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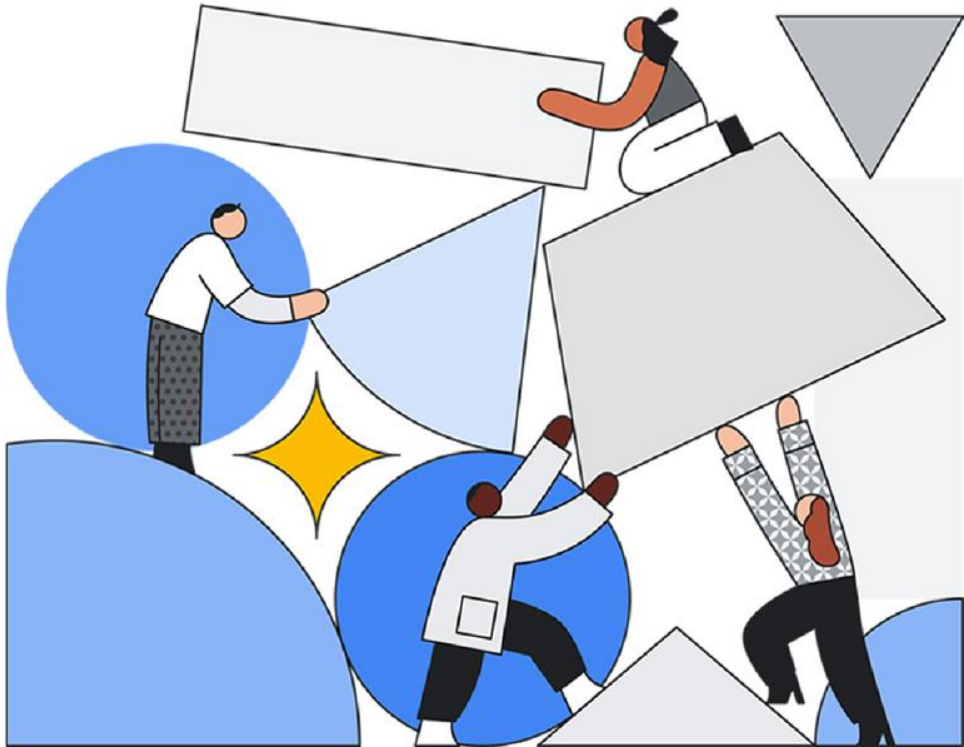


Team Name: Trailset

Team Leader Name: Anuj Shah

Team Member Names: Anuj Shah

Problem Statement Category: Scalable Solution

Problem Statement: Using open source maps

Trailset Routing: A Route Optimization API for Logistic Companies

Trailset Routing is an innovative solution aimed at empowering logistic companies with efficient route planning for their deliveries. Leveraging VROOM, an open-source optimization engine, and powered by Valhalla's robust capabilities, this API offers comprehensive features tailored to various real-life vehicle routing problems (VRP).

Technical Details

Engine: Utilizes VROOM optimization engine and Valhalla's C++ based API for cross-platform compatibility and efficient routing on memory-constrained devices.

Map Data: Geofabrik provides map data, ensuring comprehensive coverage for accurate routing calculations.

Geocoding: Nominatin geocoding service is utilized for location-based services, enhancing address resolution and geospatial functionality.

Hosting: Hosted on GCP Compute Engine VM c2-standard-4 (4vCPU 16GB Memory)

OS: Ubuntu 22.04.3 LTS

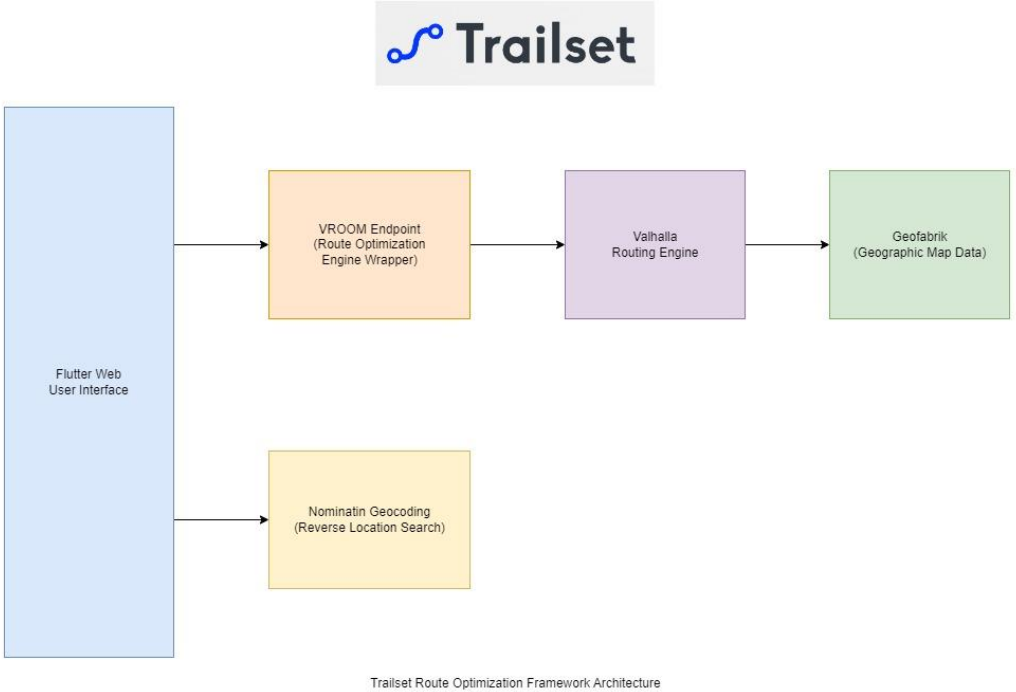
UI Support: Developed on Flutter for web 3.13.4 with openstreetmap.

