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## Travel Dashboard

Naveen Kumar Lalam

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Travel Dashboard

Naveen Kumar Lalam

A Project Submitted to

GRAND VALLEY STATE UNIVERSITY

In

Partial Fulfillment of the Requirements

For the Degree of

Master of Science in Applied Computer Science

School of Computing and Information Systems

December 2022



The signatures of the individuals below indicate that they have read and approved the project of Naveen Kumar Lalam in partial fulfillment of the requirements for the degree of Master of Science in Applied Computer Science.

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Robert Adams, Project Advisor                      Date

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Robert Adams, Graduate Program Director   Date

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Paul Leidig, Unit head                                      Date

## **Abstract**

Travel Dashboard is a one stop solution for all the travel needs of travelers and tourists visiting a new place. In today's world travel has become a part of everyone's life and we love to travel whenever there is a holiday or long a weekend. Earlier, the travel industry was mostly dictated by tour operators who used to plan and organize tours with standard itinerary, while tourists had very limited choices and needed to pick one of the itineraries given by operator as there was no other option left for them. Time have changed now as travelers love to plan and organize their trips on their own instead of depending on agencies, so what's the first thing a traveler should think before visiting a new place? It is research about the place, finding out best place to stay, eat, places of interest, news and looking at videos to get a good understanding about the destinations. To find all various types of information about the destination travelers search on the internet and look a at significant number of websites to gather the information. This project aims to reduce this requirement. Travel Dashboard is all about building a dashboard which displays a wide range of information about a destination which can currently only be obtained by searching different websites.

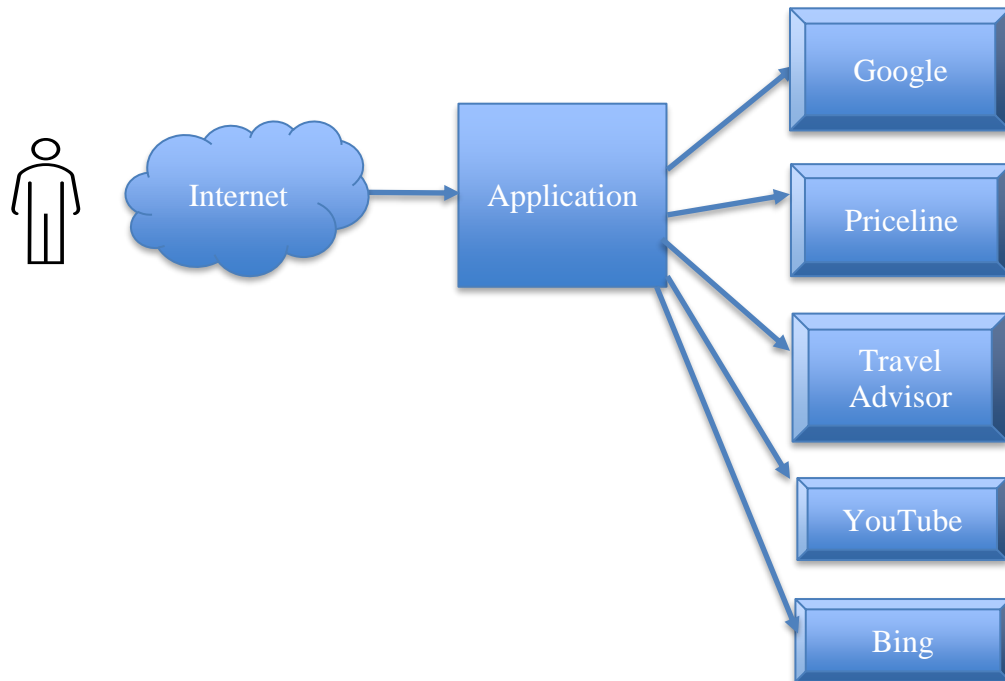
## Introduction

Travel Dashboard is a real-time informative dashboard about a city which provides variety of information about a city like.

