Product Specification and Acceptance/Test Criteria
Fuel Price API

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Start Date for API	03/04/2023
Expected completion date for API	11/05/2023
Estimated revised date	30/05/2023

Overview:

a. The Fuel Price API is a web-based API that provides real-time gas prices for India. The pricing for this API is based on the costliest source that is used to retrieve the gas prices. This API uses zip code or lat/long to locate the particular area.

b. Generating fuel price from the pin code and country given by the end user.

c. Users will be provided with a user-friendly interface, users will just need to enter the country and pin code to get the fuel price in that particular location.

d. The Fuel Price will be used to know the price of the gas at that particular time so that users can have a clear idea about the prices in different locations.

API Functionality and Use Cases

A. **Retrieving current fuel prices:** The API can be used to retrieve the current prices for different types of fuels (e.g., gasoline, diesel, natural gas) at specific locations (e.g., cities, zip codes, or GPS coordinates).

B. **Historical prices:** The API can provide historical prices for fuels at different locations, which can be useful for trend analysis and forecasting.

C. **Price comparison:** The API can compare prices of fuels at different locations to help users find the cheapest option.

D. **Notifications:** The API can provide notifications to users when fuel prices reach a certain threshold, or when there are significant changes in prices.

E. **Fuel price comparison websites:** Websites that help users find the cheapest fuel prices in their area can use this API to retrieve and display up-to-date fuel prices for different locations.

F. **Real-time gas prices:** Providing real-time gas prices for logistics companies to optimize their delivery routes and reduce fuel costs.

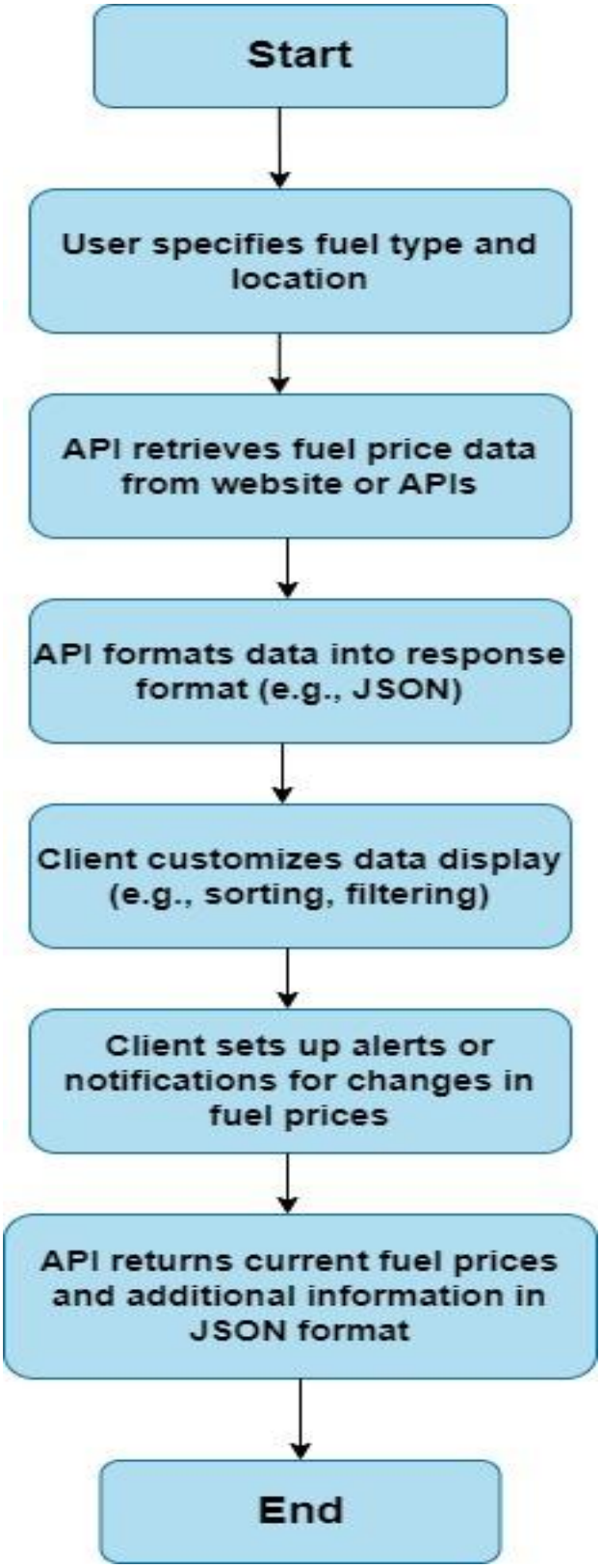
G. **Transportation:** Helping transportation companies plan their trips and reduce fuel consumption.

H. **Saving money:** Enabling individuals to find the cheapest gas prices in their area and save money on fuel costs.

Out of scope	No text input in languages other than English and numerals.
	The output will be in JSON format.

