**APA (Application Programming Interface)**

**Q1) What is API?**

The Full form of API is **Application programming Interface**. It’s a Software, or It’s a Program , or it’s a kind of interface which helps to interact with one software to another software. That means it is a software intermediary that allows two applications or libraries to talk to each other. It is the way of deciding or making the protocol that how to system interacts with each other. So it is all about request and response between the client and server. **Example of API Like Calculator API, Google Map API, Amazon Advertising API et**c.

**Note-** It is a mechanism that allows the communication between two applications , components or computer hardware using a set of rules and protocol. An API can be written and used for

1. Web based application
2. Computer operating systems
3. Data base systems
4. Computer hardware and
5. Software library

While / When working on java. We download certain Jars and try to use the features and functionality which is there in the software library. So, that is also an API.

**It works as a messenger that delivers we request to the provider. So we pass something , API will give us something.**

**Why is the API a Base record?**

API is s software program that provides the facility to provide the interaction between the software program or provide the facility of interaction between software program and the user. SO this is the need for API.

**2) Advantage of API and Limitations of API?**

* **Advantage of API --**There are number of APIs are available which will make out life easy and which will make our application easy. For Every company there are APIs are available.

**# Efficiency-** Data are created at once and made available to different systems. So It helps to ease the distribution of data . It hides the complexity of the program.

**Wider Reach**- Anyone can use APIs.

**Automation -**Since API is a machine to machine interaction, people don’t need to work every time when data are exchanged .

**Partnership-**  API elaborates the partnership among the companies. AS the company grows, API provider company needs to collaborate to each and every company that uses their API.

* **Limitations of API-**

Every API is having own limitations and Advantage which is set up by the provider. Thus try to estimate your usage and understand how that will impact the overall cost of the offering. So on the basis of the business needs you should decide which API is the best for the business.

3**) Types of API?** Types of API based on

a) Web Service API**- i) REST API ii) SOAP iii) XML-RPC iv) JSON- RPC[This APIs provide services through the world wide web]**

b) Source code API –i) Library based API ii) Class based API

c) Object Remote APIs and d) Hardware APIs

**4) What is API in Java?** Java API is a list of all classes that are part of Java development kit(JDK).it means Java API is a collection of prewritten packages, classes and interfaces along with their methods , fields and constructors. These prewritten classes provides functionality to a programmer.

**Q5) What is API testing?**

Testing the application programming interface or the business logical layer of any application is called APT testing. It is also called backend testing.

**Note -Pre -requisites**- **Tester task In case of API testing** --Before API testing Very first I ask my developers or the stakeholders is for API documentation. I have to consider in the API documentation, what are the common thing or the important think I will have to look for.

i) API end point or URL and

ii) What is the method, Whether it is GET,POST,PUT,DELETE and then I have to get the information about what is the content type that is accepts and

iii) Content type that is accepts and iv) Data type (what is the format of or the schema of the data that you have to supply to make the request) that you have to submit.

iv) Test Scope- In this steps I will discuss or ask my Stakeholders What are the scope of testing in API testing - In can be like I have to perform only functional testing. It can be also to perform performance testing of the API. So most of the time for functional of the API I perform.

v) Test tools-I have to give a confirmation that what tools I have to use. And based on the paid or open source. I can do a calculation and select a tool.

**Features of API testing** -

1. is used to determine whether APIs return the correct response or not.
2. Is considered as part of Integration testing
3. Commonly includes testing REST APIs and SOAP web services with JSON or XML message pauloads.
4. For API testing we have Rest Assured, HTTP clients methods or verbs, SOAP, Postman and different Rest clients are available.

**Q Why is API testing considered as the most suitable form for Automation testing?**

API testing is now preferred over GUI testing and is considered most suitable because

1. It verifies all the functional paths of the systems under test very effectively.
2. It provides the most stable interface
3. It is easier to maintain and provides fast feedback

**Advantage of API testing-**

1. **Easy Excess -**API testing provides access to the application without a UI.
2. **Earlier Testing –** Once the logic is implemented , test can be build to validate the correctness in response and data. We don’t need to wait for fronted to be build.
3. **Test for core functionality -**the core and code level functionality of the application will be tested **and evaluated early before the GUI test.**
4. **Easier test maintenance - -**UIs constantly change and they are accessed from different different browsers , devices and screen orientation, making UI relatively unstable, however API has no such chellenge.
5. **Time effectiveness-** API testing usually is less time consuming than functional GUI testing.
6. **Language independent-** Every Programming language we can create an APIs.

