

Application Programming Interface

What is an API?

An API (Application Programming Interface) defines how one piece of software communicates with another.

It specifies:

- What you can ask for
- How you ask for it
- What you get back

The “Steering Wheel” Analogy

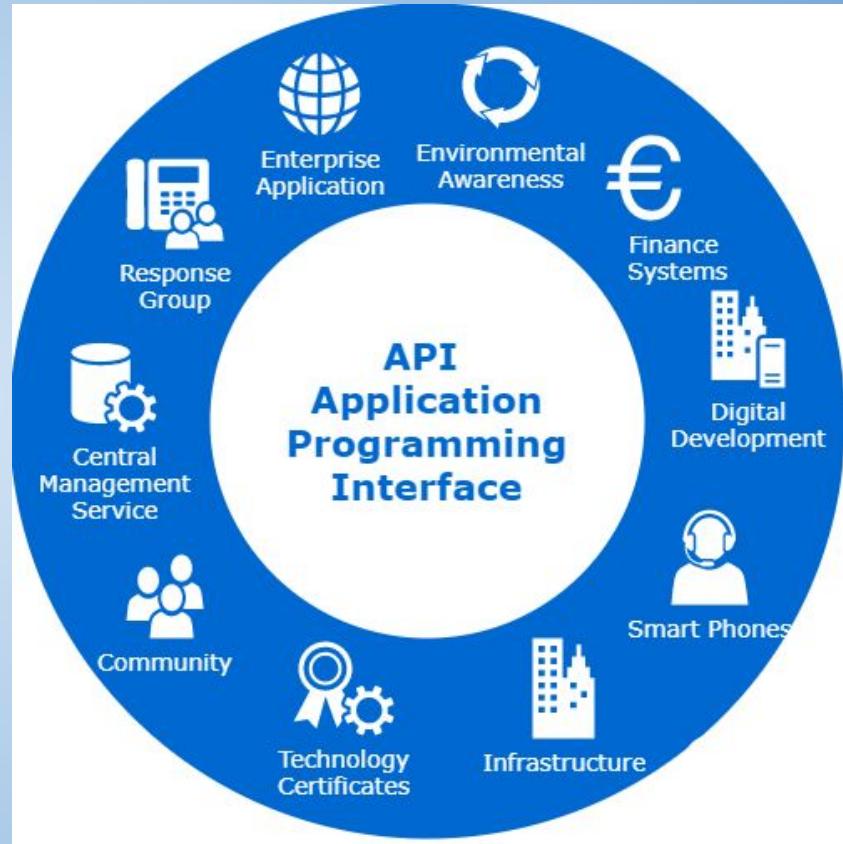
- An API is like a steering wheel in a car:
- You know how to use it
- You don't need to know how steering is implemented underneath
- (power steering, assisted, mechanical, etc.)

The internal details are hidden, the interface stays consistent.

Where APIs are Used

APIs are everywhere:

- Libraries (e.g., Python's math, requests)
- Operating systems
- Web services (weather, maps, social media)
- Machine learning models and data pipelines



How APIs Work (High Level)

- You send a request
- The API processes it
- You get structured data back



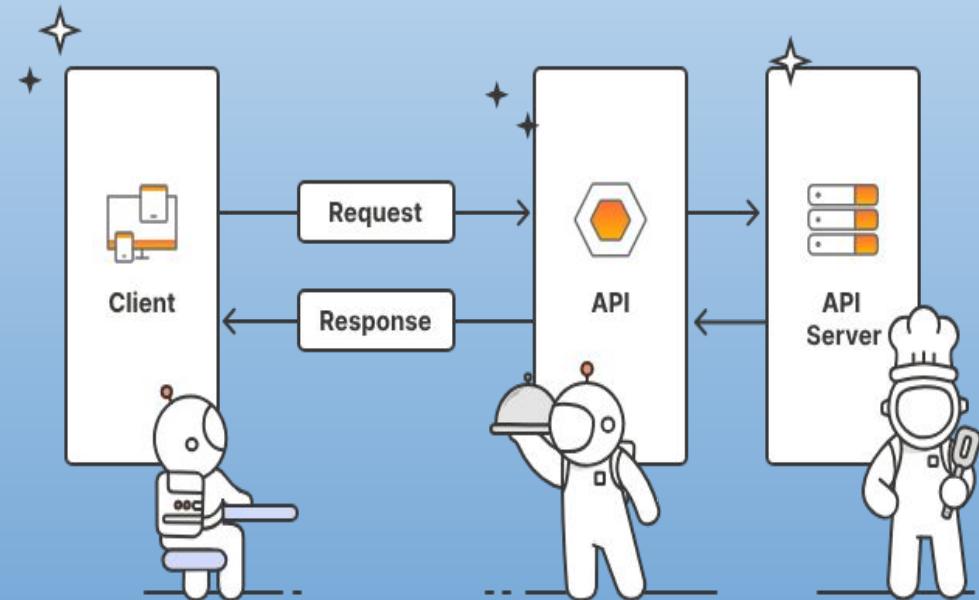
Web APIs & HTTP Basics

Common terminology you will see working with an API

- **GET** → retrieve data
- **URL** → where the API lives
- **Response** → data + status code

Status codes

- **200** → Success
- **404** → Not found
- **500** → Server error



What Is JSON?

- **JSON (JavaScript Object Notation) is a lightweight data format used by APIs to send and receive data**
- **Easy for both humans and programs to read**
- **Represents data using key-value pairs and lists**
- **Most web APIs return data in JSON format**
- **In Python, JSON is automatically converted into dictionaries and lists**

APIs We'll Use Today

Public APIs, No login, No API keys, Free and safe

Examples of APIs

-  Technology & Web — social media, search, cloud services
-  Data Science & Analytics — public datasets, surveys, economic data
-  AI & Machine Learning — model inference, NLP, image recognition
-  Finance — stock prices, crypto, exchange rates
-  Government & Public Data — census, weather, transportation
-  Maps & Location — maps, routing, geocoding
-  Entertainment — movies, music, games, sports stats