

# Route Availability prediction



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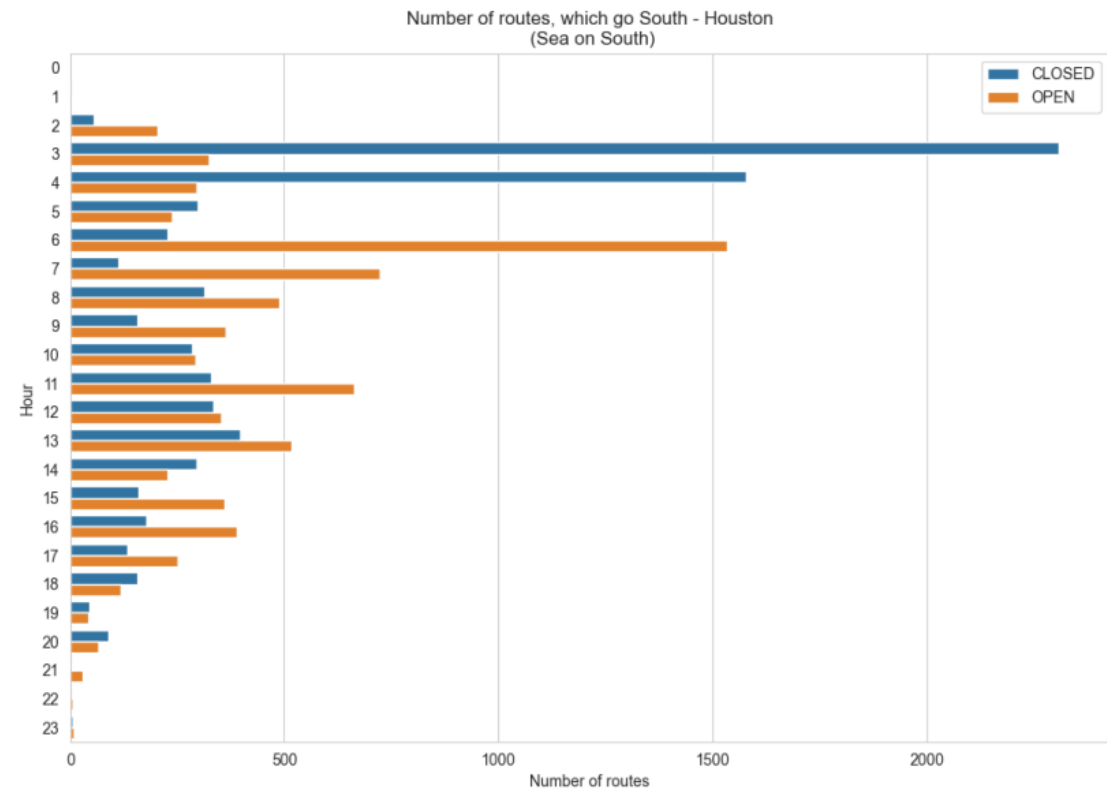
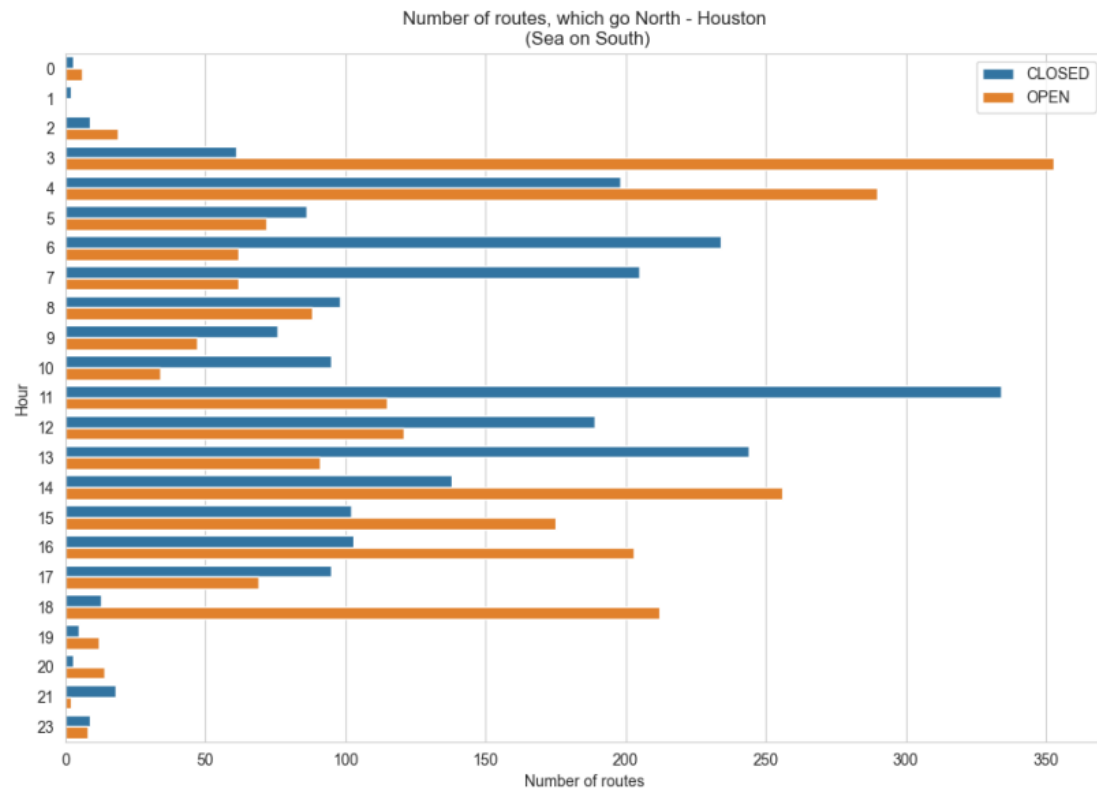
Łukasz Tomaszewski

