UNIT-I	WEB SITE BASIC, HTML 5.2, CSS 3.0	3

Internet Protocols - HTTP - Understand Internet - Difference between web site and application Server - Internet technology Overview - HTML5.2 and CSS 3.0

INTERNET PROTOCOLS

Internet Protocol are a set of rules that allow computers and other devices to communicate over the internet. These protocols ensure that data is sent, received, and understood correctly between different systems. There are many types of internet protocols, each serving a specific purpose, such as transferring files, sending emails, or securing data.

i. What is Internet Protocol?

Internet Protocol (IP) is a set of rules that allows devices to communicate with each other over the Internet. It is like the address system used for sending data. Every device connected to the internet has a unique IP address that helps data know where to go and where it is coming from.

It ensures that information sent from one device reaches the correct destination by using a unique set of numbers known as **IP addresses**.

ii. Why is Internet Protocol Important?

The Internet Protocol is a fundamental component of the Internet and computer networks, responsible for delivering packets of data from the source host to the destination host based on their IP addresses. It ensures that packets of data get to the right destination from the source device.

Each device connected to a network is assigned an IP address, which serves as a "home address" for the device, enabling other devices to locate and send messages to it and providing the addressing and routing mechanisms the devices require for their communications.

iii. Primary Terminologies

Terminology	Description
IP Address	IP address is referred as a number sticker given to each device that

	belongs to the network which utilizes Internet Protocol to communicate. It serves two main purposes: host or network interface recognition, identifier or location addressing.
Packet	A packet is a parcel of data that is switched between an origin and a destination via the Internet.
Router	A router is a network device that (serves as) a forwarding point for data packets between computer networks.
IPV4	Internet Protocol version 4 (IPv4) is a protocol that tends to provide connectivity between the desktop computers online and that application layer is the wider application one that covers most of the Internet communications.
IPV6	Internet Protocol version 6 (IPv6), the final iteration in the series of the upgrades to the Internet Protocol, is used for the purpose of identifying, locating and routing of various computers so that traffic through Internet can be transferred properly.

iv. Working of Internet Protocol

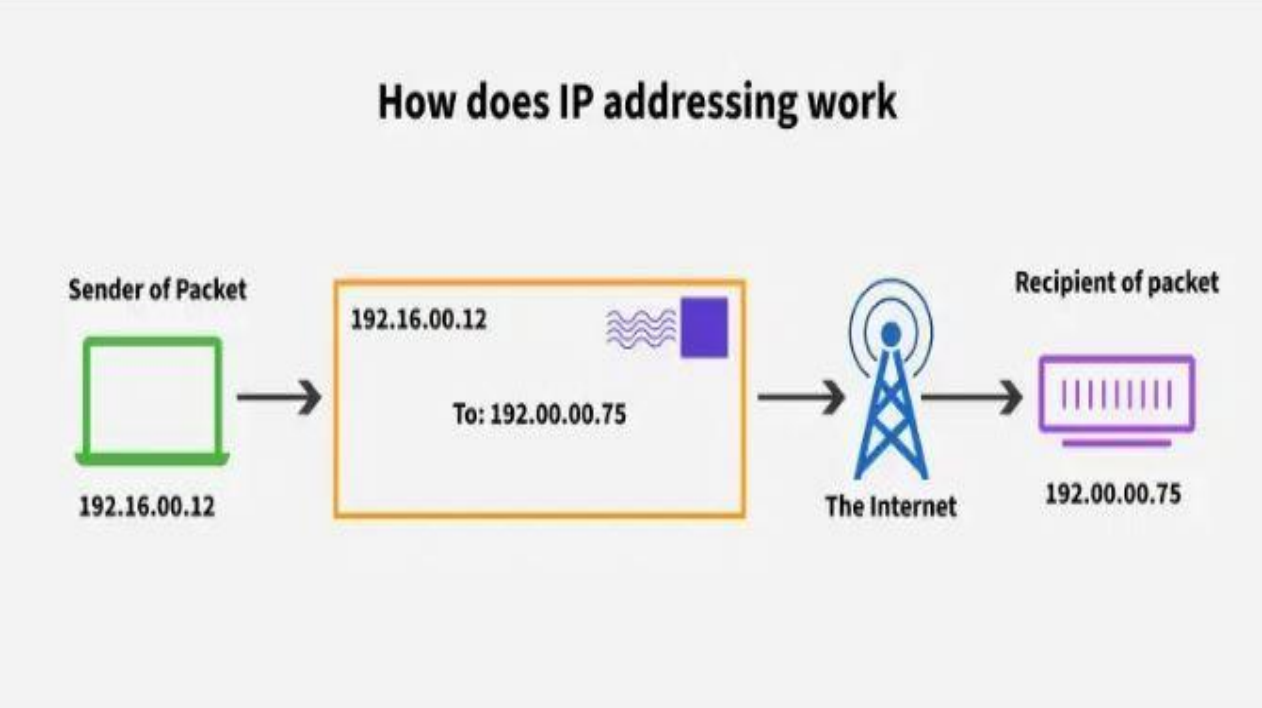
Step by step working of internet protocol:

