



# Network Simulator (NS)

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## Overview

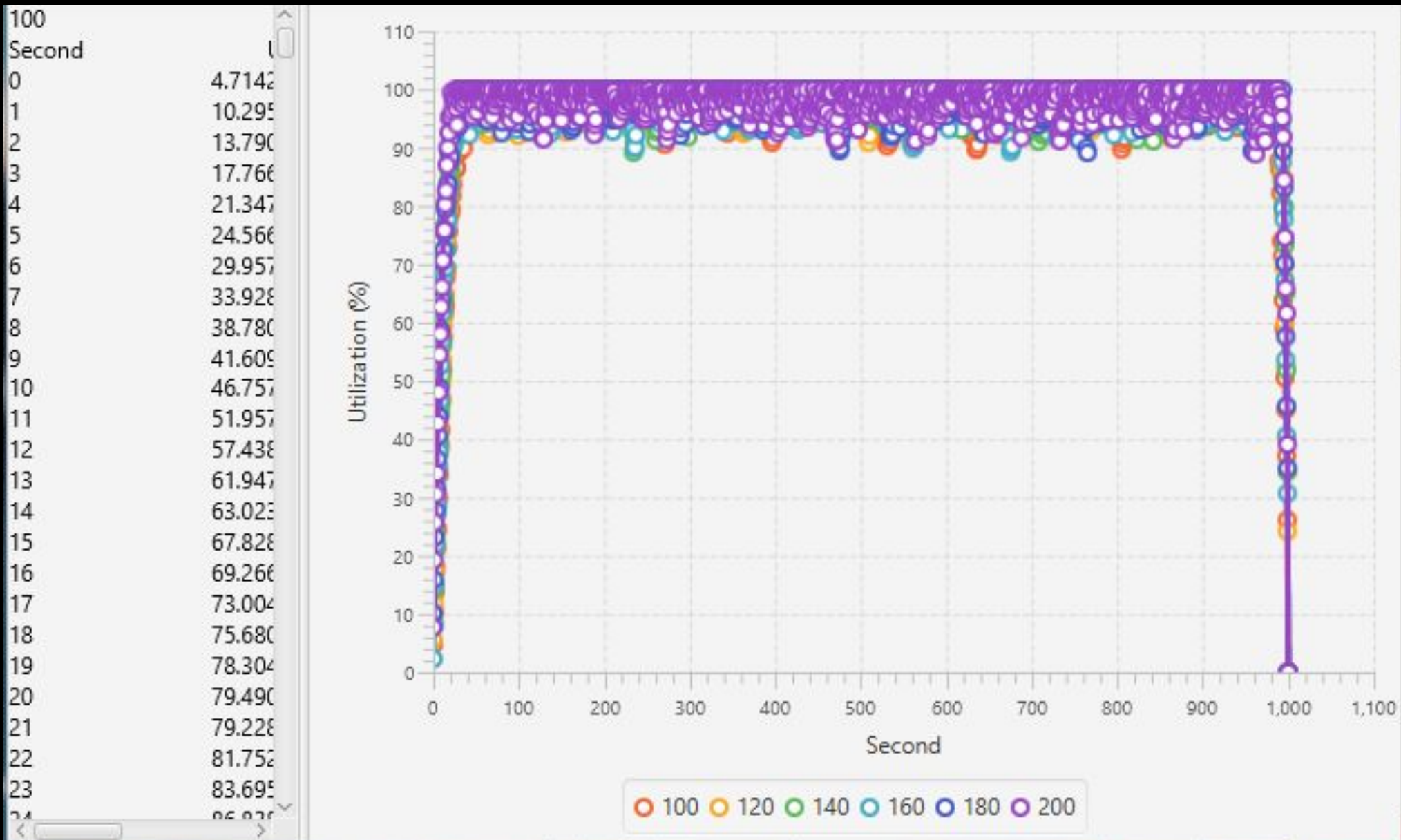
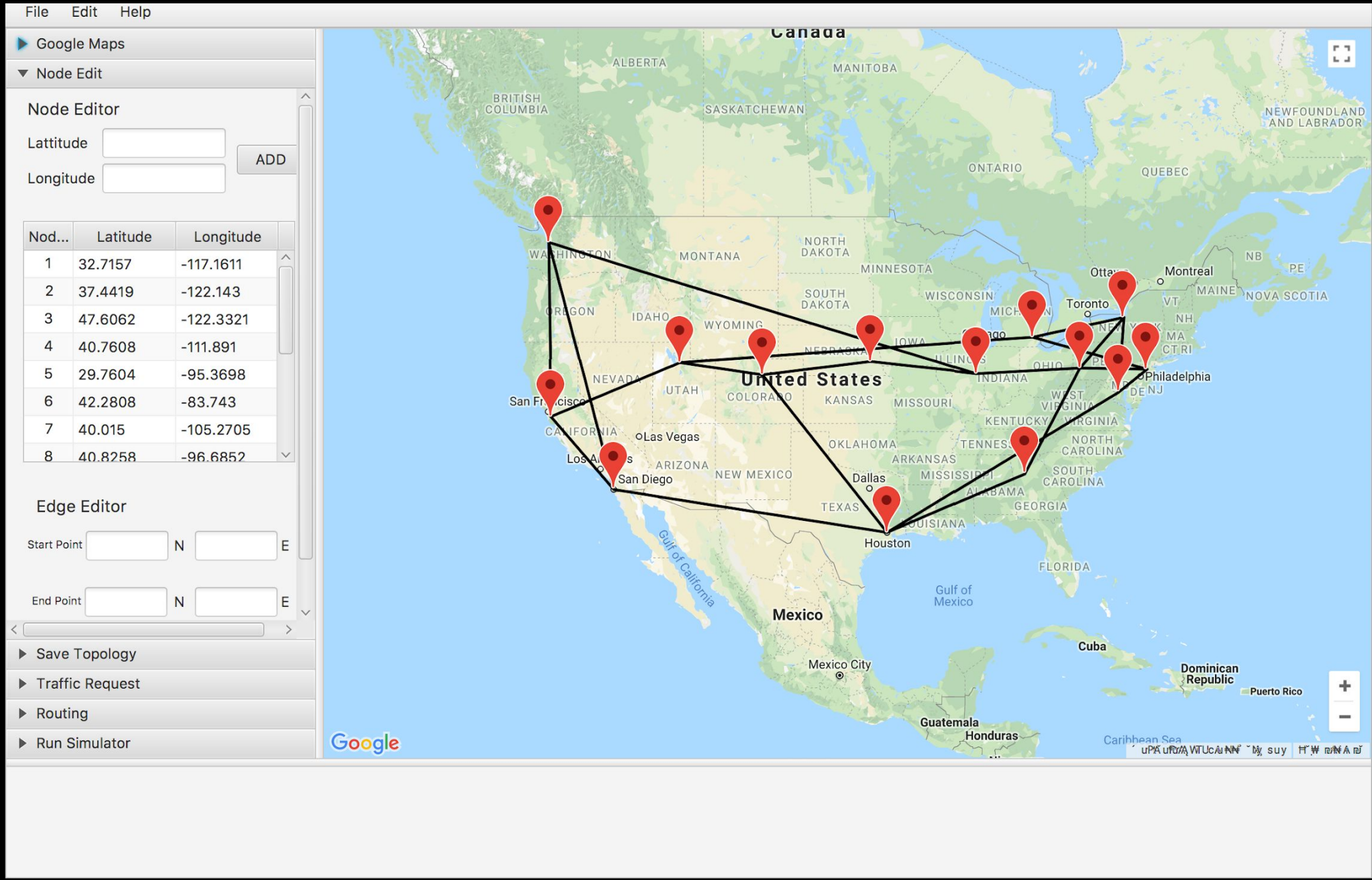
NS is a real world network simulation to evaluate the best strategy for resource allocation while accounting for the failure rate in various network scenarios.

