FUNDAMENTALS OF WEB SUMMARY - 15/09/2022
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IMPORTANT POINTS

- HTTP
  - Hypertext transfer protocol
  - It is a protocol to set up communication between web service between and clients any time you click a button or send a submit a form or do something a request is sent and in that regard response from the back which contains headers and a body
  - request is completely independent
  - Http can be used to hold login data, sessions, cookies etc
- HTTPS
  - Hypertext transfer protocol Secure
  - All the request and data that is sent is encrypted with the help of SSL or TLS certificate
  - SSL - Secure sockets layer
  - TSL - Transport layer security
  - this is done by installing an SSL certificate on the web host
- HTTP METHODS
  - GET - Retrieve data from server
  - POST - Submit data to the server
  - PUT - update data already on the server
  - DELETE - delete data from the server
- Each request or response has a header and a body
- HTTP status codes
  - 200 - ok
  - 201 - ok created
  - 301 - moved to new url
  - 304 - not modified (cached version)
  - 400 - bad request
  - 401 - unauthorized
  - 404 - not found
  - 500 - internal server error
- HTTP/2
  - Revision of HTTP
  - Reduces latency by enabling ful request and response multiplexing
  - it is fast efficient and Secure
- Peer to peer Model
  - Decentralized
  - Not much cost to run a single machine.
  - Drawback :
    - If malicious thing is done,it is not easy to detect it
- IP : internet protocol
  - As soon as device added to network, it is assigned ip address (it is unique)
  - Routers act as traffic managers
  - ISP assigns ip address
  - Static and dynamic IP's are 2 types
  - Versions of IP : IPv4 and IPv6
- IPv4
  - 32 bit address

    - Address representation in decimal
- IPv6
    - 128 bit address
    - Address representation in hexadecimal.
- DNS - domain name servers : phonebook of internet
- API (Application programming interface) : helps to communicate between client and server. Reduces presentational overhead as raw data is sent by the server and then the client can use the data and render it instead of sending whole webpages (HTML documents) as response

1. What is the internet?

A global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols
Important points :

- Internet is expanse : Contains millions of networks and billions of devices which are interconnected
- Internet has no owner but the governments can regulate its usage
- It is decentralized, failure of 1 network or device does not affect the internet

2. How does the web work?

- We first connect our device to the internet through an ISP (internet service provider)
- When we make a request from our device with the help of a browser, it will first resolve the destination address.
- DNS (domain name server) is the phonebook of the internet and helps to convert the domain name into the IP address.
- Once our HTTP request reaches the server, the server responds back with a response
- The data transmission occurs in form of small packets of data
- Once all packets are received at the user end, the browser will arrange these packets to form the original response/data.
- After the arrangement we will be able to see the contents of the website we requested for.

3. What are the building blocks of the web?

- **Client - server model :** Client is just like a user, it requests something from the server. In a network, a client is a device which is capable of displaying the response/webpage returned from the server. Server is a powerful device which is able to handle many requests from multiple clients. It is generally connected to a database and is responsible for serving the client with information.
- **TCP/IP** (Transmission Control Protocol/ Internet Protocol) : It determines how requests/messages are formatted and ensures that the transmission is error free and reaches the destination correctly. TCP - Connection is established between the sender and receiver. IP ensures correct addressing and correct delivery of packets..
- **Packet Switching:** splitting messages into small units called packets and sending them through different paths and reassembling those packets at the destination.

4. How do websites work?

- The user uses a browser to make a request to view a website.
- Then the DNS converts the URL to the respective IP address and locates the server

- The server receives the request and generates a response which could be with or without the help of a database.
- The client end and the backend of the website communicate or share data with the help of API's (Application Programming Interface).
- When the server receives the request, The backend of the website performs certain functions like validation, submission etc. and then reverts back with a response
- The backend is usually connected with a database which stores user data or information which can be used accordingly.