Functional Requirements	
Input	• User specifies the type of fuel they want to know the price for (e.g. gasoline, diesel, natural gas) • User specifies the location they want to know the fuel prices for (e.g. city, zip code, GPS coordinates)
Operation	1. The API retrieves the fuel price data from the website or webpage using web scraping or APIs. 2. The client can customize the way the fuel price data is displayed, such as sorting by price, fuel type, or location, and filtering by specific criteria (e.g., only show prices for premium gasoline). 3. The API should allow clients to set up alerts or notifications for changes in fuel prices at the specified location. 4. The API may provide authentication and authorization mechanisms to ensure that only authorized users can access the fuel price data. 5. The API formats the data into a response format (e.g., JSON, XML) that can be easily consumed by the client application. 6. The API should ensure the security and privacy of user data by following industry-standard security practices.
Output	The API returns the current fuel prices for the specified fuel type, location, provider, currency, and updated data in JSON format. The API may also return any additional information such as the brand of the fuel station or the distance from the user's location to the fuel station

Flowchart:


Start
User specifies fuel type and location
API retrieves fuel price data from website or APIs
API formats data into response format (e.g., JSON)
Client customizes data display (e.g., sorting, filtering)
Client sets up alerts or notifications for changes in fuel prices
API returns current fuel prices and additional information in JSON format
End

Real Life Users:

Truck Fleet Operators:

1. **Fuel cost optimization:** Truck fleet operators can use a fuel price API to access real-time fuel prices and make data-driven decisions about where and when to refuel their vehicles. By identifying the cheapest fuel stations along a route, operators can optimize fuel costs and save money.
2. **Route planning:** With a fuel price API, fleet operators can plan their routes based on fuel prices, ensuring that their vehicles refuel at the cheapest stations. This helps to reduce fuel costs and increase profitability.
3. **Budgeting**: Fleet operators can use a fuel price API to forecast their fuel costs for a given period. This can help with budgeting and financial planning.
4. **Driver incentives**: Fleet operators can use a fuel price API to incentivize their drivers to refuel at cheaper stations. By rewarding drivers who refuel at the cheapest stations, operators can encourage cost-saving behavior and improve profitability.
5. **Compliance**: Fleet operators can use a fuel price API to ensure compliance with government regulations. For example, if a city or state imposes a fuel tax, operators can use the API to calculate the tax and ensure that they are paying the correct amount.

RTC Operators:

1. **Fleet Management Companies -** Fleet management companies manage large numbers of vehicles, often for commercial purposes. They can use Fuel Price API RTC Operators to monitor fuel prices in different locations and plan their routes accordingly to save costs.
2. **Ride-Hailing Services -** Ride-hailing services such as Uber and Lyft can benefit from Fuel Price API RTC Operators by using real-time fuel price data to calculate fares accurately and ensure that drivers are reimbursed fairly for fuel expenses.
3. **Gas Station Chains** - Gas station chains can use Fuel Price API RTC Operators to monitor fuel prices in real-time at their various locations and adjust their pricing strategy accordingly to stay competitive in the market.
4. **Travel Companies** - Travel companies such as airlines, bus operators, and train companies can use Fuel Price API RTC Operators to monitor fuel prices and plan their routes and schedules accordingly to save costs and provide affordable travel options to their customers.
5. **Logistics and Transportation Companies** - Logistics and transportation companies that transport goods over long distances can use Fuel Price API RTC Operators to plan their routes and schedules based on real-time fuel prices to optimize their costs and increase their profitability.

Private Travels:

1. **Cost optimization for road trips:** When planning a road trip, knowing the fuel prices along your route can help you budget for the trip and choose the most cost-effective route. A Fuel Price API can provide real-time fuel price data, allowing you to make informed decisions about where to stop and fill up to optimize your fuel expenses.
1. **Finding the cheapest fuel:** If you're traveling to an unfamiliar area, you may not know where to find the cheapest fuel. A Fuel Price API can help you find the cheapest fuel near your current location or at a specific destination. This can save you money on your travels and help you stay within your budget.
2. **Planning fuel stops for electric vehicles:** If you're traveling in an electric vehicle, you'll need to plan your route carefully to ensure that you have access to charging stations. A Fuel Price API can help you find charging stations along your route, along with information on charging speeds, prices, and availability.
3. **Tracking fuel expenses**: If you're on a tight budget, it's important to track your fuel expenses. A Fuel Price API can help you keep track of your fuel expenses and make adjustments to your travel plans as needed. This can help you stay within your budget and avoid overspending on fuel.
4. **Monitoring fuel prices:** Fuel prices can fluctuate rapidly, so it's important to stay on top of changes in fuel prices. A Fuel Price API can provide real-time fuel price data, allowing you to monitor fuel prices and make informed decisions about when to fill up. This can help you save money on fuel and avoid overpaying for gasoline.

