



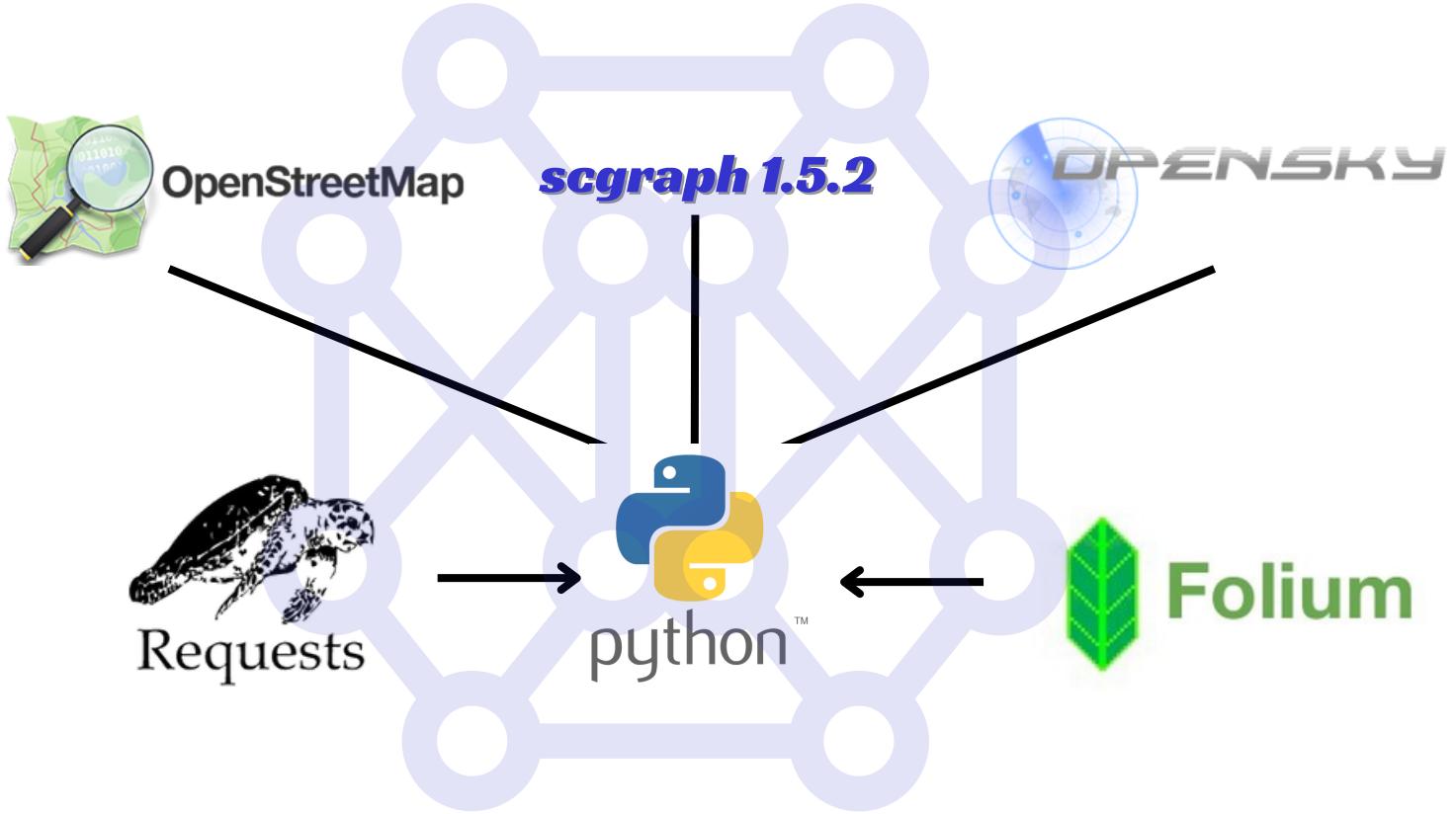
# Dynamic Route Optimization for International Trade

**Team Name - No Direction**

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# Get Route Coordinate & Real time data

