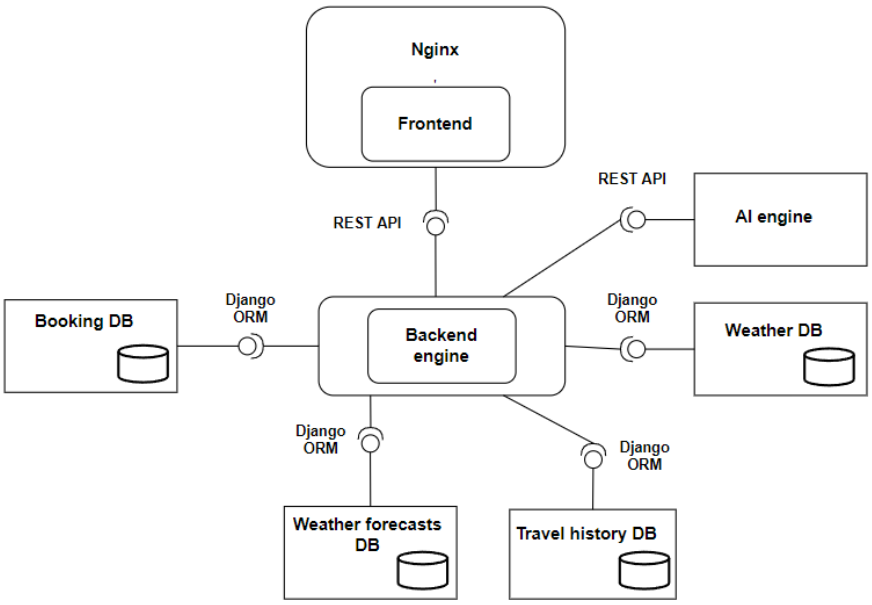
The overall architecture

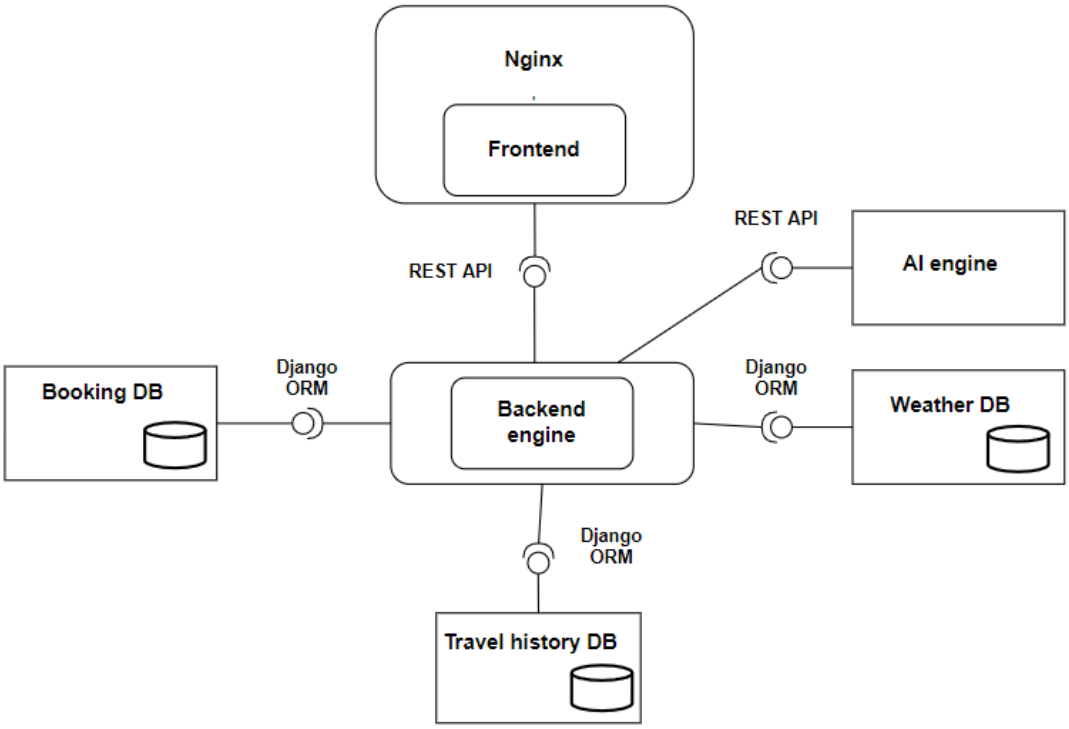
Description: The active components are the Frontend, the Backend, and the AI engine. The Backend has a connection with the AI engine and four databases, such as: Booking DB, Weather DB, Weather forecasts DB, and Travel history DB. The User can make a REST API call for data to the backend via the Frontend. Backend is connected with the databases via Django ORM, which provides a level of abstraction which encapsulates the interaction with the database using objects instead of raw SQL queries. The data that is sent through Django ORM is combined into two parts. The first part contains the data, and the second part contains the information on how to deal with it.

Frontend-Nginx: Used to pass requests to other web servers.
Backend engine: Contains the API services.
AI engine: Contains the algorithm and the model that are used for prediction.
Booking DB: Contains booking related data.
Weather forecasts DB: Contains weather forecasting data.
Travel history DB: Historical data for booking time, routes, number of spaces, etc.
Weather DB: Historical weather data for a few points such as: Zurich, Basel, Bern, etc.



Scenario: Recommendation model

Description: When the user interacts with the model via Frontend. When the user gives the input (selecting a date to book a bicycle place) to the Frontend, Frontend sends the data to the Backend engine and trigger an endpoint call, which collects the relevant[1] data from 3 databases(Booking DB, Travel history DB and Weather DB) in a csv file. After the data is merged from the 3 sources, backend then sends this merged file(dataset) to the AI engine via a REST API request. After the Ai engine has accepted the dataset, it automatically starts training the ML model with that particular dataset. As a final result after the model has been trained, now the AI engine send the result back to the Backend, which it passes the results to the Frontend, and as a result the predicted data is displayed to the User. The result can be either: a 0 (which it means that the model has predicted that on that date there is a high chance that all the places are booked), or a 1(which it means that the model has predicted that on that date there is a high chance that there is a free place)



[1] Relevant data: The data which has impact positivly on creating the optimal model for predicting the space availability in the train