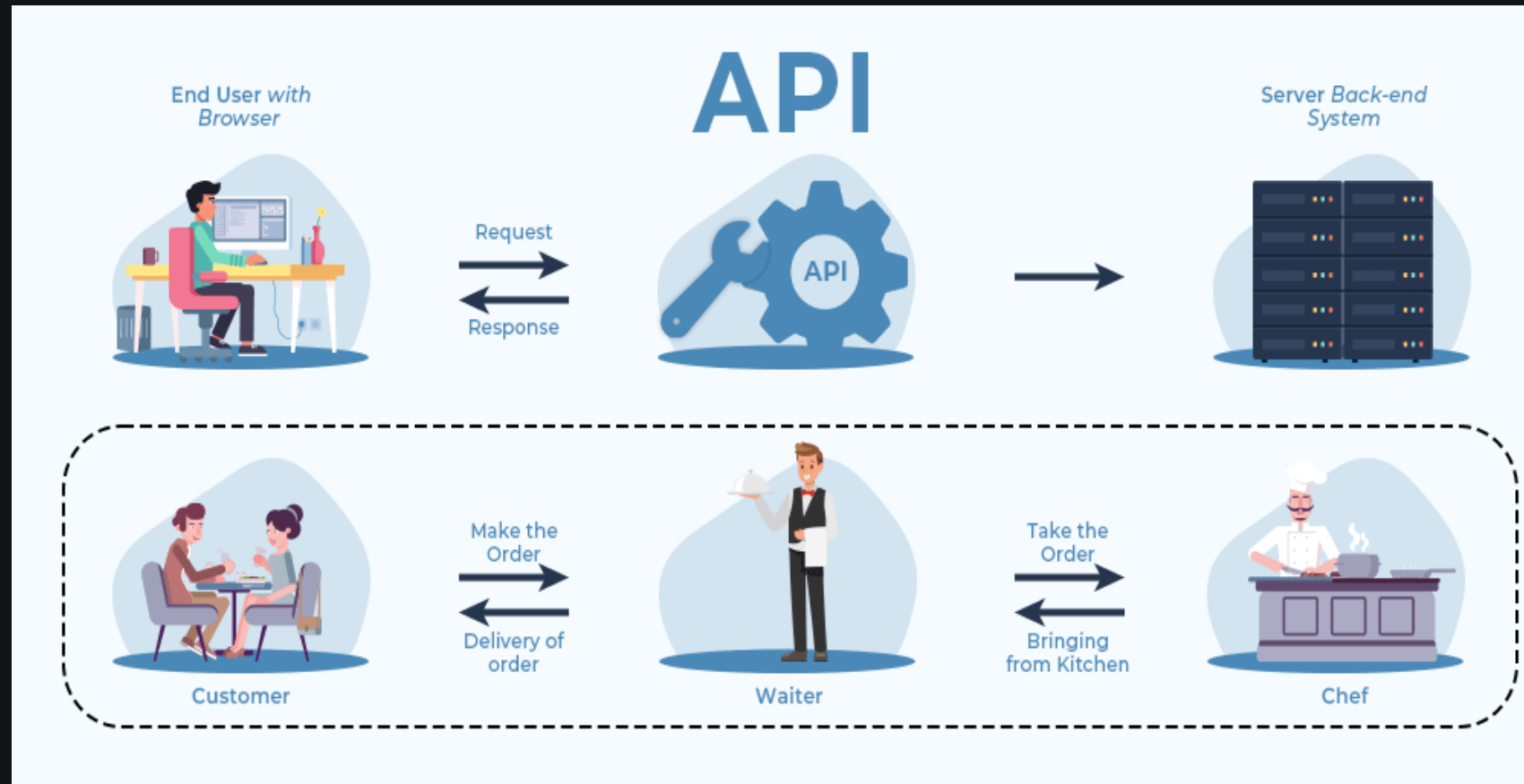


What is an API (Application Programming Interface)?



What is an API?

API is an abbreviation for Application Programming Interface which is a collection of communication protocols and subroutines used by various programs to communicate between them. A programmer can make use of various API tools to make their program easier and simpler. Also, an API facilitates programmers with an efficient way to develop their software programs. Thus in simpler terms, an API helps two programs or applications to communicate with each other by providing them with the necessary tools and functions. It takes the request from the user and sends it to the service provider and then again sends the result generated from the service provider to the desired user.

A developer extensively uses APIs in his software to implement various features by using an API call without writing complex codes for the same. We can create an API for an operating system, database system, hardware system, JavaScript file, or similar object-oriented files. Also, an API is similar to a GUI(Graphical User Interface) with one major difference. Unlike GUIs, an API helps software developers to access web tools while a GUI helps to make a program easier to understand by users.

How do APIs Work?

The working of an API can be clearly explained with a few simple steps. Think of a client-server architecture where the client sends the request via a medium to the server and receives the response through the same medium. An API acts as a communication medium between two programs or systems for functioning. The client is the user/customer (who sends the request), the medium is the API, and the server is the backend (where the request is accepted and a response is provided). Steps followed in the working of APIs -

- The client initiates the requests via the APIs URI (Uniform Resource Identifier)
- The API makes a call to the server after receiving the request
- Then the server sends the response back to the API with the information
- Finally, the API transfers the data to the client

APIs are considered safe in terms of attacks as it includes authorization credentials and an API gateway to limit access so as to minimize security threats. To provide additional security layers to the data, HTTP headers, query string parameters, or cookies are used.