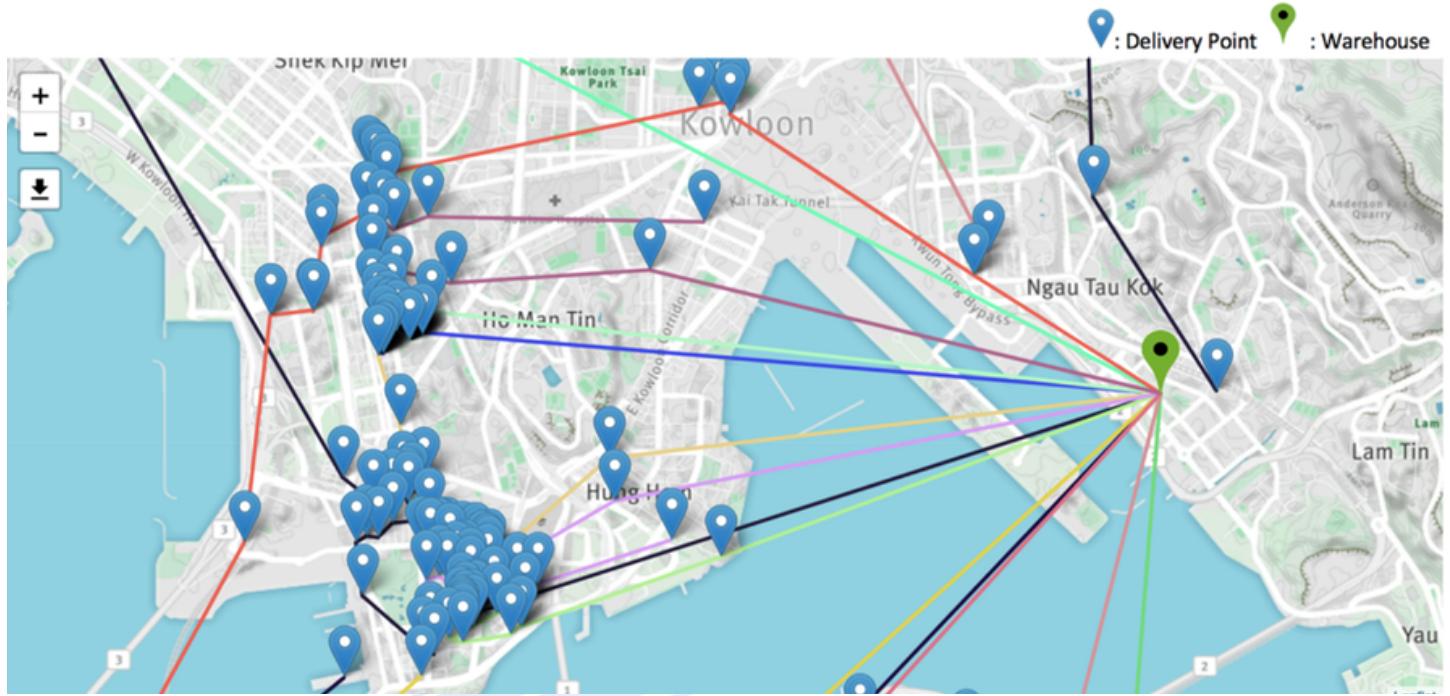


**OpenStreetMap:** Use the OpenStreetMap API to retrieve real-time roadway routes. You can make requests to the API using Python's `requests` library to obtain coordinates, and then use those coordinates to generate routes using Folium.

**Scgraph:** Utilize Scgraph to find sea routes using past data. This involves analyzing historical sea route data to determine optimal routes between specific points. The specifics of accessing this data would depend on the Scgraph API.

**OpenSky:** Access the OpenSky API to get flight routes and traffic information. With Python's `requests` library, you can make API calls to retrieve flight routes and real-time traffic data, which can be visualized using various libraries such as Folium.

# Routing System Overview



## Getting Origin Latitude and Longitude from User:

Utilize user input fields or a map interface to collect the origin coordinates (latitude and longitude).

## Finding Nearest Port and Airport:

Upon receiving the origin coordinates, employ algorithms to determine the nearest port and airport. Utilize databases or APIs containing geographic data to facilitate this process.