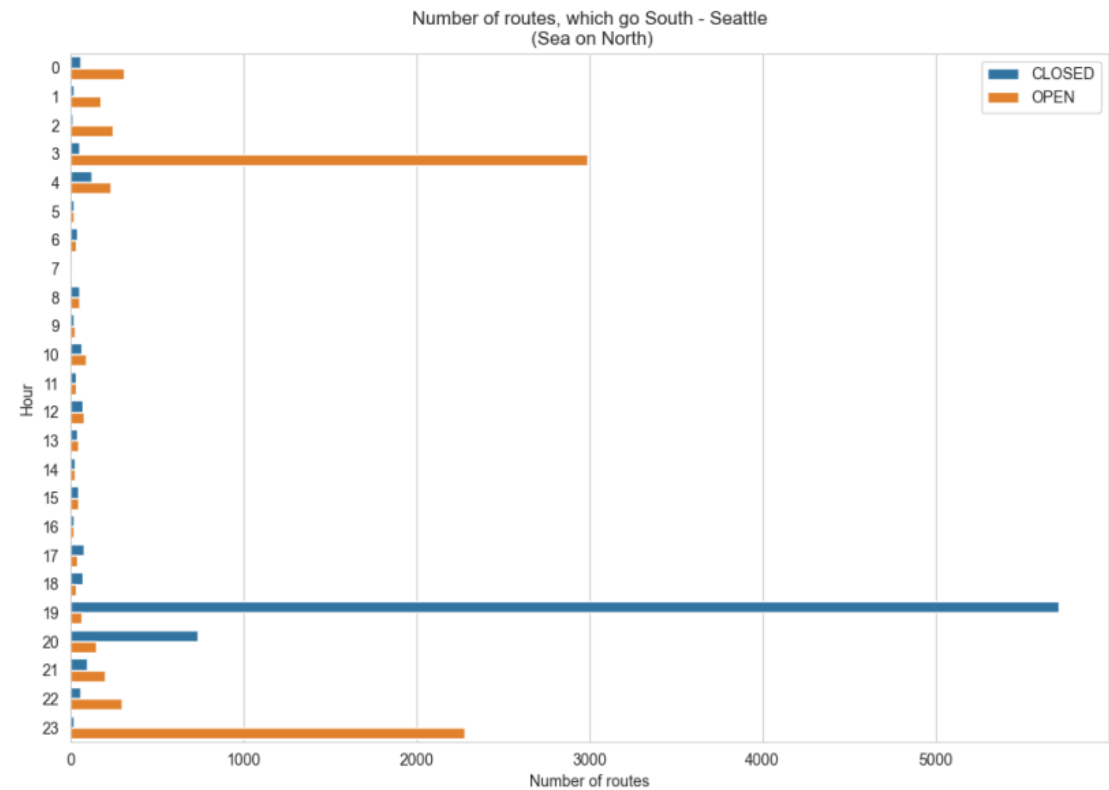
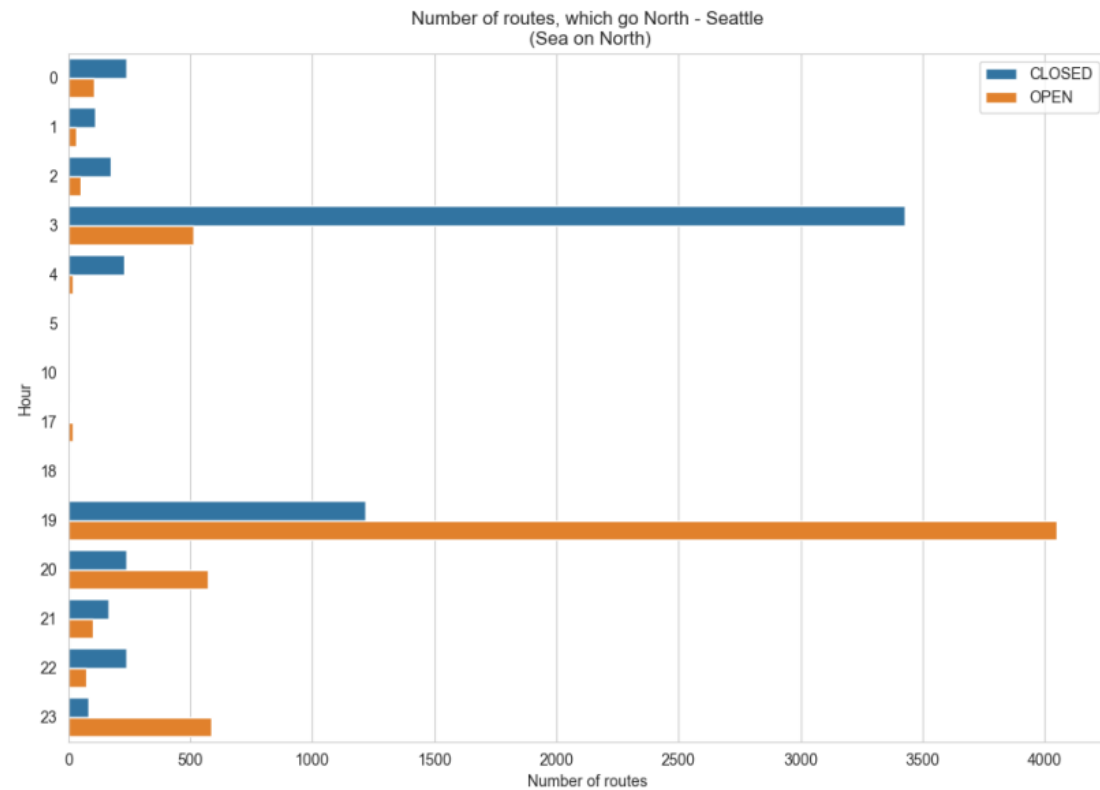
Maja Andrzejczuk