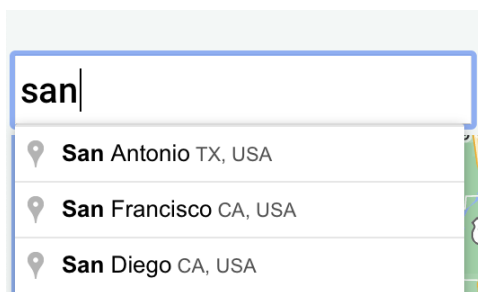
- Map of the city.
- Photos of the city
- Airport details
- Hotels to stay
- Places to visit
- Weather forecast
- Restaurants to dine-in
- Videos
- News updates

Dashboard is a web application that is built using various front-end technologies like ReactJS, CSS, HTML, JavaScript, JSON and Google Cloud. The main objective of the application is to reduce the effort of tourists and traveler who would search for information about a place in multiple different websites. Instead, all the information is available to them on a single dashboard and all they need to do is to just type in the first 3 letters of the city name and the autocomplete provides all matching names to select, the user just needs to select a city and that's it. The dashboard automatically builds with all the information and presents it to the user. All the real-time information displayed on the dashboard is obtained by spinning different APIs. Application logic processes the data, transforms, and displays it on the front-end.

## High level application architecture

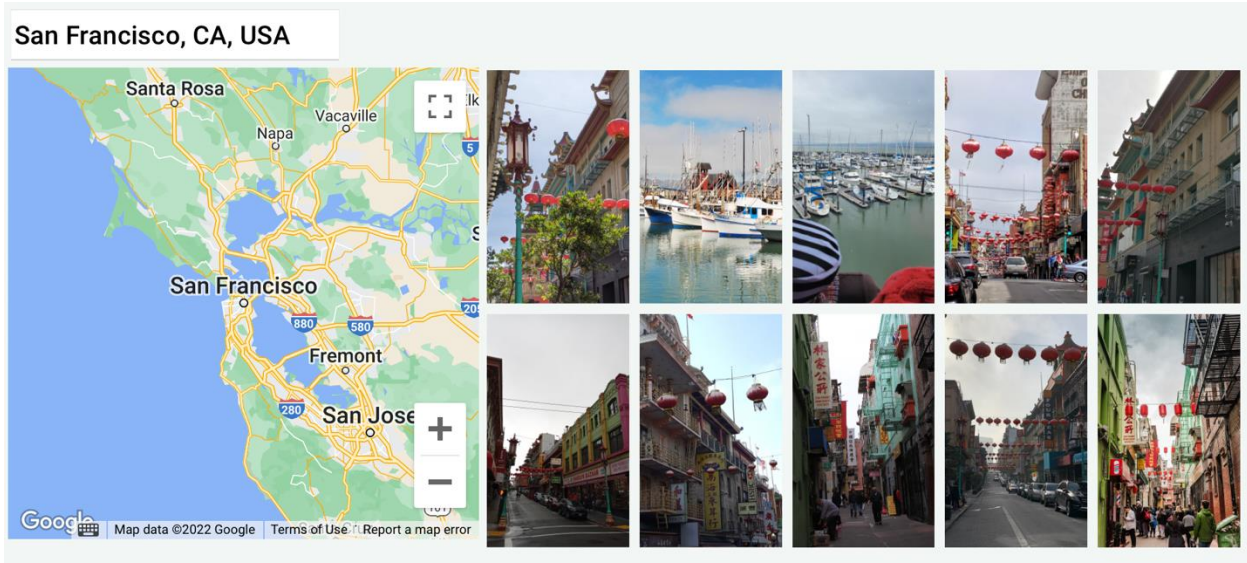


Dashboard is a web application which is hosted on Google Cloud platform. It is a single page application which interacts with different APIs for data as there is no database in the application. All the data is queried fresh for every user request. Initially the page displays an autocomplete



search box and map, where the user selects a city, and the application logic extracts the latitude and longitude value of the place and pass this value to the map.

The map displays the selected location. Photos details are extracted from Google Places API and the application selects the top 10 photos and displays them on the dashboard.



