Quantified Student

Weather API Research

Logo

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Created by G. Malisz

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# Version History

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Date | Author | Comment |
| 0.1 | 13-04-2023 | G. Malisz | First iteration of this document. |
| 0.2 | 10-05-2023 | G. Malisz | Added couple of requirements requested by Stakeholder. Added new weather API source. |

# Overview

This document contains summary of API research for the Quantified Student project. It is supposed to contain information and explanation about what API will be used to access weather data and why this API.

# Research

During API research multiple sources that can be useful in the process of developing application were inspected. That worth noting are:

**WeatherAPI.com** – WeatherAPI.com is a powerful fully managed weather and geolocation API provider that provides extensive APIs that range from the real time and weather forecast, historical weather, Air Quality Data, Bulk Request, IP lookup, and astronomy through to sports, time zone, and geolocation. WeatherAPI.com provides current and 14 day weather data, future weather, historical weather and geo data via. REST API in JSON format. WeatherAPI will also provide time zone information, astronomy data and geo location data. The weather data is provided in partnership with several data providers, government and meteorological agencies.

**Forecast** - For the past 15 years, ForecastAPI has been collecting and analysing weather data from their own meteorological unit, to provide the most accurate forecast possible for any given location in the world. With this API you can enrich and improve your website or trigger any event based on high accurate weather forecast This API provides weather forecasts worldwide: for a given location (latitude/longitude), you can get weather forecasts on daily (free) or hourly level for the next 16 days and weather stations historical data up to 1 year

**Meteostat** – The Meteostat JSON API is a web service that provides weather observations, historical statistics and long-term climate data for thousands of weather stations and places worldwide. Meteostat is one of the largest vendors of open weather and climate data. Access long-term time series of thousands of weather stations and integrate Meteostat data into your products, applications and workflows. The Meteostat JSON API provides simple access to a large archive of historical weather and climate data. The records are queried by weather station or geo location and can be filtered by specifying a date range and other optional parameters.

**Open-Meteo** – The Historical Weather API is based on reanalysis datasets and uses a combination of weather station, aircraft, buoy, radar, and satellite observations to create a comprehensive record of past weather conditions. These datasets are able to fill in gaps by using mathematical models to estimate the values of various weather variables. As a result, reanalysis datasets are able to provide detailed historical weather information for locations that may not have had weather stations nearby, such as rural areas or the open ocean. Weather Forecast API – Open-Meteo weather forecast APIs use weather models from multiple national weather providers. For each location worldwide, the best models will be combined to provide the best possible forecast.

Decision Matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **WeatherAPI.com** | **Forecast** | **Meteostat** | **Open-Meteo** |
| Daily Weather | + | + | + | + |
| Hourly Weather | + | - | + | + |
| Free access | \* | \* | \* | + |
| Weather for Eindhoven | + | + | + | + |
| Weather history at least half a year | - | - | + | + |
| Requests per day | + | - | - | + |
| Mean Temperature | + | + | + | + |
| Sunrise | + | + | - | + |
| Sunset | + | + | - | + |
| Precipitation/Rain/Snowfall Sum | + | + | + | + |
| Maximum Wind Speed | + | + | + | + |

***-*** *Not supported,* ***+*** *supported,* ***\**** *supported with some limitation, outdated or in beta phase*

# Conclusion

Based on the decision matrix Open-Meteo is the best candidate for the development. Main reason for that is free access for the weather history and all the weather parameters required, however the drawback is the delay of 5 days. This can be overcome be implementing solution that calls Historical Weather API and Weather Forecast API both from Open-Meteo. This solution would mainly call Historical Weather API and if there is a need for weather from 5 last days since the API call it would combine Historical Weather API and Weather Forecast API. As both of those API are from the same organisation, they have similar or the same form of weather parameters, so it will be easy to integrate them into one.

# Resources

<https://www.weatherapi.com/>

<https://www.weatherapi.com/docs/>

<https://www.weatherapi.com/pricing.aspx>

<https://rapidapi.com/blog/access-global-weather-data-with-these-weather-apis/>

<https://www.forecast.app/>

<https://dev.meteostat.net/>

<https://dev.meteostat.net/api/>

<https://open-meteo.com/en/docs/historical-weather-api#latitude=51.44&longitude=5.48&start_date=2023-04-01&end_date=2023-05-07&daily=temperature_2m_mean,sunrise,sunset,precipitation_sum,rain_sum,snowfall_sum,windspeed_10m_max&timezone=Europe%2FBerlin>

<https://open-meteo.com/en/docs>