**API testing Types/Methods Comes under API testing**

**a)Unit testing** and functional testing. b) **Discovery testing** to lists, create and delete the number of calls documented in API. c) **Usability and Reliability** testing to get consistent results d) **Security and Penetration** testing to validate all types of authentication e) **Load** testing to test performance under load f) **Automation testing** to create and run scripts that require regular API calls g) **End to End integration and web UI testing** h) All documentation testing to determine its efficiency and effectiveness.

**API testing Tools** – a) Postman b) Rest Assured c) SOAP UI d) JMeter.

**Postman** – is simply a software. By using this software we can test API that we have developed. It is an application of google chrome , i.e it is a browser extension. But for its popularity now it is a standalone application. This is just to check the functionality of the API that how it works and how it does not. I perform the following steps- a) Website name to download b) use Get method c) Copy URL and then paste it into the postman .

But most of the time you will either find Rest Assured to perform API testing automation or Soap UI.

**Note- while doing unit and API testing, both targets source code.**

**What are major challenges faces in API testing?**

The Challenges are Parameter selection, combination, Call Sequencing , Output verification and Validation.

Another important challenge is providing input values, which is very difficult as GUI is not available in this case

**Procedure to perform API Testing—**

1. Choose the suite to add API test cases
2. Choose test development mode
3. Demand the development of the test cases for the required API methods
4. Configure the control parameters of the application and then test conditions
5. Configure method validation
6. Execute the API test
7. Check test reports and filter API test cases and viii) Arrange all API test cases.

**Q What is the best approach method to perform API testing?**

The following factors should be considered when performing API Testing-

1. Defining the correct input parameters,
2. Verifying the calls of the mixture of two or more add value parameters
3. Defining the basic functionality and scope of the API program
4. Writing appropriate API test cases and making use of testing techniques such as equivalence class, boundary value etc. to check the eperability.
5. Testing cases execution
6. Comparing the test result with the expected result.
7. Verifying the API behavior under conditions such as connection to files and so on.

**Q What must be checked when performing API testing?**

During the API testing process, a request is raised to the API with the known data. This way we can analyze the validation response .While testing an API we should consider ---

1. Accuracy of data , Schema validation, HTTP status codes,
2. Data type, Validation, order & Completeness, Authorization checks
3. Implementation of response timeout, Error code in case API returns and Non-functional testing like performance and security testing.

**Rest Assured** – is a java library API for test automation of REST based web services. It supports GET, POST,PUT,DELETE, OPTIONS, PATCH, and HEADS request. It can be used to validate and verify the response data of rest requests.

It will have to download and you can use the functionalities of the Rest Assured library to perform API testing. **REST Assured**(RA) is a framework built on Java, developed to test the **REST** services.

**SOAP UI -**It is very good tool. But it is paid tool and it also gives many flexibility to perform API testing.

First I download SoapUI for Soap and REST . I take WSDL address( to search web site )and then I copy the URL from the search box and paste it into the SoapUI tool. then I got XML and JSON file. it will create all the API call or request.

I copy the file and paste it in the note pad. Then I check the data in the note pad exactly match with my database. If it is matched then the test cases is passed. If it is not matched then the test cases is failed.

**JMeter-** is usually used to perform API load testing or performance testing.

**Q6) What are some Architectural styles for creating a Web API?**

There are four common web API Architectural styles—

1. HTTP for client server communication-there is a client and sever communication.
2. XML/JSON as formatting language
3. Simple URI/URL as the address for the services.
4. Stateless communication- Every request is different from another request

**Q7)Web can use a web API?**

Web API can be consumed by any clients which supports HTTP verbs/methods such as GET,PUT,POST and DELETE. Since web API don’t require configuration, they can be easily used by any client. Infect, even portable devices such as mobile devices can easily use web API, which is undoubtedly the biggest advantage of this technology**.**

**Q8) Some common protocols used in API testing?**

Many API are now available to be used in API testing ,such as JMS(Java message service),REST,SOAP, HTTP, UDDI.

**Q9) What are the test environment of API?**

The test environment of API is a bit complex and requires the configuration of the data base and server, depending on the software requirements. NO GUI is available in this test form.

When the installation process is complete, API is verified for the proper aperation. Throught the process, the API called from the original environment is set up with different parameters to study the test result.

**Q10) Difference between API Testing and Unit Testing?**

* **Unit Testing –**It is always generally done by the developers. It means on the basis of the code whatever the code the developers they have written , they are responsible to write the unit level test cases and they are also responsible for the first test application and then once they feel that it is okay then they give it to QA. So that type of testing is called Unit testing. It is called White box testing.
* **What is API testing?**

Testing the application programming interface or the business logical layer of any application is called APT testing. It is also called backend testing. It enables communication between two separate software systems.

