

1) What is HTTP? Explain Request and Response mechanisms.

HTTP:

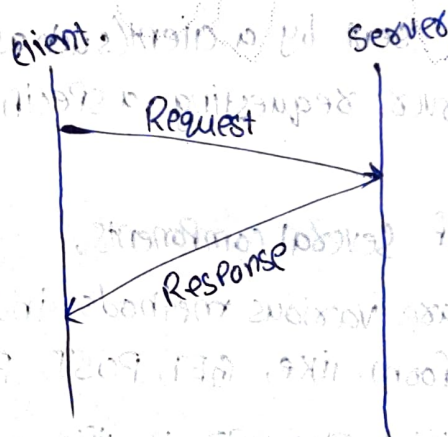
HTTP (Hypertext Transfer Protocol) is the foundation of data communication on the internet.

- It is a Transfer Protocol can be used to transfer the data on the world wide web (www).
- It is the most commonly used Protocol for data transfer between client & server.

Features of HTTP:

- * Connectionless
- * Stateless
- * media independent
- * Client server architecture.

HTTP working



- At first, The client initiates an HTTP request to the server. This request contains information about the Resource client wants.
- Server receives the Request which is sent by the client, this may be GET, POST, PUT or any other method.
- Then the server processes Request by performing necessary operations to fulfill the client's Request.
- Server then generates Response after processing the Request along with a status code, headers and content.
- Client receives the Response sent by the server and client interprets the Response status code to determine the success or failure of the Request.
- Finally the client displays the content if the Response is a success. Then the connection is closed.

HTTP Request:

HTTP Request is a message sent by a client (such as a web browser or an mobile app) to a server, requesting a specific action to be performed.

- A HTTP Request consists of several components,
 - i) Request method: These are various methods indicating the action client wants server to perform. like, GET, POST, PUT.....
 - ii) Uniform Resource Identifier: The URI identifies the resource upon which the Request is being made.

- iii) HTTP Version: Specifies the version of HTTP Protocol being used.
(HTTP/1.1, HTTP/2)
- iv) Headers: Headers provide additional information about Request or client.
- v) Request Body: If any data, Parameters are to be sent, are sent in body.

HTTP Response:

An HTTP Response is a message sent by the server to a client in response to the HTTP Request.

- HTTP Response consists of several components.
 - i) Status: A status code is a 3 digit numeric code that indicates the outcome of the Request.
→ Few of status codes are 200 OK, 404 Not Found etc.
 - ii) Headers: Headers provide additional information about the Response of server.
 - iii) Response Body: The body contains the requested resource or the data provided by the server.

Advantages:

- * Universal
- * Simple & lightweight

Disadvantages

- * security issues
- * limited functionality.

2) What is DNS? Explain architecture and services provided by DNS?

DNS

Domain Name System (DNS) is a hierarchical distributed naming system used to translate domain names into IP addresses.

→ As we know all the systems (websites, servers, etc.) on the internet can only be accessed through IP address. But remembering IP addresses is not an easy way for humans.

→ So we use human-readable domain names, DNS is used to convert the names into the IP address.

→ it serves as the phone book of the internet.

eg. →

Domain name	→	IP address
Google.com	→	172.217.164.174

Architecture of DNS

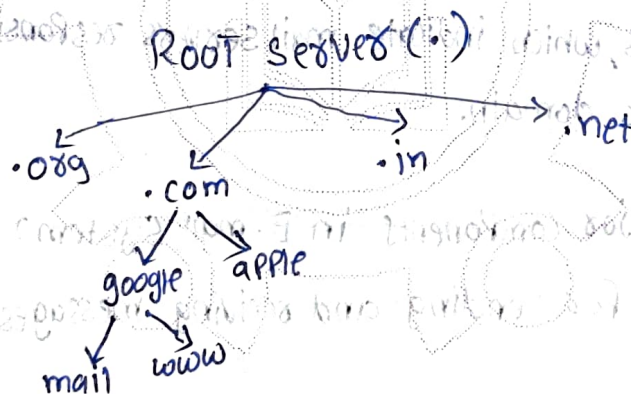
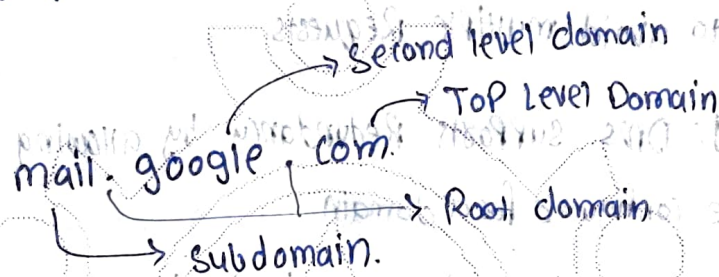
DNS has an hierarchical tree type of architecture with the following components.