Priceline API takes the city name and returns the airport, hotels and places of interest.




**San Francisco**  
San Francisco Intl Airport (SFO) , CA ✈️  
**Places of Interest :**  
Union Square Park - San Francisco, CA  
Pier 39 Fisherman's Wharf - San Francisco, CA  
Fisherman's Wharf - San Francisco, CA  
Union Square - San Francisco, CA  
Moscone Center - San Francisco, CA  
San Francisco State University - San Francisco, CA  
The Castro District - San Francisco, CA  
Powell Street Bay Area Rapid Transit Station - San Francisco, CA  
Ferry Building - San Francisco, CA  
George R Moscone Recreation Center - San Francisco, CA

Weather details are obtained from Open Weather API



YouTube and Bing consume the city name and provides the list of vides of the city and latest news.

Videos

	<b>Robberies Continue at San Francisco's Twin Peaks</b> San Francisco police are investigating an armed robbery at one of the city's most scenic spots. Sergio Quintana reports.
	<b>San Francisco has a New DA</b> San Francisco District Attorney Brooke Jenkins says "all crime in San Francisco is illegal again." She spoke to Bloomberg's Karth...
	<b>Baby Exposed to Fentanyl at San Francisco Park, Family Says</b> A Bay Area family said their baby playing in a San Francisco public park was hospitalized after somehow being exposed to ...

## News updates



### 'Far more than just a bar crawl': San Francisco SantaCon explained

SantaCon participants pose for a photo in San Francisco's Union Square. San Franciscans love costumes, and we look for any reason (or no reason at all) to throw one on and celebrate. Events like San Francisco Pride,

Travel Advisor takes the latitude and longitude of the city and provides the list of fine dining restaurants. The Travel Dashboard processes all the data, filters and display it on the dashboard.

## Hotels to stay in San Francisco 🇺🇸

- Beacon Grand A Union Square Hotel Formerly SIR Francis Drake Hotel - San Francisco, CA
- Aldrich Hotel - San Francisco, CA
- Elite Inn - San Francisco, CA
- Civic Center Motor Inn - San Francisco, CA
- Layne Hotel - San Francisco, CA
- Jackson Court - San Francisco, CA
- Canopy BY Hilton San Francisco Soma - San Francisco, CA
- The Canterbury BY Resortshare - San Francisco, CA
- LUZ Hotel - San Francisco, CA
- Deluxe Union Square Suites - San Francisco, CA






## Google Cloud – Maps, Places and YouTube

Travel Dashboard is an API-centric application deployed on a cloud platform. Creating an application in Google Cloud is very easy. To deploy an application in Google's cloud the developer must create a project, enable the option "Enable APIs & service", and to enable the specific APIs and services (like Maps and Places). Maps JavaScript API is required to use Google maps on web applications and Places API to build the autocomplete search box and to display the photos of the selected city. To display the videos, we leverage YouTube Data API v3. After enabling all the APIs Google Cloud will generate a key for use in the application code as an authentication key to leverage the services of these external APIs.

## Open Weather Map – Weather forecast

Open Weather Map <https://home.openweathermap.org/> is a service provider which provides an API to get the weather information based on the latitude and longitude of a place.

To leverage the service first a profile should be created and then the Weather service should be prescribed, this is a free service for a specific number of requests. It normally takes more than 24 hours for the service to be enabled. Once the service is enabled a key should be generated so that it can be used to access the API.