- **Dividing Data into IP Packets**: When you send information over the internet, IP split it into small parts called **packets**. Each packet contains a piece of the data and the address of where it needs to go.
- **IP Addressing**: Every device connected to the internet has its own **IP address**. This address helps identify where the data is being sent from and where it should be delivered.

- **Routing the Packets**: As the packets travel across the internet, they pass through several devices called **routers**. These routers help direct the packets toward the correct destination, like how mail is sorted at different post offices.
- **Reassemble the Data**: Once all the packets arrive at the destination, they are put back together to recreate the original message or file.
- **Handling Missing Packets**: If some packets don't arrive, the system can request that they be sent again, making sure the complete data is received.

v. How Does IP Addressing Work?

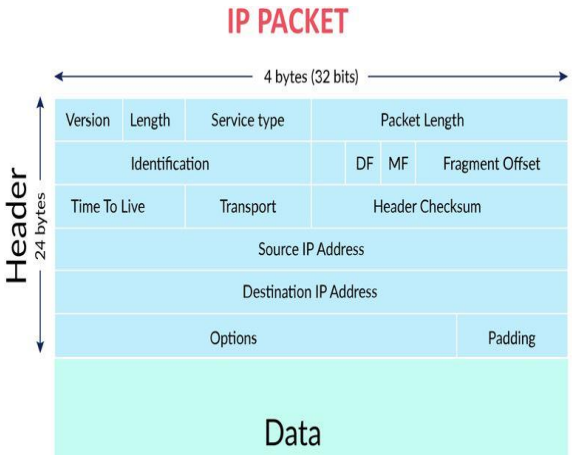
Every device connected to a network (such as the internet or a local network) needs a unique identifier so it can be located and communicated with other devices. So, the IP address serves this purpose.



IP addresses are used by routers to determine how to forward data packets across the internet or a local network. This is essential for the delivery of data between devices located in different geographical regions or network segments.

vi. What is an IP Packet?

An IP packets is the basic unit of data transmission in an IP network. It consists of a header and a payload:



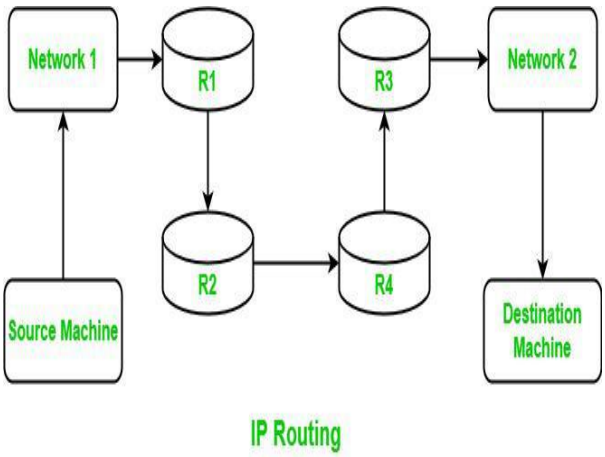
Header: The header contains essential control information, such as the source and destination IP addresses, that helps routers determine where to send the packet.

Payload: The payload contains the actual data being transmitted.