- i) Root Domain: At the top level DNS hierarchy is the root domain represented by a single dot (.).
- ii) Top Level Domains (TLDs): Below the root domain are the top level domains such as .com, .org, .net, .edu and country code TLDs like .in, .uk, .jp etc...

iii) Second Level Domains: under the Top Level domains are the Second Level Domains which are often used by organizations, business or individuals to create a unique domain name.
like, google.com, wikipedia.org etc.

iv) Sub domains: Subdomains are subdivisions of domains and can be created to organize and structure the websites or services.
like, mail.google.com.

Example:



Services Provided by DNS:

In modern day networking, DNS plays very important role, they provide many services such as,

i) Domain Name Resolution:

DNS resolves domain names to IP addresses and vice versa.

which enables users to access websites and internet services using human readable domain names.

ii) Load Balancing: DNS can be used to distribute traffic across multiple servers by associating multiple IP addresses with a single domain name.

iii) Caching: DNS servers can cache DNS records locally for some time period to avoid multiple requests.

iv) Redundancy: DNS supports redundancy by allowing multiple name servers to be configured for a domain.

v) Mail Routing: DNS is used for mail routing by specifying mail exchange records, which indicate mail servers responsible for receiving email for specific domain.

3) What are the major components in E-mail system? and explain the role of SMTP for sending and receiving messages.

Email is a communication system that enables the exchange of messages between users over the internet.

* Email means electronic mail, is method of exchanging digital messages between people using electronic devices.

* Email has become an integral part of personal and business communication worldwide due to its speed, convenience.

Architecture / Components of Email:

Email Architecture consists of several key components they are,

i) User Agent:

User Agent is an interface that users utilize to interact with their emails.

→ used by users to send or view emails

→ examples are, web browsers, desktop clients or mobile apps

ii) Mail Servers:

This is the server responsible for storing, sending and receiving mails

→ This contains two components, they are Mail Transfer Agent (MTA) and Mail Delivery Agents (MDA)

iii) SMTP (Simple Mail Transfer Protocol)

SMTP is a protocol used for sending emails between servers.

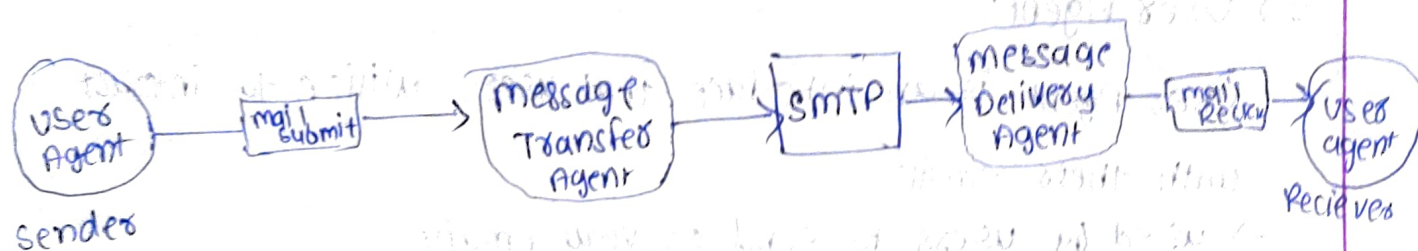
→ It defines how messages should be formatted and transmitted over the internet.

iv) POP (Post Office Protocol)

POP is a protocol used by email clients to retrieve emails from the mail server or manage and access emails stored on the server.

v) DNS (Domain Name System):

DNS is used to look up the mail server associated with a recipient's email address.



Role of SMTP:

SMTP Plays a crucial Role in sending and receiving messages in the email system.

Sending messages:

when a user sends an email, the email client communicates with their email server using SMTP

- The client sends, sender, Receiver address and content of message.
- The SMTP then contacts Receiver's email server and delivers the mail

Receiving messages:

When a message is received by a mail server, it is stored in a queue and then delivered to receiver using POP.

- SMTP is used in background for the server-to-server communication to transfer from sender to receiver.

4) How streaming of video and audio can be done. explain.

Streaming of video and audio:

Streaming of video and audio involves delivering multimedia content over the internet in real-time.

→ The videos or audios stored on the servers should be able to consumed by users.

→ There are various steps in video and audio streaming:

i) Compression:

Before streaming video and audio files are compressed using various methods to reduce file size while maintaining quality.

ii) Content storage:

The compressed video and audio files are stored on servers, known as streaming servers.

→ These servers are optimized for delivering multimedia content efficiently.

iii) Streaming Protocols:

Different streaming protocols govern how multimedia content is transmitted over the internet.

→ Some common protocols include:

HLS, DASH, RTMP etc...

iv) Client side software:

users access streaming content through client-side software such as, web browsers, mobile apps

→ This software decode the compressed multimedia data and display to user.

v) Buffering:

To ensure smooth playback and reduce interruptions, streaming clients buffer a small portion of content before play begins.

5) write a short note on world wide web?

- World wide web, which is also known as a web
- www is a collection of websites or webPages stored in web servers and connected to local computers via internet.
- These websites contain text Pages, digital images, audios, videos etc.
- users can access content of these websites from any point in the world over internet using devices like, computer, mobiles etc.
- users can access www using The web browsers like, chrome.
- www is a foundation of internet and should be used to access anything on the internet.