What is an API?

An API is a set of rules that allow different software applications to communicate with each other. Think of it like a bridge that connects two systems and lets them share data or services.

To make this clearer, let's use an example:

- Imagine you're at a restaurant. The waiter (API) takes your order (request), brings it to the chef (server), and then brings the food back to you (response).
- Similarly, when you search for a course on a website, you send a request through an API, which then checks the database and sends the result back to you.

APIs are the building blocks for the todays websites in which heavy data is transferred from the client to server and vice versa. If you want to learn such more concepts of the websites then you should enrol in our Full Stack Node Development Course

Why Do We Need APIs?

APIs help developers to create software programs more easily. Instead of writing complex code from scratch, they can call APIs that already provide the functions they need. For example, if a developer wants to display a weather report, they can use an API to get the data instead of creating the entire system to gather weather data themselves.

APIs are also crucial in building modern websites, where heavy data transfers happen between the client (user) and the server.

How Do APIs Work?

APIs work in a simple step-by-step process:

- **Request:** A client (user) sends a request through the API's URI (Uniform Resource Identifier).
- **Processing:** The API forwards the request to the server.
- **Response:** The server processes the request and sends the response back to the API.
- **Delivery:** The API returns the server's response to the client.

Think of this as a client-server architecture: the client sends a request, the server processes it, and the API acts as the messenger.curity threats. To provide additional security layers to the data, HTTP headers, query string parameters, or cookies are used.

Types of API Architectures:

1. **REST (Representational State Transfer) :**A simple, flexible API architecture that uses HTTP methods (GET, POST, PUT, DELETE) for communication.
2. **SOAP (Simple Object Access Protocol) :**A more rigid protocol that requires XML-based messaging for communication.

Both define a standard communication protocol for the exchange of messages in **XML** (Extensible Markup Language).

How is an API Different From a Web Application?

An API acts as an interface that allows proper communication between two programs whereas a web application is a network-based resource responsible for completing a single task. Also, it's important to know that **"All web services are APIs, but not all APIs are web".**

The difference between an API and a web application is that API allows two-way communication and web applications are just a way for users to interact through a web browser. A web application may have an API to complete the requests.

Types of APIs

There are three basic forms of API -

1. WEB APIs

A **Web API** also called Web Services is an extensively used API over the web and can be easily accessed using the HTTP protocols. A Web **application programming interface is** an open-source interface and can be used by a large number of clients through their phones, tablets, or PCs.

2. LOCAL APIs

In this type of API, the programmers get the local middleware services. TAPI (Telephony Application Programming Interface), and .NET are common examples of Local APIs.

3. PROGRAM APIs

It makes a remote program appear to be local by making use of RPCs (Remote Procedural Calls). SOAP is a well-known example of this type of API.

What are REST APIs?

REST stands for Representational State Transfer, and follows the constraints of REST architecture allowing interaction with RESTful web services. It defines a set of functions (GET, PUT, POST, DELETE) that clients use to access server data. The functions used are:

- GET (retrieve a record)
- PUT (update a record)
- POST (create a record)
- DELETE (delete the record)

Its main feature is that REST API is stateless, i.e., the servers do not save clients' data between requests.

What is a Web API?

Web API Is simply an API for the web. It is an API that can be accessed using the HTTP protocol. It can be built using Java, .nET, etc. It is implemented to extend the functionality of a browser, simplify complex functions, and provide easy syntax to complex code.

The four main types of web APIs are:

- Open API
- Partner API
- Internal API
- Composite API