API (Application Programming Interface)

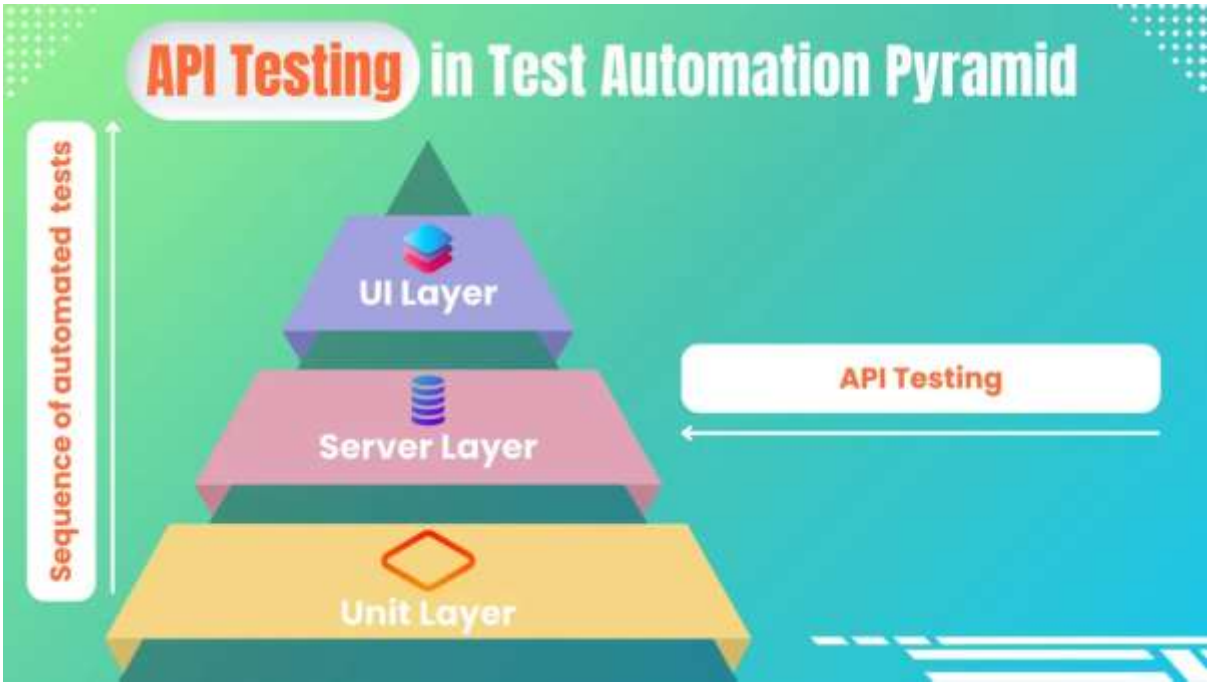
What is API?

API is allow the interface bwt., the two application using the set of rule or protocol to exchange the data each other's.

What are the various way API help us?

API is help us in various way there are validating the request, verfing the response, data validation, performance and functionality.

I. Data Validation – verify the requesting the data is accurate and given response is correct as per the proper formate.
II. Security – Verfiyig the vulnerability of the given api data
III. Error handling – ensure the correct error message are returned to invalid request
IV. Perfomance – Mesure the api time under the different loads.



Why Use Postman for API Testing?

Postman is the user friendly platform, it has the minimul set up envoironment compare with other frameworks. Postman can test all API types, e.g, Soap UI, Rest asurd etc.,

Using postman we can manage request and response side by side. We can save the time duration while in the automation test by automate the multiple test at once.

How to Install Postman

Getting started with Postman is a straightforward process:

1. **Download Postman**: Head over to Postman's official download page and choose the version for your OS (Windows, macOS, or Linux)
2. **Install**: Once downloaded, run the installer and follow the instructions. The process is seamless and doesn't require additional software.
3. **Sign Up or Log In**: When you launch Postman, you can sign in with your existing account or create a new one. Signing in allows you to sync your API collections and work across multiple devices.
4. **Explore the Workspace**: Postman offers a free tier, but if you're working on a large team or project, you might consider upgrading to access additional features like enhanced collaboration tools, monitors, and more storage.

Once installed, you can start creating and running API tests instantly!