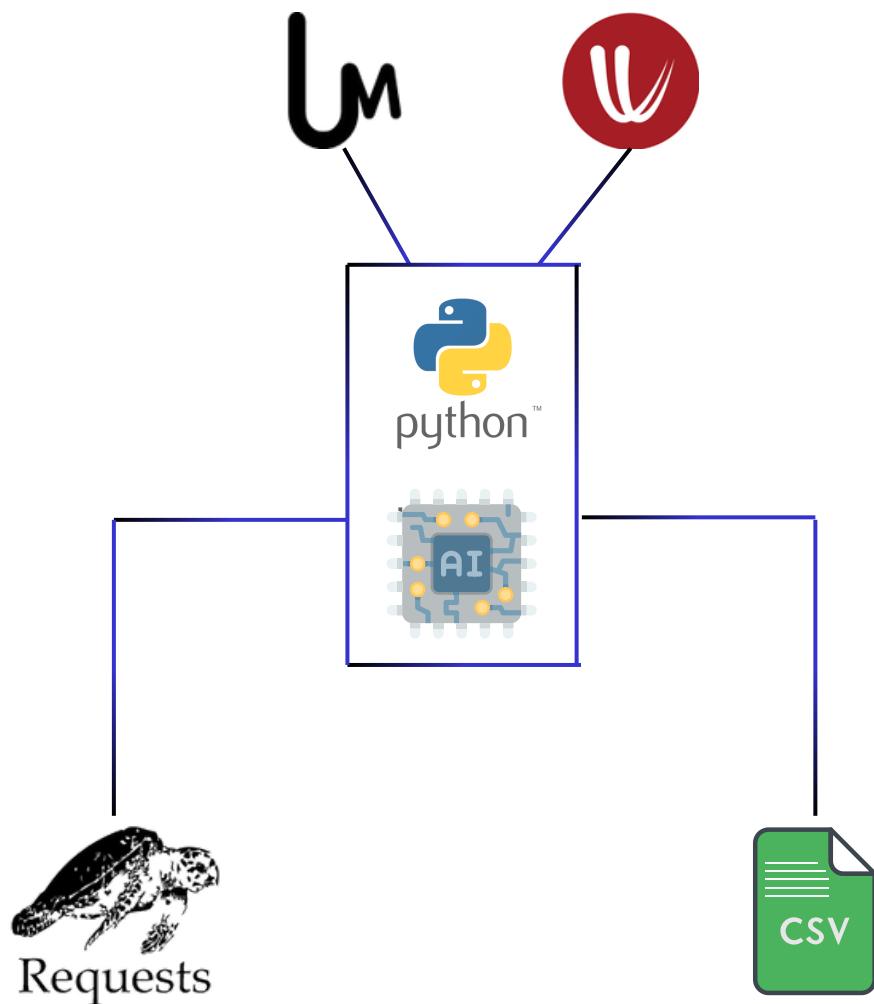
## Finding Multiple Routes for Multiple Destinations:

Develop algorithms capable of calculating multiple routes for a set of given destination points. Implement various routing strategies such as shortest distance, fastest time, or optimal cost.

## Calculating Single Routes Based on User Preferences:

Offer users the ability to specify routing preferences such as cost, delivery time, or preferred mode of transportation. Adjust routing algorithms to optimize for the specified criteria while generating single routes.

