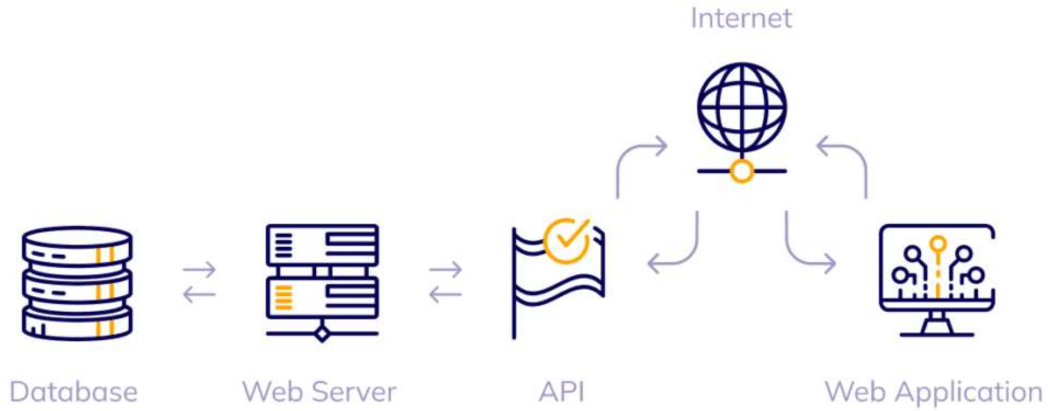
API (Application Programming Interface)

Q. What is an API?

API is a set of definitions and protocols for integrating and interacting with application software.



Q. Types of APIs:

- Web APIs: These are APIs that use web protocols such as HTTP/HTTPS. They are commonly used to enable communication between web services and applications.
- Library APIs: These are APIs provided by programming libraries to enable developers to use pre-built functions and modules in their applications.
- Operating System APIs: These APIs provide a set of functions for the interaction between applications and the operating system.

Q. RESTful APIs:

- REST, or Representational State Transfer, is an architectural style for designing networked applications.
- RESTful APIs are designed based on REST principles. They use standard HTTP methods (`GET, POST, PUT, DELETE`) to perform operations on resources identified by URLs.

Q. Understanding Status Codes

- `200` : Everything went okay, and the server returned a result (if any).
- `301` : The server is redirecting you to a different endpoint. (This can happen when a company switches domain names, or when an endpoint's name has changed).
- `400` : The server thinks you made a bad request. (This can happen when you don't send the information that the API requires to process your request).
- `401` : The server thinks you're not authenticated. (This happens when you don't send the right credentials to access an API).
- `403` : The resource you're trying to access is forbidden, and you don't have the right permissions to see it.
- `404` : The server didn't find the resource you tried to access.

Q. Examples of API Usage:

- Social media platforms often provide APIs for developers to integrate their apps with platform features.
- Weather APIs, like the OpenWeatherMap API in your previous code, allow developers to access weather data for different locations.
- Payment gateways provide APIs for processing transactions.

In [2]:

```python
import pandas as pd
import requests
from configparser import ConfigParser
```

API used in this Project:

- Weather API: https://openweathermap.org/api
- JSON Viewer: https://jsonviewer.stack.hu/

In [18]:

```python
# Extract key from the
# configuration file
api_url = "https://api.openweathermap.org/data/2.5/weather?q={}&appid={}"
api_file = "weather.key"
config = ConfigParser()
config.read(api_file)
api_key = config['api_key']['key']
```

In [21]:

```python
# Function to get weather details from OpenWeatherMap API
def get_weather(city):
    res = requests.get(api_url.format(city, api_key))

    if res:
        json_data = res.json()
        city = json_data['name']
        country_name = json_data['sys']['country']
        temp_kelvin = json_data['main']['temp']
        temp_celsius = temp_kelvin - 273.15
        temp_fahrenheit = (temp_kelvin) * 1.8 + 32
        weather_description = json_data['weather'][0]['main']
        wind_description = json_data['wind']['speed']
        pressure_description = json_data['main']['pressure']
        humidity_description = json_data['main']['humidity']

        # Create a dictionary with weather details
        weather_dict = {
            'City': city,
            'Country': country_name,
            'Temperature (Celsius)': temp_celsius,
            'Temperature (Fahrenheit)': temp_fahrenheit,
            'Weather Description': weather_description,
            'Wind Speed': wind_description,
            'Pressure': pressure_description,
            'Humidity': humidity_description,
        }

        return weather_dict

    else:
        print(f"Error - No Forecast Found for {city}, Try Again!!!")
```