Overview of Postman's Interface

When you open Postman for the first time, you'll see a dashboard with several key areas:

1. **Request URL Field**: Enter the **API endpoint URL** here.
2. **Request Methods Dropdown**: Select the type of request (GET, POST, PUT, DELETE).
3. **Request Body & Headers Tabs**: Add request headers, parameters, and body data here.
4. **Collections Tab**: Here, you can organize your postman requests into collections for better management. This is especially useful for grouping related API calls, such as user-related or order-related APIs.
5. **Response Viewer**: After sending a request (request execution), the server's response, including the body, headers, and status code, will appear in this panel. You can format or inspect the data as JSON, HTML, or raw text.
6. **Test Script Area**: Postman lets you write pre-request scripts and post-request scripts using JavaScript to automate tasks like setting environment variables or validating responses.
7. **New Request Tab**: This is where you can create new **API requests** (e.g., GET, POST,PUT and DELETE)
8. **History Tab**: Keeps track of your previously executed requests, allowing you to re-run or review past tests.

Creating Your First API Test in Postman

Creating your first API test in Postman is simple and requires just a few clicks.

Setting Up a Request 📝

1. **Sign up** or **log in** to **Postman**.
2. Create or select a **workspace** to organize your API tests.
3. Click **New** in the top-left corner and select **Request**.
4. Name your request and assign it to a **collection (**optional**)**.
5. Choose the **HTTP method** (e.g., **GET**, **POST**, **PUT**, **DELETE**).
6. Enter the **API URL** in the URL bar (e.g., https://jsonplaceholder.typicode.com/posts).

Once the URL and method are set, you can configure other parameters.

Adding Parameters, Headers, and Body Data 📦

Depending on the API you're testing, you may need to add parameters, request headers, or body data to your request details.

- **Parameters**: Add parameters in the **Params** tab to filter your request (e.g., ?userId=1).
- **Headers**: Add metadata like **Authorization** tokens or **Content-Type** in the **Headers** tab.
- **Body Data**: For **POST** or **PUT** methods, enter the data in the **Body** tab (e.g., JSON or form data).

Once your request is ready, click the **Send** button to make the API call 🚀 !

🔁 Types of API Requests in Postman

API requests typically involve performing different operations such as retrieving data, creating new resources, updating existing data, or deleting records. Here's a closer look at some common HTTP methods you'll use when working with APIs.

GET Requests for Retrieving Data 📥

GET requests are used for fetching data from an API. This is the most basic type of request, and it's often the first thing you'll test when working with an API. For example, if you're testing a weather API, a GET request might return the current temperature in a specific city.

GET Request Example:

- **Endpoint**: https://jsonplaceholder.typicode.com/posts
- **Use Case**: Fetching a list of users, retrieving specific data based on parameters like ?userId=1, or getting information from a third-party service.

POST Requests for Sending Data 📤

POST requests are used to send data to the server, typically to create a new resource. This is particularly useful when you're testing form submissions or data creation workflows, such as signing up a new user.

POST Request Example:

- **Endpoint**: https://jsonplaceholder.typicode.com/posts
- **Request Body in Post:**

{

"title": "New Post",

"body": "This is a blog post",

"userId": 1

}

- **Use Case**: Submitting a form, uploading a file, or posting a comment.

PUT and DELETE Requests for Data Modification 🛠️

- **PUT**: This method updates an existing resource. If a user changes their profile information, a PUT request can update their name, email, or other details.
- **DELETE**: Used for deleting resources, such as removing a user from a system or deleting a comment.
- **DELETE Request Example**: A DELETE request to https://jsonplaceholder.typicode.com/posts/1 will remove the post with an ID of 1.These requests allow you to manage data effectively and test the integrity of CRUD (Create, Read, Update, Delete) operations within your API.

📋 **Validating API Responses in Postman**

Once you've sent a request to the API, the next step is to validate the response to check the request status. Postman makes this process simple by providing a detailed view of the response body, headers, and status codes.

Understanding Status Codes 🟢🔴

One of the first things you'll notice in the response is the **status code**. These codes tell you whether it was a successful request or if there was an issue. Here are some common API status codes you'll encounter:

- **200 OK**: The request was successful, and the server returned the data requested.
- **201 Created**: A resource was successfully created (usually in response to a POST request).
- **400 Bad Request**: There was something wrong with the request (like missing request parameters or invalid syntax).
- **401 Unauthorized**: The request requires user authentication (e.g., missing or incorrect API token).
- **404 Not Found**: The resource requested cannot be found.
- **500 Internal Server Error**: On the server side, something went wrong.