## Objectives

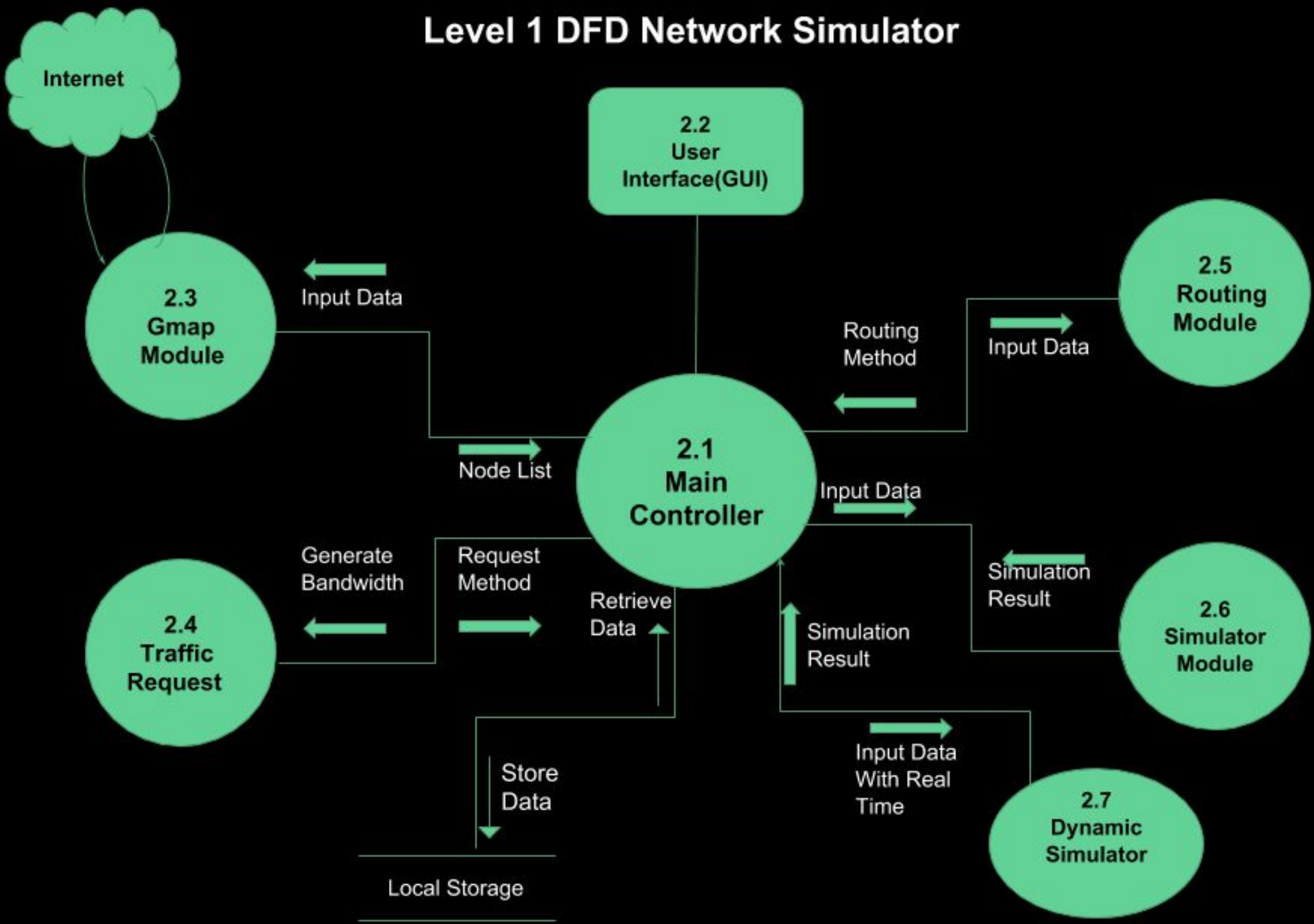
- Implement various network routing and resource allocation strategies and evaluate their performance in terms of the number of transponder used.
- Implement Google Maps and allow the creation and deletion of nodes. Additionally, simulate earthquake scenarios on it.

