Application Programming Interface

1. What is API?

- API Means Application Programming interface
- API is used to communicate between two or more software components.
- API is used to exchange data between two software components
- Everyday we use application like what's up , Facebook, phone Pay ,google pay we are using API.

2. What is API testing

- API Testing is type of software testing.
- Inside the API testing we focus on business logic of the functionality.
- API is lack of UI (User interface) means inside API we don't have UI, we check business logic of the functionality with the help API testing.
- API testing is performed on message layer or business logic layer.

3. What is Web Services?

- These are the service available over web or network that provide the way to communicate between 2 software or application
- Important points related to web service
  1) Web services work over HTTP means Internet connection compulsory required.
  2) Web service does not provide the User Interface (UI)
  3) If an API call over HTTP protocol over network then it become the Web Services

4. Difference between API and Web Service

Web Service	**API**
it always need network to do operation	it may not required network for its operation
All Web Service are API	All API are not Web Services
Web service can be used SOAP,REST etc communication	API Can communicate through CRUD calls
It is not possible in case of Web Services	If an API get call over HTTP protocol over network then it become Web Service

5. What are the different types of API?

there are different types of APIs

1) Private API
2) Partner API
3) Open / Public API
4) Composite API
5) Internal API

i. Private API

- *Development team use these API within the team.*
- *These API is created in house by development team and it is highly personalized API according to team needs.*
- *These API cannot be used by external developer or company.*
- *these API specially build for own project or company use.*

ii. Partner API

- *We use Partner API to collaborate on Projects.*
- *Partner developer they can modify the API as per the requirements wise.*
- *These API allow or maintains the Organization API flows .*

iii. Open / Public API

- *Open API or public API is used to any organization.*
- *it is free to available in market , any company they can use these API.*
- *some Open API have free of cost and some have with charges.*
- *if u want to use Open / Public API then we have register application information in their portal.*

iv. Composite API

- *Composite API it allows to application to make the request in different platform (OS and Language)*
- *Composite API is used widely by organization to capture the test data from different platforms.*

v. Internal API

- *Internal API is strictly used in within the organization or company.*

- *if u want to connect to internal software component or functionality then we use Internal API*

6. What are the different types of API protocol?

-API protocol it is used to exchange the data between 2 or more software components

there are different types of API protocol

I. *REST API*
II. *SOAP API*
III. *GraphQL API*
IV. *Webhook API*

1) REST API

- *Representation State Transfer (REST) it is used on web applications.*
- *it is used to exchange the data between 2 or more software components*
- *it uses HTTP or HTTPs request to send or retrieve the data from server.*
- *REST is stateless means they don't store any session information/ test data between the requests.*
- *REST it supports for different format as like JSON/XML/java script/html etc.*
- *it is more preferred than other API protocol.*
- *REST is architectural style, so easily we can implement SOAP protocol inside the REST.*
- *in REST service it inherits the securities from other Protocol.*

2) SOAP API

- *Simple Object Access Protocol used in complex transactions that require higher level of security.*
- *SOAP uses only XML format.*

- *SOAP is protocol, we cannot implement or inherit securities from other protocol.*
- *SOAP define their own securities*
- *SOAP is slower than the REST.*
- *SOAP is preferred is less compare with REST but in transactions level API we preferred SOAP protocol.*

3) GraphQL API

- *GraphQL API is mostly used in mobile and web-based applications.*
- *in GraphQL we use single endpoints for the multiple purpose.*
- *GraphQL has ability to query multiple resources in single requests*
- *GraphQL, it allows to more precise control over the test data that is retrieved format.*

4) Webhook API

- *Webhook API is used in real time notifications when specific events is occurs.*
- *Webhook API is mostly used in social media applications.*

7. Difference between SOAP and REST?

SOAP	***REST***
SOAP Means simple object Access protocol	*REST means Representational State Transfer*
SOAP is protocol	*REST is architectural style*
SOAP Support only (Extensive Markup Language) XML Format	*REST supports XML or JSON format*
SOAP is slower	*REST is faster*
SOAP Define own securities	*REST service inherit the securities*
It is less preferred	*It is more preferred*
SOAP can not be REST because it is protocol	*REST can be SOAP Web service because it is concept*
Not much light weight than REST	*REST is very light weight*