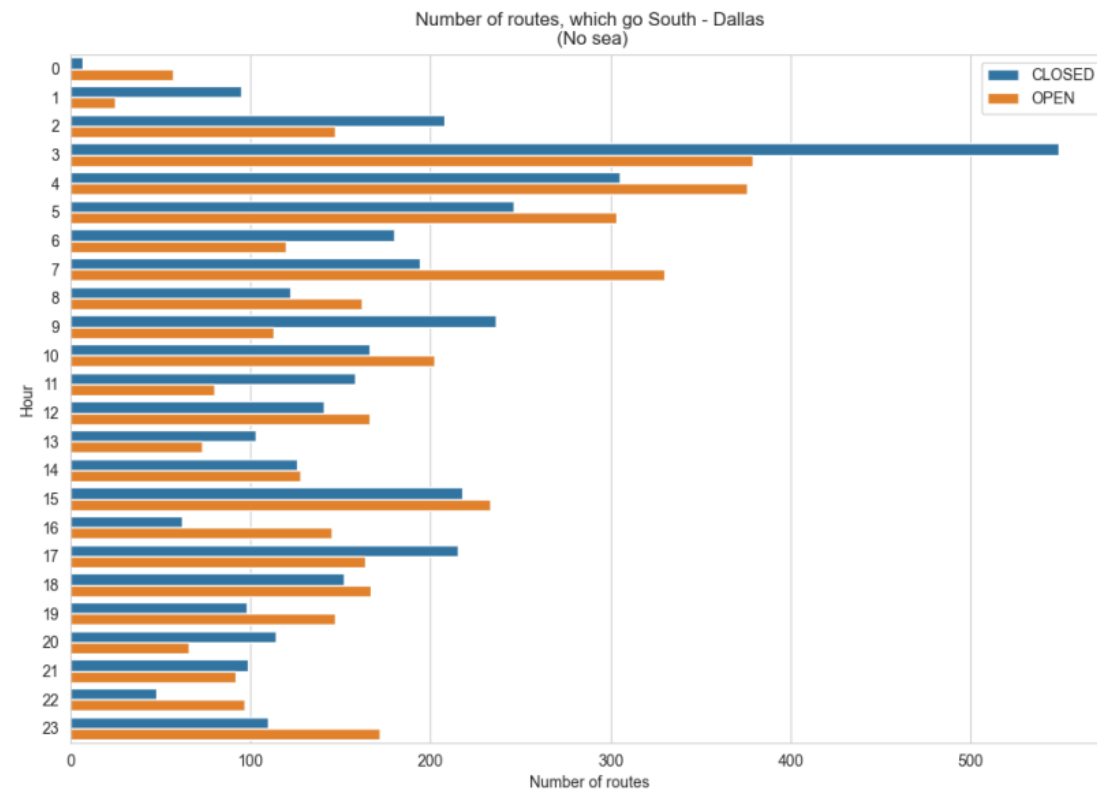
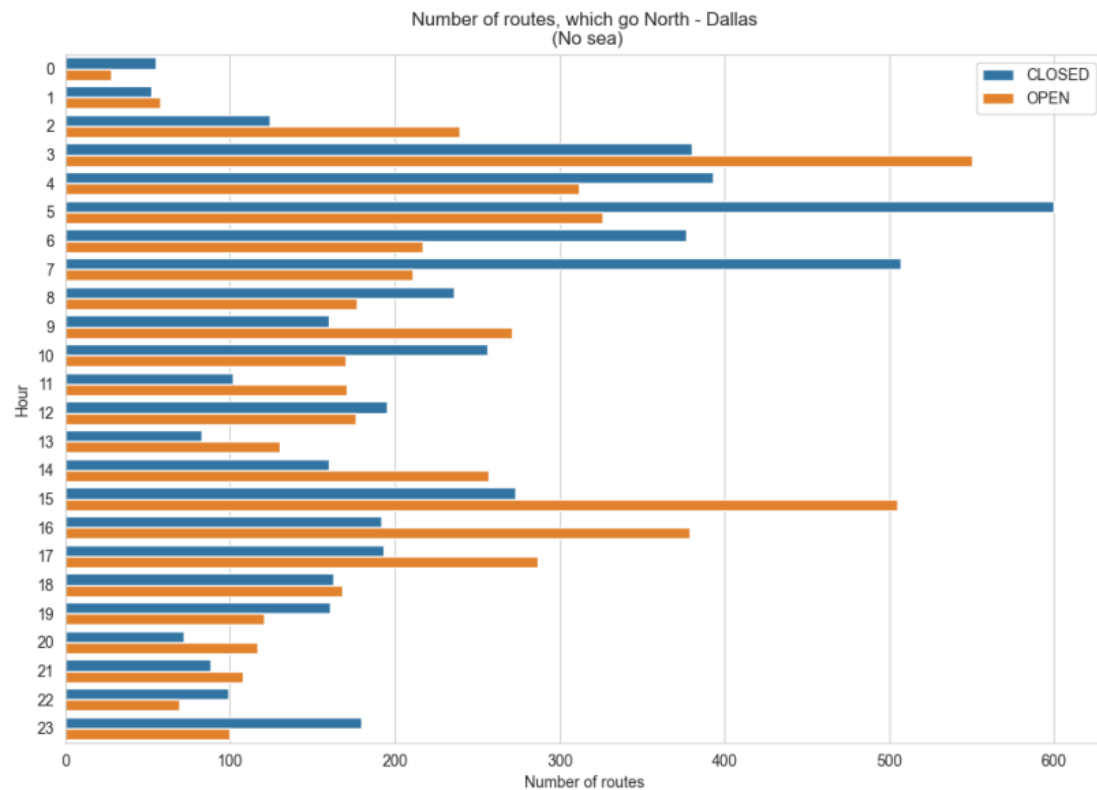
# Concept