Q 11) **Difference between API Testing and UI Testing?**

**UI testing**- It refers to testing graphical interface such as how user interact with the applications, testing application elements like- fonts, image, layout etc.UI testing basically focuses on look and feel of an application.

**Q 12) What are common API errors that often found**? The most common API Errors are --

1. Missing Module errors b) Documentation Errors c) Parameter validation Errors

**Q13) What kind of Bugs that API testing would often found ?**

1. Missing or duplicate functionality
2. Fails to handle error condition gracefully
3. Stress and load issues
4. Reliability , Security , Performance , Multithreading issues, Improper errors.
5. Non implemented Errors
6. Inconsistent error handling ,

**Q 14) What is API Documentation ?**

API documentation is a complete accurate technical writing giving instructions on how to effectively use and integrate with an API.

It is a compact(solid) reference manual that has all the information needed to work with the API and helps you answer all the API testing questions with details on functions, classes, return types, arguments and also example and tutorials.

Q15) What are API documentation **TEMPLATES that are commonly used?**

**There are several available API documentation templates that helps to make the entire process simple and straightforward, such as**

* Swagger , Mire dot, Slate, Flat Doc, API blue print, REST Doc , Web service API specification.

**Q16) What is Rest Full Web services?**

**There are two kinds of web services which are as follows—**

1. SOAP -an XML based methods to expose web services.
2. Web services developed in the REST style are referred to as RESTFUL web services. These web services use HTTP methods to implement the concept of REST architecture**.**

A REST Full web services usually defines a URI (Uniform resource identifier) . this service provides resource representation like JSON and a set of HTTP methods.

Example- http://www.amazon.com/products/123

**6) What is JDK? And Its component?** It Compries 3 basic components-a) Java Compiler b) JVM c) Java API.

**7) How the user can use the API?**

API allows the user to use the pre written code to develop the new software component or application. Prewritten may be package or classes or it may be an interface. This is how the API is used in Java. And it supports the java program execution and the development.

**8) What is the Java remote method invocation?**

It is an API in java. It allows an object to invoke a method on an object that exists in another address space, which could be on the same machine or on a remote machine.

**9) What is Web Service and Types of Web Service? Advantage of Web service**

A web service is a collection of open protocols and standards used for exchanging data between applications or system. These s vxystem can include programs, objects, message or documents. It doesn’t provide the use with a GUI. It is also software module which is designed to perform a certain set od tasks.

**Features of Web service-**

a) It can be searched for over the network and can also be invoked accordingly.

b) When invoked the web service would be able to perform functionality to the client which invokes that web service. c) Web services is an API wrapped in HTTP

**Types 0f Web Service—**

* **SOAP –** The full form of SOAP is Simple object Access **Protocol**. It means it’s a language which is used to do a communication between the client and server. Soap can’t make user of REST since Soap is a protocol and Rest is an Architectural Pattern.

**Feature-**

1. Its is protocol. It uses service interfaces to expose behavior which represent business logic.
2. It permits XML data format only.All data passed in soap is in XML format.
3. It includes a WSDL(W.S description language) file which has the required information on what the web service does in addition to the location of the web service.
4. JAX- web service is the Java API for soap services.
5. **It requires more band with and resource than REST.**
6. Each Soap documents needs to have a root elements known as the <Envelope> elements. The root element is the 1st element in an XML documents.

* **REST API-** The full form of REST is Representational state transfer API . It Is a A**rchitecture** that means it’s a design which uses the existing protocol to have a(It is the way to ) communication between the client and the server. All REST API depends on resource.Resource means data which contain in the JSON. Like
* **Whether API –** through the REST API, third party company provide Whether API.
* **OMDB API for Movie , Spotify API for music**
* **Example –** Like I create a Block and in the blog I want to store some posts. So When I talk about post. I have to create a post, Read the post, either single post or all post. Post edit or delete. So we need all the above when we talk about post. In that case when we think about REST API , then I will send request to get all the post. like blog.com/ posts-GET

**Features-**

1. It is an Architectural Style , We make REST API using JSON.
2. It permits different data format. Such as Plain text, HTML, XML,JSON ect. But the most preferred format for transferring data is JSON.
3. Rest can make use of SOAP as the Underlying protocol for w.services. Bcause in the end it is just an architectural pattern.
4. REST is an Architectural style in which a web service can only be treated as RESTful service.
5. Most of the web services are implemented using REST ful.
6. It involves many words like – Resource, Representation, URI, State, Client Server Communication.
7. It exposes resources which represent data, and
8. In terms of consumption it is simpler than SOAP.
9. It is used to cache third party library, any data, or info of server in the browser.
10. To use Rest API some code we can store in the database. And then client on demand we can send from the database to the client.
11. REST API depends on the URL but it has different action.
12. REST API shows a JSON file as like Java script object .
13. To use REST API server will not give website and everything store in the data base not the server.

