Overview

NS is a real world network simulation to evaluate the best strategy for resource allocation while accounting for the failure rate in various network scenarios.

Objectives

- Implement various network routing and resource allocation strategies and evaluate their performance in terms of the number of transponder used.
- Implement Google Maps and allow the creation and deletion of nodes. Additionally, simulate earthquake scenarios on it.

GUI

- **Google Maps**
  - Dynamically/physically add topology nodes and connections.
  - Input earthquake location and radius to disable nodes and connections.
  - Save and load custom topologies to Google Maps.

- **Simulator**
  - User selects traffic request and routing method before pressing run.
  - Results saved locally into .csv files.
  - Graphs are generated and displayed using results from the .csv files.

Routing Algorithms

These are shortest path algorithms the simulator uses to determine the number of transponders for each request. The user can choose between the following:

- **SPF**
  - Uses Dijkstra’s shortest path algorithm to find the shortest path from the starting to destination node.

- **LUF/MUF**
  - Both initially use the K-shortest path algorithm to determine a number of shortest path algorithms that we specify.
  - LUF picks the path that has the least used node.
  - MUF picks the path that has the most used node.

- **OPT/MUX**
  - Both determine the number of transponders based on a direct path from the starting to destination node.
  - MUX tries to be more efficient by combining requests that have the same starting and destination node.

- **Hybrid**
  - Uses a threshold system, where SPF is run if the bandwidth is under the threshold and OPT is run if it’s over the threshold.