The Routers examine the IP header and use the destination IP address to determine the best route for the packet. The packet may pass through multiple routers before reaching its destination.

vii. How Does the IP Routing Work?

IP routing is a procedure of routing the information from the source to the recipient to enable its direction to the final destination.



IP Routing

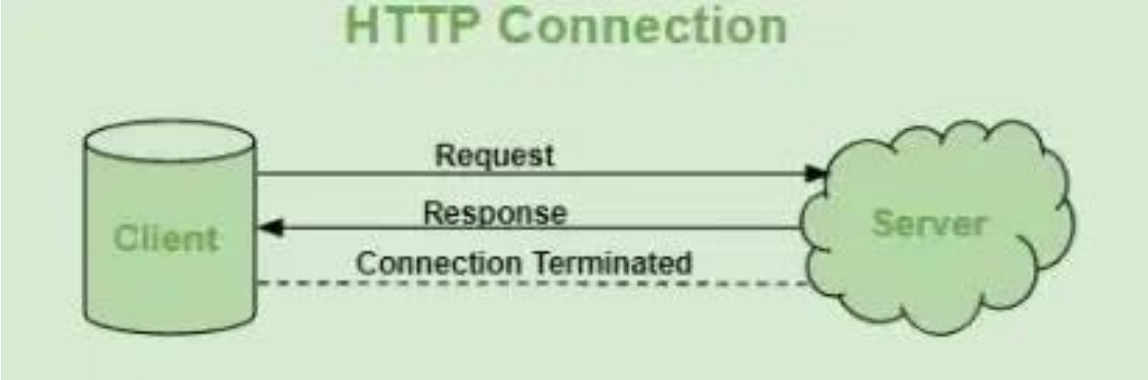
As we also know that the data is broken into several pieces, and then each piece will almost definitely go through several routers until these data ends up in the final destination.

The path that the set of data package follows is determined by the routing algorithm.

HTTP (Hypertext Transfer Protocol)

HTTP (Hypertext Transfer Protocol)

It is a fundamental protocol of the Internet, enabling the transfer of data between a client and a server. It is the foundation of data communication for the World Wide Web.



HTTP provides a standard between a web browser and a web server to establish communication. It is a set of rules for transferring data from one computer to another. Data such as text, images, and other multimedia files are shared on the World Wide Web.

Whenever a web user opens their web browser, the user indirectly uses HTTP. It is an application protocol that is used for distributed, collaborative, hypermedia information systems.

i. Characteristics of HTTP

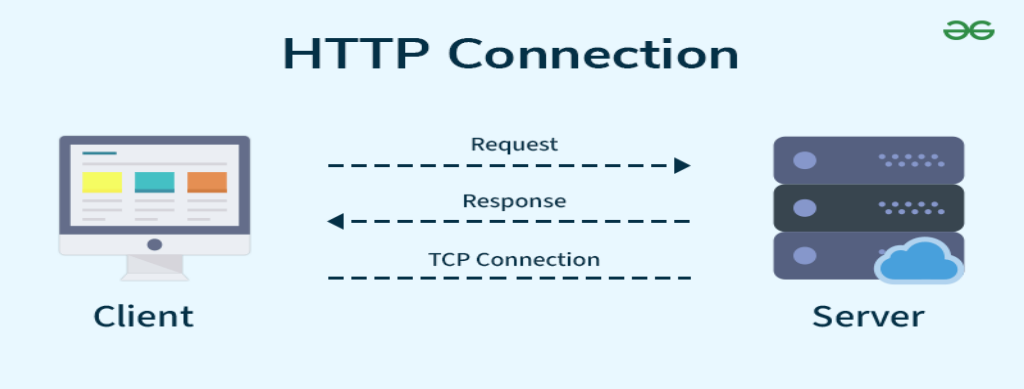
HTTP is IP based communication protocol that is used to deliver data from server to client or vice-versa.