## 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.



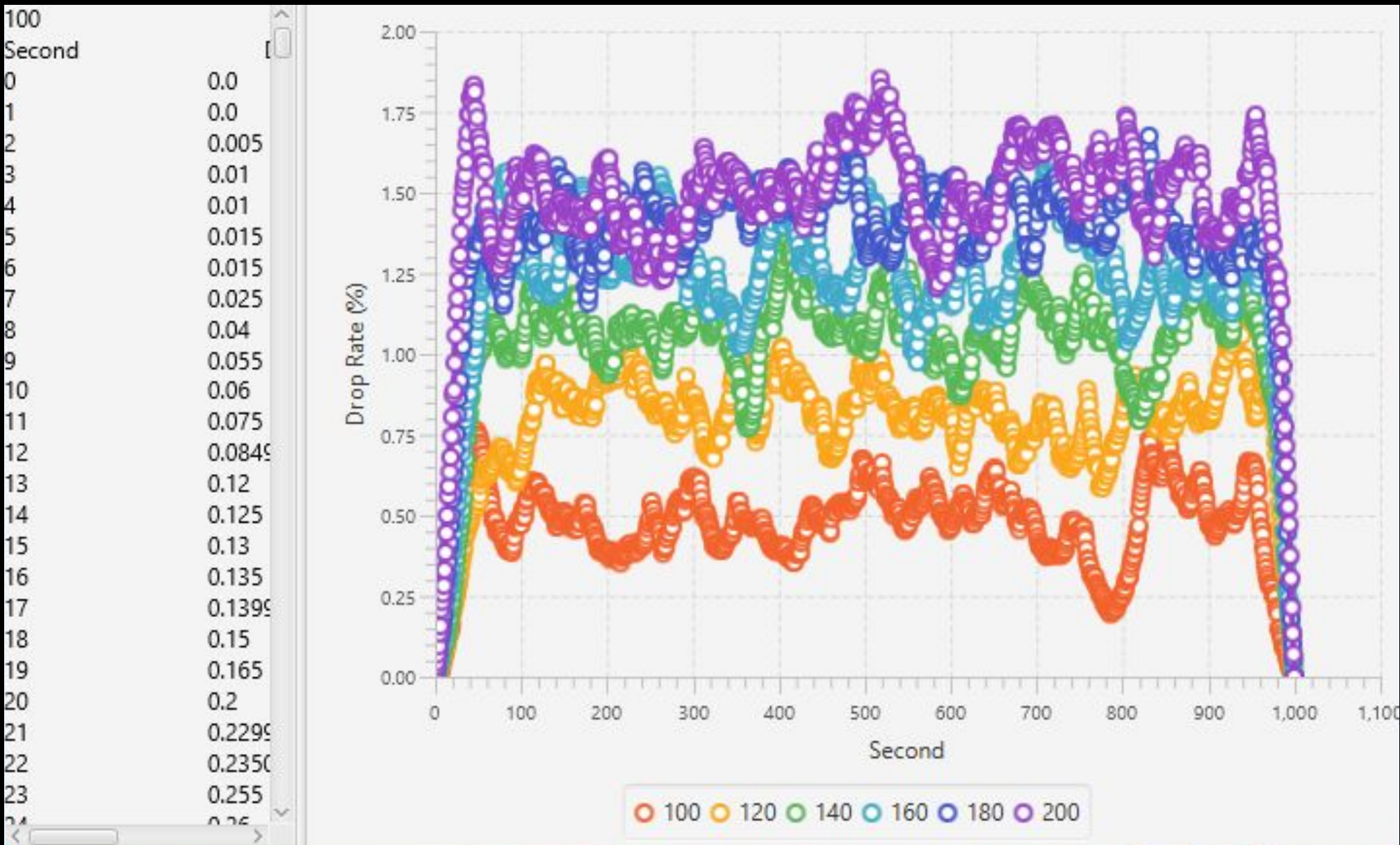
Utilization



## 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.



Drops Per Second

## Tools



DISCORD