8. What are the different tools used in API?

- There are famous Tools in market to test API Manually as well as by using Automation.
  1) Postman
  2) Soap UI
  3) Karate
  4) HTTP Master
  5) Para-Soft
  6) HP UFT
  7) Rest Assured
  8) Rest Pro
  9) PyRest test
  10) TOSCA

9. What are the different testing types we performed in API?

we performed different testing types on API

1) Functional testing

- by using Functional testing, we validate the application behaviour as per the requirement documents
- by using Functional testing, we validate the functionality of the application.

2) Security testing

- by Security testing we test to ensure that data send in secured mode.
- by Security testing we validate application access functionality as per the user roles wise.

3) Performance testing

- by using Performance testing we validate the speed and accuracy of API response.

4) ***Integration testing***

- *by using Integration testing we validate API integration flow from one to another system.*

5) compatibility testing

- *by using compatibility testing we validate application with different versions.*

10. What are the different types of available to create API documentation

there are different tools

1) Swagger tool

2) Postman tool

3) Apiary tool

4) RAML tool.

*1***) Swagger tool***

- *Swagger/openAPI tool used to create API documentation and*
- *it allowed to developer to define the API specification in standard format.*
- *in my current project we use swagger tool to create API documentation*

2) ***Postman tool***

- *In Postman tool also we create API documentation*
- *but in my current project we use Postman tool to test the APIs or Web Services manually*

3) ***Apiary tool***

- *by using Apiary tool also, we can create API documentations*

4) ***RAML tool.***

- *RAML means RestFul API Modelling Language tool.*
- *RAML tool used for creating the API documentations.*
- *RAML tool is used on YAML language.*

- *it enables to developer to define the API structure of request or response parameters in human readable format.*

11. What is API Documentation?

there different important things present in API documentation

1) Endpoints

2) Request Parameter

3) Request and Response format

4) Authentication and Authorization

5) Response code/ status Code and Error Handling code

6) Usages Examples or code Snippets

7) Interactive documentations

8) Versioning and changelogs

1. Endpoints

- in API documentation we have different endpoints available to interact with API.
- Each endpoints are used for different purpose as like retrieve entity, create a entity, update the entity and delete the entity.
- To perform this operation we use different types of request as like GET Request, POST Request, PUT/PATCH Request or DELETE request.
- in API documentation we mention endpoints along with request type.

2) Parameter

- in API documentation they clearly mention parameter as like path parameter, query parameter, request body parameter, header parameter, cookies parameter, form multipart parameter along with key-value pair and its datatype information
- API documentation also provide more information regarding the parameters as like which parameter compulsory or optional.

3) Request and Response format

- in API documentation, they clearly mention we have to send request body in JSON/XML format to the server and after getting the response, server should return response body in JSON/XML format.
- Which type of request body format is accepted by endpoints and What will be response body format will return from server.
- Can we send request body in JSON or XML format for same end points?

  Yes

- can we send request body in combination of JSON and XML format?

  No

4) Authentication and Authorization

- API documentation, it should provide the instruction regarding how to add Authorization or how to use them
- it provide Authorization types of information

5) Response code/ status Code and Error Handling code

- in API documentation must cover various status code and error code message that API Can return in Response.
- This helps to handle different request scenario as like successful request, error code, rate limiting and authentication fail (401/403)

6) Usages Examples or code Snippets

- API documentation, it includes the Practical usage examples and code snippets with how to hit the API effectively.
- API documentation, they should provide dummy examples to how to use APIs.

7) Interactive documentations

- Interactive documentations means same tools allows to make the request directly without other tools.

8) Versioning and changelogs

- In API Documentation, it clearly mention the API version details and any recent changes introduced in each and every version.
- Change log it helps to track the updates .

12. What are the different types of Authorization in API

- ***there are different types of Authorization in API***
  - ***1) No Auth***
  - ***2) Basic Auth***
  - ***3) Digest Auth***
  - ***4) Bearer token***
  - ***5) OAuth 1.0***
  - ***6) OAuth 2.0***
  - ***7) JWT Auth***
  - ***8) API Key***

13. What are the different HTTP Request?

- *There are 5 most important or famous HTTP Request in API*

1) GET Request

Get Request is used to retrieve the data from the server.

