**API (Application Programming Interface)**

**What is an API?**

An API is an interface by which to host machines interact with each other on the internet. They follow a client server architecture – HTTP protocol to communicate

Examples-

1. Weather app on the phone - The weather app displays weather data by interacting with the system .This is done through APIs

**Client – Mob app**

**Server – Weather System Database**

2. Ola app – Ola interacts with the Google Maps to provide location. This is done through APIS

Client – Ola App

Server – Google Map Database

**Types of APIs**

1. **REST API**- Most popular API . in which the client sends data in the form of requests to the server ,the server uses them to start functions and responds with the o/p

**Client requests are URLs type in browser**

**Server response is plain text data(not a webpage)**

2. **SOAP API** Simple Object Access Protocol

3. **WebSocket API**

4. **RPC(Remote Procedure Call) -**  The client completes a function (procedure) and the server responds with an o/p

**Benefits OF APIs.**

1. **Integration** - Any new features in the application can be integrated at the API level instead of writing the code from the scratch

2. **Expansion-** APIs present a unique opportunity for businesses to meet their clients’ needs across different platforms. For example, maps API allows map information integration via websites, Android,iOS, etc. Any business can give similar access to their internal databases by using free or paid APIs.

3. **Innovation**- When a new app is created, businesses need to accept the changes. With APIs, the changes can be made at API level instead of writing the code from the scratch

4. **Ease of maintenance**- An API is a gateway b/w computers. Each system is obliged to make internal changes so that API is not impacted. This way any code changed in future by one developer does not affect the other.

**API Integrations.**

Software components that automatically update data b/w client and server.

Example –The photos on the photo gallery are automatically sync with the Cloud

Laptop

**Types of APIs**

**1. Private** - Used within the org

**2. Public-** Open to be used by anyone.

**3. Partner**- Only authorized by external developers to help inter-business partnerships

**4. Composite APIs-** Combination of two or more APIs for complicated use cases

**How to create an API?**

Due diligence and effort are required to build an API that other developers will want to work with and trust. These are the five steps required for high-quality API design:

**1. Plan the API**

API specifications, like OpenAPI, provide the blueprint for your API design. It is better to think about different use cases in advance and ensure the API adheres to current API development standards.

**2. Build the API**

API designers prototype APIs using boilerplate code. Once the prototype is tested, developers can customize it to internal specifications.

**3. Test the API**

API testing is the same as software testing and must be done to prevent bugs and defects. API testing tools can be used to strength test the API against cyber attacks.

**4. Document the API**

While APIs are self-explanatory, API documentation acts as a guide to improve usability. Well-documented APIs that offer a range of functions and use cases tend to be more popular in a service-oriented architecture.

**5. Market the API**

Just as Amazon is an online marketplace for retail, API marketplaces exist for developers to buy and sell other APIs. Listing your API can allow you to monetize it.

**Hoe to Secure Rest APIs?**

2 Ways to secure a REST API

1. Authentication token

2. API Keys