If we talk about the architectures, API's architectures are:

- **REST (Representational State Transfer)**
- **SOAP (Simple Object Access Protocol)**

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 API 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.

Few other types of APIs:

- **SOAP (SIMPLE OBJECT ACCESS PROTOCOL):** It defines messages in XML format used by web applications to communicate with each other.
- **REST (Representational State Transfer):** It makes use of HTTP to GET, POST, PUT, or DELETE data. It is basically used to take advantage of the existing data.
- **JSON-RPC:** It uses JSON for data transfer and is a lightweight remote procedural call defining a few data structure types.
- **XML-RPC:** It is based on XML and uses HTTP for data transfer. This API is widely used to exchange information between two or more networks.

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 statelessness, 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

SOAP vs. REST

SOAP	REST
SOAP (Simple Object Access Protocol) is a protocol with specific requirements like XML messaging	REST (Representational State Transfer) is a set of guidelines (architectural style) offering flexible implementation
Heavier and needs more bandwidth	Lightweight and needs less bandwidth
It defines its own security	It inherits security from the underlying transport
It permits XML-based data format only	It permits different data formats such as plain text, HTML, XML, JSON, etc.
SOAP calls cannot be cached	REST calls can be cached

Also, the major difference is that SOAP cannot make use of REST whereas REST can make use of SOAP. You can also read about the **difference between REST API and SOAP API**

What is API Integration?

API Integration is the connection between two or more applications, via APIs, letting you exchange data. It is a medium through which you can share data and communicate with each other by involving APIs to allow web tools to communicate. Due to the rise in cloud-based products, API integration has become very important.

What is API Testing?

API Testing is a kind of software testing that analyzes an API in terms of its functionality, security, performance, and reliability. It is very important to test an API so as to check whether it's working as expected or not. If not, again changes are made in the architecture and re-verified.

APIs are the center of software development to exchange data across applications. The API testing includes sending requests to single/multiple API endpoints and validating the response. It focuses majorly on business logic, data responses and security, and performance bottlenecks.

Types of Testing:

- **Unit Testing**
- **Integration Testing**
- **Security Testing**

- [Performance Testing](#)
- [Functional Testing](#)

Must Read: API Testing in Software Testing

API Testing Tools:

- Postman
- Apigee
- JMeter
- Ping API
- Soap UI
- vREST

How to Create APIs?

Creating an API is an easy task unless you are very well clear on the basic concepts. It's an iterative process (based on feedback) that just includes a few easy steps:

- Plan your goal and the intended users
- Design the API architecture
- Develop (Implement the code) and Test API
- Monitor its working and work on feedback

Must Read: Tips for Building an API

Restrictions of Using APIs

When an API is made it's not really released as software for download and it has some policies governing its use or restricting its use to everyone, usually there are three main types of policies governing APIs, those are:

- **Private:** These APIs are only made for a single person or entity (like a company that has spent the resources to make it or bought it).
- **Partner:** Just like the name it gives the authority to use APIs to some partners of entities that own APIs for their private use.
- **Public:** You should be aware of them cause you can only find these APIs in the market for your own use if you don't own specific API access from some entity that owns private these APIs for their private use. An example of a Public API is 'Windows API' by Microsoft for more public APIs you can visit this GitHub repository -> <https://github.com/public-apis/public-apis>.

Advantages of APIs

- **Efficiency:** API produces efficient, quicker, and more reliable results than the outputs produced by human beings in an organization.
- **Flexible delivery of services:** API provides fast and flexible delivery of services according to developers' requirements.
- **Integration:** The best feature of API is that it allows the movement of data between various sites and thus enhances the integrated user experience.
- **Automation:** As API makes use of robotic computers rather than humans, it produces better and more automated results.

- **New functionality:** While using API the developers find new tools and functionality for API exchanges.

Disadvantages of APIs

- **Cost:** Developing and implementing API is costly at times and requires high maintenance and support from developers.
- **Security issues:** Using API adds another layer of surface which is then prone to attacks, and hence the security risk problem is common in APIs.

Conclusion

By now, you must have had a clear idea of **What is API?** it's working, types, testing tools used, etc. After understanding these concepts, you can try working on them by implementing some of the concepts in projects. Not just theoretical knowledge, you must also have a practical idea of it by working on it. Developers must have a deep understanding of APIs in order to implement them.

FAQs

1. What API means?

Ans. Application Programming Interface (API), often referred to as web API, is an interface that allows two systems to communicate with each other (share data and access resources). One of its purposes includes making visible the internal details of how a system works to only those that a programmer finds required.

2. What are the 4 types of API?

Ans. The four major APIs commonly used in web-based applications are:

- Public
- Partner
- Private
- Composite

Also, some of the other APIs based on its services include:

- Web
Local
Program

What is an example of an API?

Ans. We can take Zomato as an example to explain the concept of an API. Zomato receives a request for an order, the customer can track the driver's location. Here, the API functions in this way- the Zomato app integrates with Google Map where after integration, google maps help you to track the location.

4. Which API is most used?

Ans. The most used APIs are the social media APIs where developers can access data from social media platforms like Facebook, Instagram, etc. Each social media has its own API that can be used by developers to interact with the platform's data.