By checking the status code, you can immediately identify whether the API behaved as expected.

Working with Response Body and Headers 📜

After sending a request, Postman displays the response body, which contains the actual data returned by the API. The format of the response could vary depending on the API, but most modern APIs return data in **JSON** format.

- **Response Body**: This is where you'll see the actual data sent back from the API. For example, a GET request to fetch user information might return a JSON response like:

```
{

 "id": 1,

 "name": "John Doe",

 "email": "johndoe@example.com"

}
```

You can view this data in multiple formats: raw text, formatted JSON, or even as a preview (if it's an HTML response). Postman also allows you to search within the response body or response parameters to quickly locate specific fields.

- **Response Headers**: Provide metadata, such as **Content-Type** (e.g., JSON) or **Cache-Control**. These help you understand the format and caching rules.

Using the **status codes**, **headers**, and **response body**, you can ensure the API returns the correct data. Postman also lets you automate validation with test scripts.

🤖 Automating API Tests with Postman

Automation is key when it comes to efficient testing. Instead of manually running tests for each API request, Postman allows you to write scripts that run automatically after sending a request. This is particularly useful for multiple API endpoint execution or need to perform regression tests.

Writing Scripts for Test Automation 👷

Postman provides a test editor where you can write JavaScript code to validate the response. This Postman test execution runs after the request is completed, and you can use them to check things like status codes, response times, or the presence of specific fields in the response.

For example, to check if the response status code is 200 (OK), you can write the following script in the **Tests** tab:

You can add multiple tests in the script, such as:

- **Validating JSON Structure**: Make sure certain fields exist in the response.
- **Checking Response Time**: Ensure that the API responds within an acceptable time frame.

  These scripts help automate the validation process and ensure that the API performs consistently.

  Running Collections and Scheduling Tests 🗓️

  Postman's Collection Runner allows you to execute multiple tests at once, organizing them into collections. This is useful for bulk testing or running a sequence of tests. You can also schedule your tests to run at specific intervals using Postman's integration with CI/CD tools, allowing you to automate your API testing techniques in continuous integration and continuous development pipelines.

1. **Creating a Collection**: Organize related requests into collections for specific API testing workflows, like user management (e.g., create, fetch, update, delete users).
2. **Running the Collection**: Use the Runner to execute all requests in a collection, with options for multiple iterations, great for load testing.
3. **Scheduling Tests**: Postman's Monitors allow you to schedule tests at set intervals (e.g., daily/weekly), helping monitor APIs in production.

   By collection tests, you can save time, reduce manual errors, and ensure that your APIs are functioning correctly over time. 🤖✨

   How Postman's Postbot Can Help You Generate Tests

   Postman's **Postbot** is an AI-powered feature that makes generating test scripts faster and easier. Here's how Postbot can help:

- **Auto-generating Test Scripts**: Postbot automatically writes code for tests for common checks like status codes, response times, and JSON field validation.
- **Suggested Tests**: Based on the API response, Postbot recommends tests that you might otherwise miss, improving test coverage and accuracy.
- **Reduces Human Errors**: With Postbot generating tests, you avoid manual mistakes, especially useful for beginners unfamiliar with scripting.
- **Learning Tool**: As Postbot generates tests, you can learn by reviewing how the API test scripts are structured, making it easier to write your own in the future.
- **API Documentation:** Postbot helps document test scripts within Postman, making it easier for teams to understand API workflows and ensuring accurate API documentation.

  Postbot simplifies and enhances your API testing, making it faster and more efficient!

  🌟 **Best Practices for Efficient API Testing with Postman**

To make the most out of Postman and ensure your API tests are effective, here are some best practices to follow:

1. **Use Environment Variables**: Store common variables like base URLs, API keys, and tokens in environment variables for easy reusability.
2. **Organize Requests in Collections**: Group related requests into collections for better organization and reusability.
3. **Use Pre-Request Scripts**: Write pre-request scripts to automate tasks like generating tokens or setting dynamic values.
4. **Validate Responses with Assertions**: Always write tests to verify that the response meets expected conditions, such as status codes and content.
5. **Leverage Automation Testing**: Use Postman's Collection Runner and scripting capabilities to automate repetitive tasks, reducing manual effort and improving efficiency.

   By following these best practices, you'll ensure that your API testing process is efficient, scalable, and reliable. 🏆