Key	Name	Status	Actions	Create key
70aaab319fb1721c0205fdd5f81d8150	weather	Active	  	<input type="text" value="API key name"/> <input type="button" value="Generate"/>

Sample JSON data is returned by the API for a specific location. The data returned consists of details like temperature, climate description and an icon code representing the if it is sunny or cloudy.

```

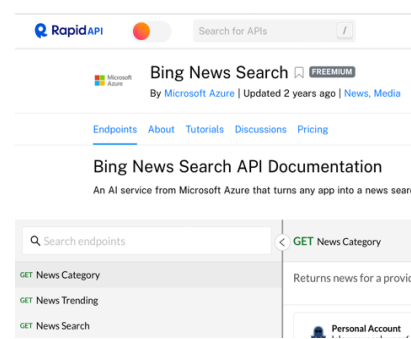
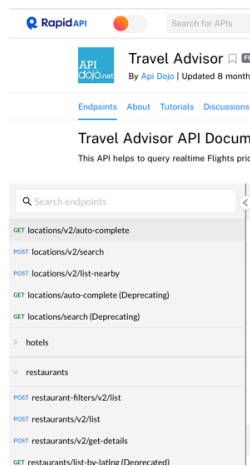
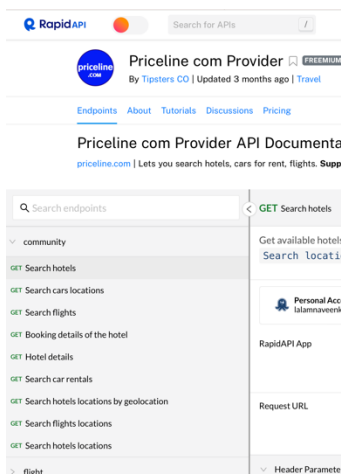
{"cod": "200", "message": 0, "cnt": 40, "list": [{"dt": 1670263200, "main":
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```

Travel Dashboard requests the forecast of a place by passing the coordinates and then receives the response in form of a JSON object. It processes the JSON data and displays the temperature along with an icon that depicts the description of the climate.

## Rapid API – Priceline, Travel Advisor and Bing

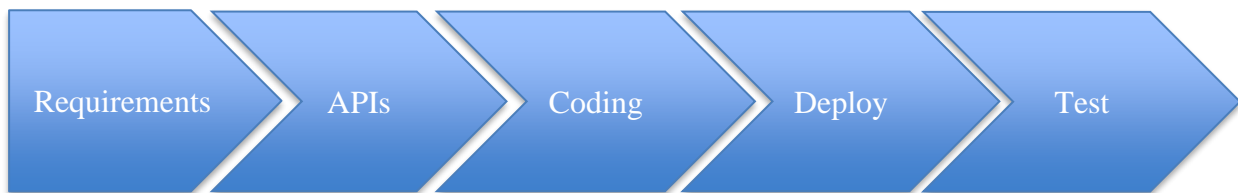
Rapid API <https://rapidapi.com/> is a platform which provides services to access different APIs across multiple domains. Rapid API platform is leveraged to access APIs of Priceline, Travel Advisor and Bing. Priceline provides various services like hotels, flights, and hotel locations. Dashboard leverages the API to get details about the airport of a specific location, places of interest and hotels. The city name is passed to the request and all the data is returned in form of a JSON object.



## **Kubernetes, Container Registry & Docker**

Travel Dashboard is deployed on the Google Cloud platform and runs on a serverless container using Docker. Kubernetes is used to create a cluster of servers to increase the volume of requests that can be handled.

## Project Management



The development of Travel Dashboard was divided into 5 phases –

- Requirement – Finalize the details that needs to be displayed on the dashboard.
- APIs – Enable and Subscribe all the required APIs that are required for the development of the project.
- Coding – Code all the all required modules and ensure that required data is displayed as per the requirement.
- Deploy – Deploy the application is Cloud by leveraging services like Container Registry and Kubernetes.
- Test – Unit testing of each component as well as Integration testing of all the APIs with the application.

## **Reflection and Conclusion**

The whole idea of this project was to develop a web-based application leveraging the knowledge gained through Web Architectures and Cloud Application Development. Travel Dashboard is a single page web application that relies on wide range of different external APIs to present information like a city map, weather etc. The deployment on Google Cloud and Kubernetes ensures the high availability and scalability of the application. In the future, additional information could be added to the application, like flight details and car rentals. A mobile version of the application can also be developed in the future. One limitation is that Travel Dashboard displays an extensive amount of information when a big city is searched, but there is a limitation when the user searches for a small city or town where details might not be available.