# Handling Weather, Traffic and Geopolitical



**Weather:** NOAA/WMO (Windy)

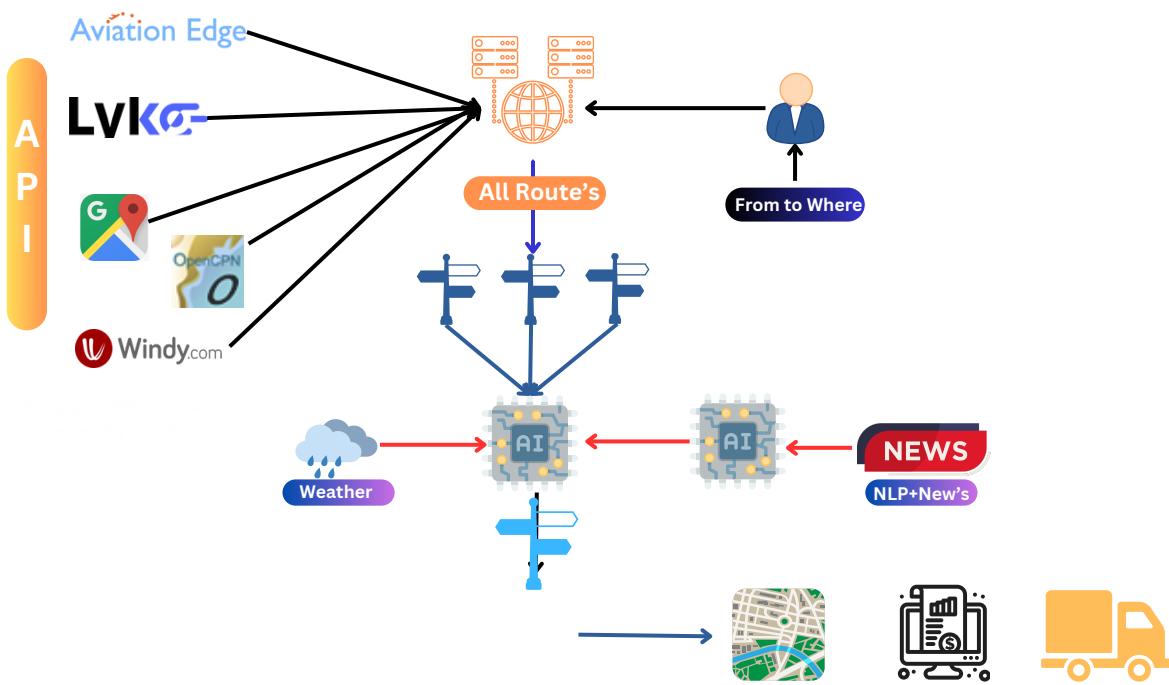
**Traffic:** Government agencies, mapping services (APIs or live feeds)

**Geopolitical:** Reputable news sources, government websites (APIs or web scraping)

**Data Storage:** Coordinates: Local/cloud database (GeoJSON, lat/lon)

**Application Logic:** Integrate data sources for weather, traffic, and geopolitical issues. Save area coordinates to avoid in a suitable database. Use routing libraries that consider weather, traffic data, and user-defined avoidance areas.

# Machine Learning Model



**Version Control:** Establish a robust version control system, such as Git, to manage changes to the model code, configuration files, and associated documentation. Maintain clear labeling conventions to differentiate between different model versions and releases.

**Change Management Process:** Implement a structured change management process to govern updates to the deployed model. This process should include steps for reviewing proposed changes, testing them in a staging environment, and obtaining approvals from relevant stakeholders before deploying them to the production environment.

**Automated Testing:** Develop automated testing scripts to validate the performance of updated model versions against a predefined set of test cases. These tests should cover both functional requirements (e.g., correct route optimization) and non-functional aspects (e.g., computational efficiency, memory usage).

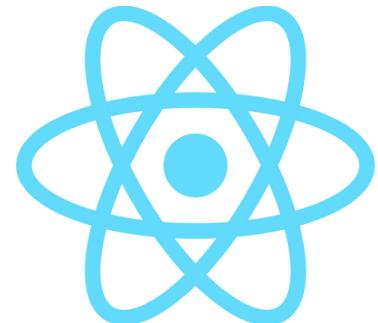
**Rollback Mechanism:** Define a rollback mechanism to revert to previous model versions in case of unexpected issues or regressions. This ensures that any disruptions caused by faulty updates can be quickly mitigated, minimizing the impact on business operations.

# User Interface Deployment



Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries. It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions

React is a free and open-source front-end JavaScript library for building user interfaces based on components. It is maintained by Meta and a community of individual developers and companies. React can be used to develop single-page, mobile, or server-rendered applications with frameworks like Next.js



Cascading Style Sheets is a style sheet language used for specifying the presentation and styling of a document written in a markup language such as HTML or XML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript

JavaScript, often abbreviated as JS, is a programming language and core technology of the Web, alongside HTML and CSS. 99% of websites use JavaScript on the client side for webpage behavior. Web browsers have a dedicated JavaScript engine that executes the client code.

