REST API

CS-493: **Enterprise Application Development**

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Contents

1 Introduction

1.1 API Overview

The acronym API stands for Application Programming Interface, which is a group of subroutines and communication protocols that allow different applications to talk to each other. Programmers can simplify and ease their code by utilizing a variety of API tools. Additionally, an API gives programmers a more effective way to create applications. Therefore, the meaning of an API is when it provides the tools and capabilities required for two programs or apps to connect with one another. After receiving the user's request, it forwards it to the service provider, who subsequently forwards the result back to the intended user.

In order to integrate different features in their product without having to write complicated code, developers frequently use APIs. An operating system, database, hardware, JavaScript file, or other object-oriented file can all have an API made for it. A substantial distinction exists between an API and a GUI (Graphical User Interface). A graphical user interface (GUI) makes a program easier for consumers to grasp, whereas an application program interface (API) allows software developers use web tools.

1.2 How API's works?

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.

2 Types of API's

There are different ways that APIs can work depending on when and why they were created.

- **SOAP APIs**
  These APIs use Simple Object Access Protocol. Client and server exchange messages using XML. This is a less flexible API that was more popular in the past.

- **Websocket APIs**
  Websocket API is another modern web API development that uses JSON objects to pass data. A WebSocket API supports two-way communication between client apps and the server. The server can send callback messages to connected clients, making it more efficient than REST API.

- **REST APIs**
  These are the most popular and flexible APIs found on the web today. The client sends requests to the server as data. The server uses this client input to start internal functions and returns output data back to the client.

3   What are REST API's?

REST stands for Representational State Transfer. REST defines a set of functions like GET, PUT, DELETE, etc. that clients can use to access server data. Clients and servers exchange data using HTTP.

The main feature of REST API is statelessness. Statelessness means that servers do not save client data between requests. Client requests to the server are similar to URLs you type in your browser to visit a website. The response from the server is plain data, without the typical graphical rendering of a web page.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)

4   API Integration

API (Application Programming Interface) 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.

5   API Testing

API (Application Programming Interface) 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.

5.1   Types of Testing

- Unit Testing

- Integration Testing

- Security Testing

- Performance Testing

- Functional Testing

5.2   API Testing Tools

- Postman

- Apigee

- JMeter

- Ping API

- Soap UI

- vREST

6   Advantages of REST API's

- **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.

7   Disadvantages of REST API's

- **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.

8   Mock API's

Mock API's that I created are:

- createStudents

- getStudents

- updateStudents

- deleteStudents

- studentCourses

- courseData/cs102

- registerCourse

- deleteSingleCourse/cs102

- getAllCourse

- getCourseStudents/cs102

9   Real API's

Real API's that I created are:

- getQuestions

- postQuestions

- postManyQuestions

- updatesQuestions

- deleteQuestions