In [22]:

```python
# List of cities for which you want weather details
cities = [
    "Tokyo",
    "Delhi"
    "Delhi",
    "Shanghai",
    "Sao Paulo",
    "Mumbai",
    "Mexico City",
    "Beijing",
    "Osaka",
    "Cairo",
    "New York City",
    "Dhaka",
    "Karachi",
    "Chongqing",
    "Istanbul",
    "Kolkata",
    "Lahore",
    "Manila",
    "Lima",
    "Tehran",
    "Bangkok",
    "Kinshasa",
    "Bogotá",
    "London",
    "Lagos",
    "Lima",
    "Bangalore",
    "Bangkok",
    "Chennai",
    "Hyderabad",
    "Paris"
]
```

In [23]:

```
# Create an empty list to store weather details for each city
weather_data_list = []

# Loop through each city and fetch weather details
for city_name in cities:
    weather_data = get_weather(city_name)
    weather_data_list.append(weather_data)

# Create a Pandas DataFrame from the list of dictionaries
weather_df = pd.DataFrame(weather_data_list)

# Print the resulting DataFrame
weather_df
```

Out[23]:

	City	Country	Temperature (Celsius)	Temperature (Fahrenheit)	Weather Description	Wind Speed	Pressure	Humidity
0	Tokyo	JP	8.68	539.294	Clear	2.06	1027	59
1	Delhi	IN	15.05	550.760	Mist	2.06	1015	82
2	Shanghai	CN	9.63	541.004	Mist	1.00	1023	96
3	São Paulo	BR	27.06	572.378	Clear	3.60	1018	54
4	Mumbai	IN	27.99	574.052	Smoke	4.12	1012	44
5	Mexico City	MX	10.73	542.984	Clouds	0.00	1027	46
6	Beijing	CN	-4.06	516.362	Clear	1.22	1025	62
7	Osaka	JP	6.68	535.694	Clear	2.06	1028	54
8	Cairo	EG	16.42	553.226	Clouds	7.72	1020	39

9	New York	US	1.43	526.244	Clouds	3.60	1024	67
10	Dhaka	BD	21.99	563.252	Haze	1.54	1015	60
11	Karachi	PK	25.90	570.290	Haze	7.20	1013	50
12	Chongqing	CN	9.27	540.356	Clouds	1.34	985	79
13	Istanbul	TR	6.73	535.784	Clouds	11.83	1030	57
14	Kolkata	IN	23.97	566.816	Haze	4.12	1014	69
15	Lahore	PK	18.99	557.852	Smoke	2.57	1015	48
16	Manila	PH	26.04	570.542	Clear	3.42	1018	77
17	Lima	PE	24.94	568.562	Clouds	4.12	984	81
18	Tehran	IR	8.85	539.600	Clouds	2.06	1022	31
19	Bangkok	TH	28.21	574.448	Clouds	4.10	1013	75
20	Kinshasa	CD	31.18	579.794	Clouds	4.12	1012	55
21	Bogota	CO	7.73	537.584	Fog	3.09	1028	100
22	London	GB	8.27	538.556	Clouds	6.69	1028	78
23	Lagos	NG	33.18	583.394	Clouds	2.76	1009	28
24	Lima	PE	24.94	568.562	Clouds	4.12	984	81
25	Bengaluru	IN	27.34	572.882	Clouds	1.54	1017	38
26	Bangkok	TH	28.21	574.448	Clouds	4.10	1013	75
27	Chennai	IN	26.99	572.252	Clouds	5.14	1013	69
28	Hyderabad	IN	27.23	572.684	Haze	6.17	1016	34
29	Paris	FR	11.37	544.136	Clouds	4.63	1031	84

In [25]:

```
# Saving the weather data into csv file for future use.
weather_df.to_csv("weather_data.csv")
```

Note: Steps to create the Configuration file:

- Create a text file named "waether_key"on your jupyter notebook.
- Write key name enclosed in closed brackets in it as [api].
- Create a variable key here I used was "key" and paste the key you copied from the Open Weather Map website.