**REST** stands for Representational State Transfer. It's an architectural pattern for creating web services. A **RESTful** service is one that implements that pattern.

In a Rest Assured API first we make a request object, and to make a request object we need to apply or add some option such as Base URI, Query parameter, Body, Authentication, headers. And to send this request to the server or web service we need some HTTP method Like GET,PUT, POST and DELETE and we also need URL End point . API or server response back in the form of JSON format when we Postman.

All of things we have to do on that basis of API document or Swagger file, what ad of option,

Example -Get 5 days weather API by city ID

Coding 1) 1st request make with base URI

a) set a null variable like weatherapi; Static RequestSpecification weatherapi;

b)create an object (anonymous object)of the variable (weatherapi) inside the initialization method & Set the baseUri with the object

c) under the @Beforesuite—we will init method and object create. Because it will run first before another test run.

[new RequestSpecBuilder().build().baseUrl(“http://api.openweathermap.org/data/2.5”)]

2) Query parameter

a) )query parameter add with request at the test level

weatherapi. Param(“q”,”London”).param(“mode”,”json”);

b) request send by any method like we use GET method. So we choose GET.so Get and endpoint point pass. Like our endpoint url is “forcast” .we are sending request to use GET method . endpoint means “forecast”. It will go to server with query parameter. Then it will take a response from the server. And we can store this respone. Like this Respone respone = weatherapi.get(“forecast”);

**Q What is a Resource in REST?**

REST architecture treats any content as a resources which can be either text files, data, HTML pages, images, Videos or dynamic business information, any kind of knowledge.

REST server gives access to resources and modifies them, where each resource is identified by URLs /Global IDs.

* **Advantage of Web service**—

1. **Exposing business functionality on the network**-it means it can be anywhere.
2. **It is a unit of manage code that provides some sort of functionality to client applications or end user**. So it anywhere on the internet and provide the necessary functionality as required.
3. **Reduction in cost of communication**-It uses soap over HTTP protocol. So you can use your existing low cost internet for implementing webservice.
4. **A standardized protocol which every body understands**- Web service use standardized industry protocol for the communication that all the four layers. I) Service transport, ii) XML messaging, iii) Service Description and iv) Service Discovery layers.

**REST API Method—**

GET – Retrieve information about the Rest API resource.

POST- Create a Rest API resource

PUT- Update a rest API resource

DELETE- Delete a rest API resource or related components.

**Q) What is web table and how many types of web table? Why are tables useful?**

Table is a kind of HTML data which is displayed with the help of <tab le> tag in connection with the <tr> and <td> tags. Each table row is defined with the <tr> tag. A table header id defined with the <th> tag. A table data / cell is defined with the <td> tag. The <td> elements are the data containers of the table. They can contain all sorts of HTML elements like text, image, lists, other table etc.

How to Use the tables—HTML tables should be used for tabular data . This is what they are designed for.

There are two types of HTML tables published on the web---

1. Static tables- Data is static, that means no of rows and columns are fixed.

2) Dynamic tables- Data is dynamic -it means no of rows and columns are not fixed.

Usefullness --- Tables and graphs are visual representation. They re used to organize information to show patterns and relationships.

**Postman** – is simply a software. By using this software we can test API that we have developed. It is an application of google chrome , i.e it is a browser extension. But for its popularity now it is a standalone application. This is just to check the functionality of the API that how it works and how it does not. I perform the following steps- a) **Website** name to download b) **use Get** method c) **Copy URL** and then paste it into the postman.

In a REST API we use Postman software to send request to the server or to confirm or check the URL whether it is oaky or not.

**Use of Postman--**

1. It is used to test our developed API. We can early test our developed API.
2. To send data or information to the client and Communicate client and Server.
3. To send token for saving cookies.
4. To send Raw JSON data.

But most of the time you will either find Rest Assured to perform API testing automation or Soap UI.

In my last project I used Postman for testing API manually, in this case I used GET, POST, PUT Call .Our End point was Product ID and Product Name . Most of the time I used GET call to validate this I used GET call.

**10) What is Web Elements ?**

Web elements are nothing but HTML elements, like-text box, drop downs radio button, Submit button, etc. These HTML elements are written with start tag and ends with an end tag.

Example- <p> My first HTML documents </p>.

**11) How to handle Dynamic Web Elements?** Strategy to handle-

a**) Absolute path method**-this is the easiest way to solve the issue

b) Use Relative Xpath-using contains or starts with text.

c) Identify by Index

4) Use multiple attributes to locate an elements.