If we hit GET Request

it will return the status code as 200

It will return the status line as HTTP/1.1 200 OK

It will return the whole response Body or Response Payload

It will return response Headers

2) POST Request

Post Request is used to create a new Entity in server

If we hit POST Request

it will return the status code as 201

It will return the status line as HTTP/1.1 201 Created

It will return the whole response Body or Response Payload

It will return response Headers

3) PUT Request

PUT Request is used to update whole Entity in server

If we hit PUT Request

it will return the status code as 200

It will return the status line as HTTP/1.1 200 OK

It will return the whole response Body or Response Payload

It will return response Headers

4) PATCH Request

PATCH Request is used to update partial Entity in server

If we hit PATCH Request

it will return the status code as 200

It will return the status line as HTTP/1.1 200 OK

It will return the whole response Body or Response Payload

It will return response Headers

5) DELETE Request

DELETE Request is used to delete the entity from the server.

If we hit DELETE Request

it will return the status code as 204

It will return the status line as HTTP/1.1 204 No Content

It will return response Headers

14. Difference between HTTP GET and POST?

Get	*POST*
It is used to retrieve the data from server	It is used to add new entity in a server
Response code is 200	Response code is 201
Response status line is 200 Ok	Response status line is 201 Created
Not required to send request body	Compulsory we have to send request body
If we hit GET request 100 times it will retrieve same user 100 times	If we hit POST request 100 times then it will create 100 new users in server
Inside the GET Request we can pass request parameter in URI	Inside the POST request we pass request parameter in Body
It is not mandatory to send header with GET Request	It is mandatory to send header with POST Request
Inside the GET Request we can pass limited amount of data	Inside the POST Request we can pass large amount of data.
GET Request can be bookmarked	POST request can not be bookmarked
GET is used for view the data	POST used for create the data
GET Request is not secured	POST Request is secured
GET Request is idempotent means second request will be ignored until response of first request of first is delivered.	POST Request is not idempotent

15. Difference between HTTP GET and PUT?

Get	*PUT*
It is used to retrieve the data from server	It is used to update entity in a server
Response code is 200	Response code is 200
Response status line is 200 Ok	Response status line is 200 Ok
Not required to send request body	Compulsory we have to send request body
If we hit GET request 100 times it will retrieve same user 100 times	If we hit PUT request 100 times then it will update same user 100 times in server

Inside the GET Request we can pass request parameter in URI	Inside the PUT request we pass request parameter in request Body
It is not mandatory to send header with GET Request	It is mandatory to send header with PUT Request
Inside the GET Request we can pass limited amount of data	Inside the PUT Request we can pass large amount of data.
GET Request can be bookmarked	PUT request cannot be bookmarked
GET is used for view the data	PUT used for update the data
GET Request is not secured	PUT Request is secured
GET request is not editable	PUT Request is editable

16. Difference between HTTP GET and PATCH?

Get	***PATCH***
It is used to retrieve the data from server	It is used to update specific entity in a server
Response code is 200	Response code is 200
Response status line is 200 Ok	Response status line is 200 Ok
Not required to send request body	Compulsory we have to send request body
If we hit GET request 100 times it will retrieve same user 100 times	If we hit PATCH request 100 times then it will update same user 100 times in server
Inside the GET Request we can pass request parameter in URI	Inside the PATCH request we pass request parameter in request Body
It is not mandatory to send header with GET Request	It is mandatory to send header with PATCH Request
Inside the GET Request we can pass limited amount of data	Inside the PATCH Request we can pass large amount of data.
GET Request can be bookmarked	PATCH request can not be bookmarked
GET is used for view the data	PATCH used for update the data
GET Request is not secured	PATCH Request is secured
GET request is not editable	PATCH Request is editable