News Channels:

1. **Covering fuel-related news:** With a Fuel Price API, news channels could easily track fluctuations in fuel prices and report on them in real time. This could be especially useful during times of crisis or when fuel prices are particularly high or low.
2. **Analyzing trends:** By using a Fuel Price API to track fuel prices over time, news channels could analyze trends and provide insights into why fuel prices are rising or falling. This could help viewers understand the broader economic or political factors that are influencing fuel prices.
3. **Providing localized information:** Fuel prices can vary significantly from one region to another, and even from one gas station to another. By using a Fuel Price API, news channels could provide viewers with localized information about fuel prices in their area.
4. **Informing consumers:** Fuel is a major expense for many consumers, and understanding fuel prices is important for making informed decisions about transportation and travel. By using a Fuel Price API, news channels could provide viewers with valuable information about fuel prices and how they are likely to affect their daily lives.
5. **Sharing insights with policymakers:** Fuel prices are an important policy issue, and policymakers often rely on data to make informed decisions. By using a Fuel Price API, news channels could provide policymakers with insights into fuel price trends and how they are likely to impact the economy and consumers.

Examples of API functionality:

Base URL:

https://fuel-prices.exponentialhost.com/api/v1

API Usage:

http://localhost:5000/api/v1?fuel=petrol&country=india&city=krishna


```
[
  {
    "state": "Andhra Pradesh",
    "date": "2023-05-18",
    "fuel": "Petrol",
    "price": 111.11,
    "country": "India"
  }
]
```


API parameters:

Param	Type	Details
Api_key	String	Your API key
fuel	String	Type of fuel you want prices for. (petrol or diesel).
country	String	Name of the country in which you want to know the prices. (india, etc.)
city	String	City for which you want to know the prices.

Response:

JSON string	String	Details of the prices requested by the user in JSON format.

Response and error codes:

Code	Type	Details
200	OK	Everything worked as expected
404	Not Found	Cannot find price due to any reason.

Product Timeline (Details of Milestones)	
Product Specification Document	03/04/2023
Environment and Tool Preparation	
Coding	
Unit Testing	28/04/2023
Acceptance Testing	04/05/2023
Deployment	08/05/2023

Languages and Tools to be used:

- Node JS - Language
- Express JS - Server Side Development
- VScode - Code Editor
- Postman - API Testing
- Github - Version Control
- Swagger - Documentation

Development and Test Environment:

- Local machine - Developing & Testing
- Exponential Auth - Production (npm module will be provided)

Expected Hosting Details and Endpoints:

Host: Exponentialhost.com
Input and output endpoint names will be decided at the deployment stage.

Acceptance Testing:

Input quality:

- Input shall not be in the form of a language other than English(URLs containing numerals are acceptable).
- Max limit of the text/URL should not be exceeded.

Output quality:

- Empty output should not be returned.

Features:

- For various fuel types (such as petrol, diesel, and propane) at various places, the API should provide the most recent and historical fuel prices.
- Fuel station position details such as name, address, and geolocation data should be included in the API.
- Based on the user's starting position, destination, and vehicle details, the API could calculate the cost of fuel for a specific trip.

Competitors:

- **Oil Price Information Service(OPIS):** OPIS provides real-time fuel price data, historical data, and industry news and analysis for a range of fuel types including gasoline, diesel, biodiesel, ethanol, jet fuel, and natural gas.
- **Gas Buddy:** GasBuddy is a popular consumer-facing app that provides users with real-time fuel prices for nearby gas stations. GasBuddy also offers a Fuel Price API that provides access to its fuel price data for developers.
- **Price Advantage:** PriceAdvantage is a fuel price management software platform that provides real-time fuel price data, price optimization tools, and reporting tools for fuel retailers. PriceAdvantage also offers a Fuel Price API that provides access to its fuel price data.
- **Fuel Cloud**: FuelCloud is a cloud-based fuel management system that provides fuel price data, inventory management, and reporting tools for fuel retailers and fleet managers. FuelCloud also offers a Fuel Price API that provides access to its fuel price data.

- **My TankInfo:** MyTankInfo is a fuel management software platform that provides fuel price data, tank monitoring, and inventory management tools for fuel retailers and fleet managers. MyTankInfo also offers a Fuel Price API that provides access to its fuel price data.

Future work/potential:

➔ **Improved efficiency:** Another area for future work is in improving the efficiency of fuel API systems. This could involve the development of new algorithms for optimizing fuel delivery, or the use of advanced sensors and monitoring systems to more accurately measure and predict fuel usage.

➔ **Real-time updates:** Real-time updates would allow the Fuel Price API to provide the most up-to-date fuel prices to users. This would require a more sophisticated data processing and storage system that can handle frequent updates from multiple data sources.

➔ **Integration with more data sources**: Currently, the Fuel Price API may rely on a limited number of data sources to obtain fuel price information. In the future, the API could be expanded to include additional data sources, such as government agencies or fuel price reporting websites, to increase the accuracy and reliability of the data.

➔ **Integration with Navigation Apps:** The API could be integrated with popular navigation apps such as Google Maps or Waze, providing real-time fuel prices along the user's route. This can help users plan their trips more efficiently and save money on fuel costs.

➔ **Adding more countries:** Fuel prices of countries other than India can be integrated into API to make it globally usable.