- The server processes a request, which is raised by the client, and also server and client know each other only during the current bid and response period.
- Any type of content can be exchanged as long as the server and client are compatible with it.
- Once data is exchanged, servers and clients are no longer connected.
- It is a request and response protocol based on client and server requirements.
- It is a connection-less protocol because after the connection is closed, the server does not remember anything about the client and the client does not remember anything about the server.

ii. Working of HTTP [Hypertext Transfer Protocol]

First of all, whenever we want to open any website we first open a web browser after that we will type the URL of that website (e.g., www.facebook.com). This URL

is now sent to the Domain Name Server (DNS). Then DNS first checks records for this URL in their database, and then DNS will return the IP address to the web browser corresponding to this URL. Now the browser is able to send requests to the actual server.

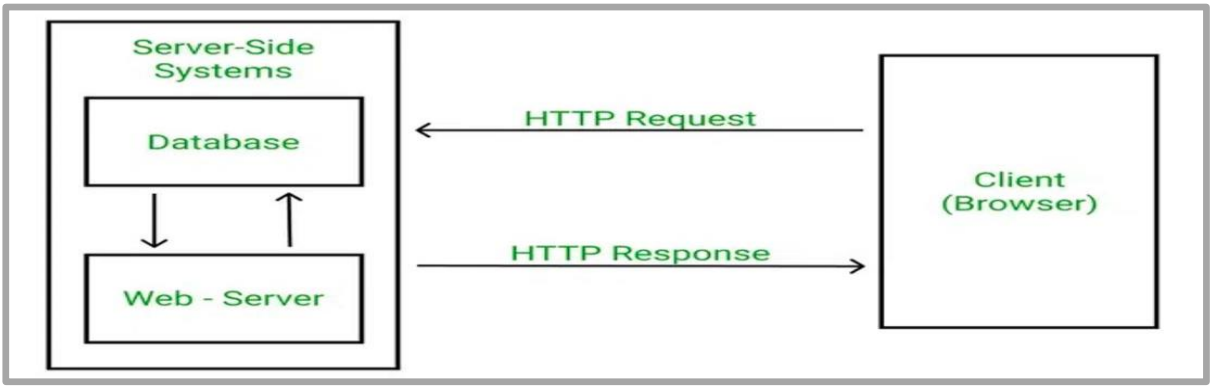


After the server sends data to the client, the connection will be closed. If we want something else from the server, we should have to re-establish the connection between the client and the server.

iii. HTTP Request/Response:

HTTP is a request-response protocol, which means that for every request sent by a client (typically a web browser), the server responds with a corresponding response. The basic flow of an HTTP request-response cycle is as follows:

- **Client sends an HTTP request**: The client (usually a web browser) initiates the process by sending an HTTP request to the server. This request includes a request method (GET, POST, PUT, DELETE, etc.), the target URI (Uniform Resource Identifier, e.g., a URL), headers, and an optional request body.
- **Server processes the request**: The server receives the request and processes it based on the requested method and resource. This may involve retrieving data from a database, executing server-side scripts, or performing other operations.



- **Server sends an HTTP response:** After processing the request, the server sends an HTTP response back to the client. The response includes a status code (e.g., 200 OK, 404 Not Found), response headers, and an optional response body containing the requested data or content.
- **Client processes the response**: The client receives the server's response and processes it accordingly. For example, if the response contains an HTML page, the browser will render and display it. If it's an image or other media file, the browser will display or handle it appropriately.

iv. Features

- **Stateless:** Each request is independent, and the server doesn't retain previous interactions' information.
- **Text-Based:** Messages are in plain text, making them readable and debuggable.
- **Client-Server Model:** Follows a client-server architecture for requesting and serving resources.
- **Request-Response:** Operates on a request-response cycle between clients and servers.
- **Request Methods:** Supports various methods like GET, POST, PUT, DELETE for different actions on resources.

v. Advantages

- **Platform independence:** Works on any operating system
- **Compatibility:** Compatible with various protocols and technologies
- **Efficiency:** Optimized for performance
- **Security:** Supports encryption for secure data transfer

vi. Disadvantages

- **Lack of security**: Vulnerable to attacks like man in the middle
- **Performance issues:** Can be slow for large data transfers
- **Statelessness**: Requires additional mechanisms for maintaining state

UNDERSTAND INTERNET

Internet is a global network that connects billions of computers across the world with each other and to the World Wide Web. It uses standard internet protocol suite (TCP/IP) to connect billions of computer users worldwide.

