlexAlgo configures Algos, which can be seen as a subset of the network. This gives flexibility to engineer network traffic based on less general constraints and uses a simplified way of configuration.

Flexible algorithms are therefore much more dynamic and manage the traffic on a network as granular as necessary. Segments and packet routes become infinitely customizable and independent from each other.

But, the maintenance of flexible algorithms in a network can be complicated, time consuming and needs intimate knowledge of network configuration. Here the application of this project comes into play. The SR-App FlexAlgo will make configurations fast and easy and allow not only a graphical view of the configurations but also show possible inconsistencies in the network. With the proof of concept built in this project, the application's feasibility can be determined and any mistakes in the architecture corrected.
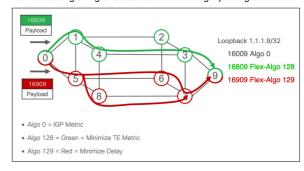
Approach: The application will work closely with the external system Jalapeño API Gateway built by the INS institute. The gateway allows a real time view of the connected network, the currently configured FlexAlgos and the surrounding networks. The application will have to be capable of handling large network workloads, as it will be used by service providers that can have networks with up of thousands of elements. To be able to handle these workloads and fulfill scaling and availability needs, the architecture was planned with a cloud native approach. A micro service architecture with serverless computing whenever reasonable and very lightweight frameworks further support the application's technical requirements.

Conclusion: Studying the FlexAlgo technology in the duration of this project revealed all necessary data that is needed and where to find it. With this knowledge a prototype was built that reads and displays all relevant network and FlexAlgo configurations.

Thanks to the Cisco proprietary application Jalapeño the project's application can retrieve the required configuration data from the underlaying network devices. The SR-App FlexAlgo prototype provides multiple views of the relevant data according to different groupings to help understand and work with the running network. Additionally it allows a graphical view of the topology and its algos on a simplified website to show how the finished product may display this data.
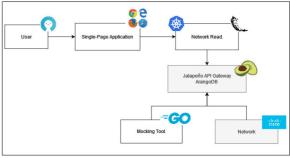
This proof of concept shows that an application based on the flex algo technology is a fitting addition to the SR-App series.

Advisor
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Subject Area
Application Design, Networks, Security & Cloud Infrastructure

FlexAlgo Example
xrdocs.io/design/blogs/2019-02-02-modernizing-ixp-design/

Container Diagram
Own presentment

Frontend
Own presentment