Containerization : VROOM and Valhalla are hosted on Docker container.

Key Features:

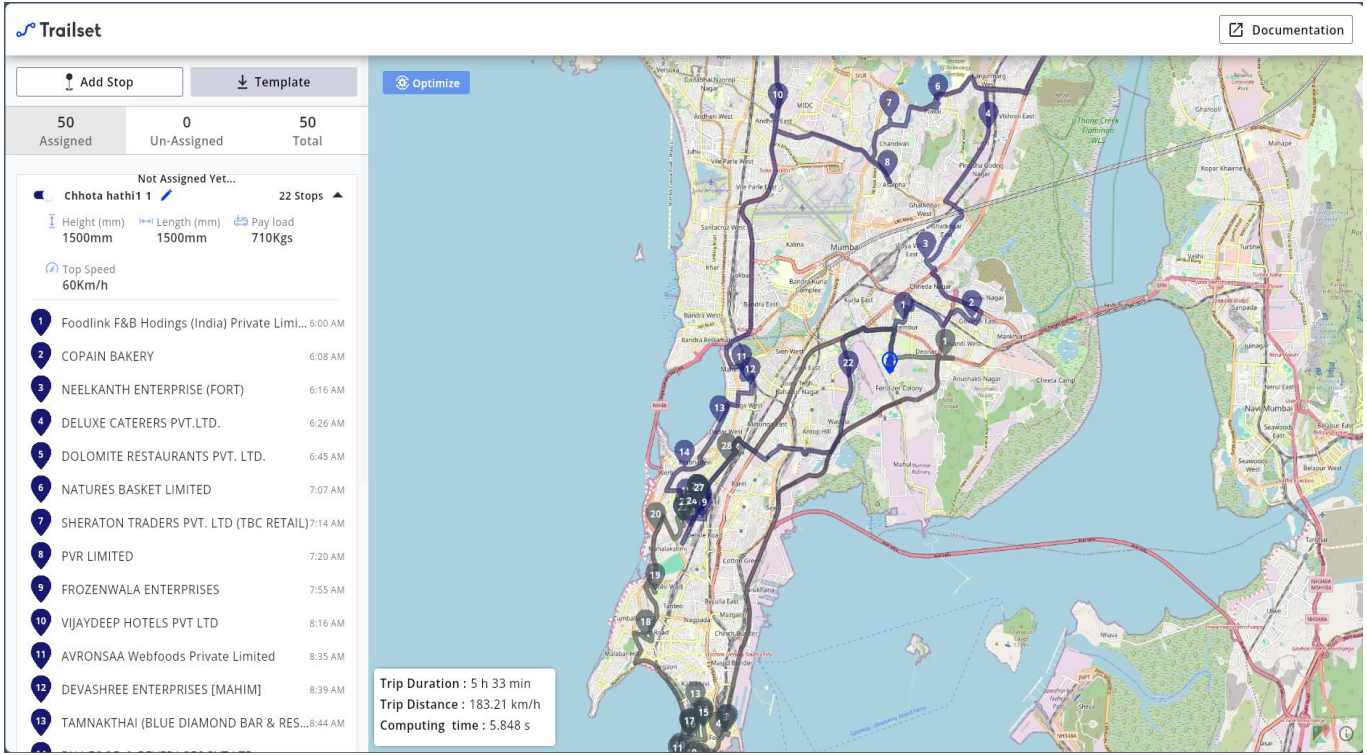
VROOM Integration: Built upon VROOM, our API supports a range of well-known vehicle routing problem types, including TSP, CVRP, VRPTW, MDHVRPTW, and PDPTW. Additionally, it can handle mixed problem types, ensuring versatility in route planning scenarios.
Flexible Job and Shipment Management: Trailset Routing facilitates the modeling of VRP with detailed job and shipment specifications. Users can define delivery/pickup amounts, service time windows, duration, priority, and more, enabling precise logistics management.
Customizable Vehicle Settings: With support for defining vehicle capacities, skills, working hours, and breaks, our API allows logistic companies to tailor route optimization to their fleet's unique requirements. Start and end points can be specified per vehicle, offering granular control over routing parameters.
Valhalla Integration: Harnessing the power of Valhalla, Trailset Routing benefits from open-source data and a tiled hierarchical structure, enabling efficient offline routing and regional extracts. Dynamic costing of edges and vertices via plugin architecture ensures adaptive routing strategies and customization.
Multi-Modal and Time-Based Routing: Beyond traditional vehicle routing, our API supports multi-modal routing, accommodating auto, pedestrian, bike, and public transportation options. Time-based routes enable users to set arrival deadlines, enhancing scheduling precision.

Underlying Architecture:



Trailset Route Optimization Framework Architecture

Demonstrate working of the solution to the evaluation team



Deployment Steps:

- Steps to Deploy

Visit URl view Demo:

- Demo Video
- http://trailset.in

Visit Documentation:

- Readme Documentation
- API Documentation
- Sample Request Response

View Test Cases Video:

- Time Window Scheduling
- Round or One Way Trip Planning
- Adding Stops Manually
- Location Priority Mapping

Important Links:-

- GitHub Public Repository Link: https://github.com/anuj509/trailset_routing
- Link to test cases and data files:trailset_routing/assets/xlsx/trailset_sample_data.xlsx at main · anuj509/trailset_routing (github.com)

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