- Task: route availability prediction
- Data: historical data about meteorological conditions and flight details
- Solution:
  - train **advanced machine learning** model predicting possibility of arrival & departures within given airports
  - create **web application** to visualize routing, possible connections for future flights.
  - presented application can be used by airlines on daily and by consumers for flight information.











# Preprocessing

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- Flights details data:
  - Encoding categorical features (flight status, airport, route type)
  - Dropping unimportant features
- Weather data:
  - Map coordinates to matrix indices
  - Extrapolation of waypoints vector
  - Vicinity analysis of weather in waypoints



# Feature engineering

## Waypoint informations:

- Flight direction (north/west)
- Distance in kilometers from arrival to destination
- Coverage of waypoints coordinates with current weather conditions along the flight route

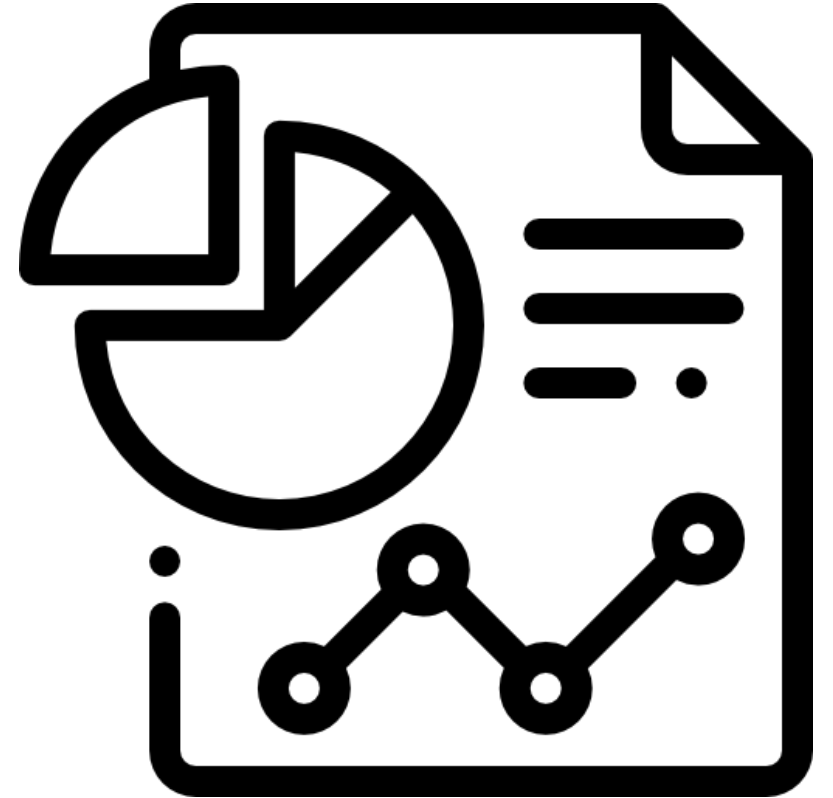
## Flights details data:

- extracting the day of the week from the date

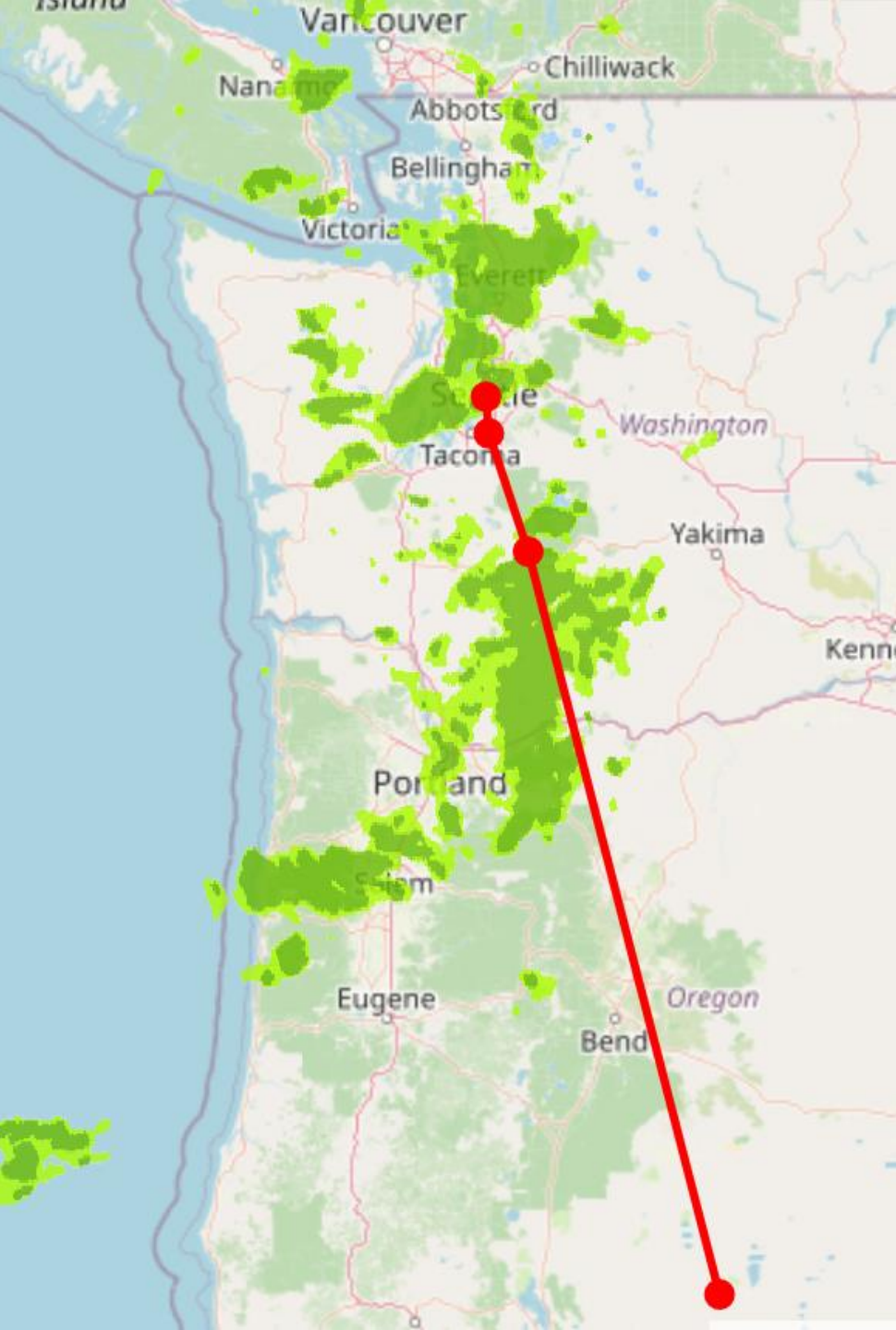


# Results

- Used algorithm – LightGBM
- Optimized parameters included learning rate, number of estimators etc.
- Final model f1 score was 0.73 on independent dataset
- Model used in application in order to predict value of a customer's desired flight







# Solution

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- Visualizing the trace of certain flight.
- Show if given route is possible
- Compare departure options depending on flight time and day