17. Difference between HTTP GET and DELETE?

Get	*DELETE*
It is used to retrieve the data from server	It is used to delete the entity from server
Response code is 200	Response code is 204
Response status line is 200 Ok	Response status line is 204 No Content
If we hit GET request 100 times it will retrieve same user 100 times	If we hit DELETE request 100 times then first it will delete the entity from server then second time it will give 404 error code (Entity is not present)
GET Request can be bookmarked	DELETE request can not be bookmarked
GET is used for view the data	DELETE used for delete the data from server
GET Request is not secured	DELETE Request is secured

18. Difference between HTTP POST and PUT?

POST	*PUT*
It is used to add new entity in a server	It is used to update entity in a server
Response code is 201	Response code is 200
Response status line is 201 Created	Response status line is 200 Ok
If we hit POST request 100 times then it will create 100 new users in server	If we hit PUT request 100 times then it will update same user 100 times in server
POST request can not be bookmarked	PUT request cannot be bookmarked
POST used for create the data	PUT used for update the data
POST is non Idempotent	PUT request is idempotent so if we send same request multiple times that should be equivalent to first request.

19. Difference between HTTP POST and PATCH?

POST	PATCH
It is used to add new entity in a server	It is used to update specific entity in a server
Response code is 201	Response code is 200
Response status line is 201 Created	Response status line is 200 Ok
If we hit POST request 100 times then it will create 100 new users in server	If we hit PATCH request 100 times then it will update same user 100 times in server
POST request can not be bookmarked	PATCH request cannot be bookmarked
POST used for create the data	PATCH used for update the data
POST is non Idempotent	PATCH request is idempotent so if we send same request multiple times that should be equivalent to first request.

20. Difference between HTTP POST and DELETE?

POST	DELETE
It is used to add new entity in a server	It is used to delete the entity from server
Response code is 201	Response code is 204
Response status line is 201 Created	Response status line is 204 No Content
Compulsory we have to send request body	we never send request body in DELETE Request
It is mandatory to send header with POST Request	It is not mandatory to send header with DELETE Request
If we hit POST request 100 times then it will create 100 new users in server	If we hit DELETE request 100 times then first it will delete the entity from server then second time it will give 404 error code (Entity is not present)
POST used for create the data	PUT used for delete the data
POST is non Idempotent	PUT request is idempotent so if we send same request multiple times that should be equivalent to first request.

21. Difference between HTTP PUT and PATCH?

PUT	PATCH
It is used to update entity in a server	It is used to update partially entity in a server

22. Difference between HTTP PUT and DELETE?

PUT	DELETE
It is used to update entity in a server	It is used to delete entity from server
Response code is 200	Response code is 204
Response status line is 200 Ok	Response status line is 204 No Content
Compulsory we have to send request body	We never send request body in Delete request
If we hit PUT request 100 times then it will update same user 100 times in server	If we hit DELETE request 100 times then first it will delete the entity from server then second time it will give 404 error code (Entity is not present)
Inside the PUT request we pass request parameter in request Body	We never send request body in Delete request
It is mandatory to send header with PUT Request	It is not mandatory to send header with PUT Request
Inside the PUT Request we can pass large amount of data.	Inside the DELETE Request we never pass data.
PUT used for update the data	DELETE request is used to delete the data

23. Difference between HTTP PATCH and DELETE?

PATCH	DELETE
It is used to update entity in a server	It is used to delete entity from server
Response code is 200	Response code is 204
Response status line is 200 Ok	Response status line is 204 No Content

Compulsory we have to send request body	We never send request body in Delete request
If we hit PATCH request 100 times then it will update same user 100 times in server	If we hit DELETE request 100 times then first it will delete the entity from server then second time it will give 404 error code (Entity is not present)
Inside the PATCH request we pass request parameter in request Body	We never send request body in Delete request
It is mandatory to send header with PATCH Request	It is not mandatory to send header with PUT Request
Inside the PATCH Request we can pass large amount of data.	Inside the DELETE Request we never pass data.
PATCH used for update the data	DELETE request is used to delete the data

24. What are the different points we verify in API?

- ***We verify different points in HTTP Request***

1) *Status code*
2) *Status Line*
3) *Response body*
4) *Response Headers*
5) *Response cookies*
6) *Response time*
7) *Authorization check*
8) *Error code in case in API return any code*
9) *Data Accuracy*