Internet

It is set up by using cables such as optical fibers and other wireless and networking technologies. At present, internet is the fastest mean of sending or exchanging information and data between computers across the world.

It is believed that the internet was developed by "Defense Advanced Projects Agency" (DARPA) department of the United States. And, it was first connected in 1969.

i. **What is the Web?**

The **World Wide Web**—usually called the **Web** for short—is a collection of different **websites** you can access through the Internet. A **website** is made up of related text, images, and other resources.

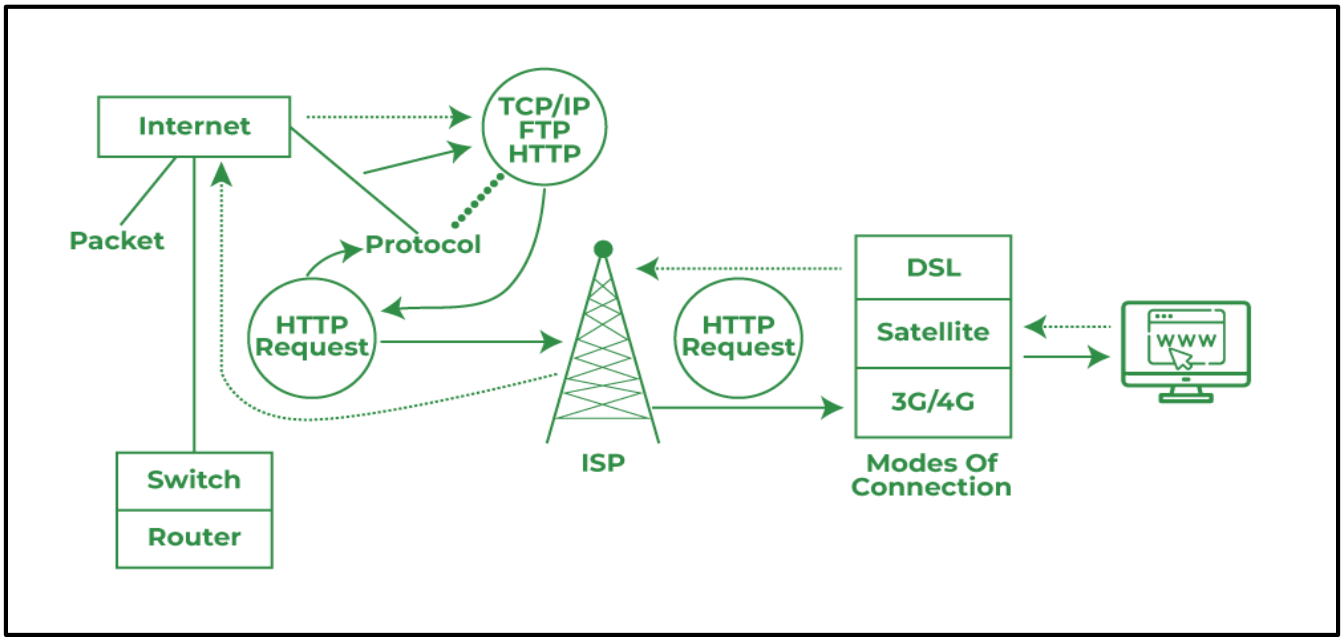
Once you are connected to the Internet, you can access and view websites using a type of application called a web browser. Just keep in mind that the web browser itself is not the Internet; it only displays websites that are stored on the Internet.

ii. How does the Internet work?

From opening a web browser to visiting a website, it all happens with specific methods that we're going to check in these 5 easy steps.

1. Firstly, you'll be required to connect your system or PC with any router or modem to establish a connection. This connection is the base of the internet connection.

2. When you open the browser and start typing something like "www.google.com", your system will push a query command to your ISP (Internet Service Provider) that is connected with other servers that store and process data.
3. Now, the web browser will start indexing the URL that you've entered and will fetch the details in numeric format (in their language to identify the address (unique) that you're trying to reach.



4. Next, now your browser will start sending the HTTP request where you're trying to reach and send a copy of the website on the user's system.
5. Once all the data (of small packets) is received at the user's end (PC/Laptop), the browser will start arranging all those small packets and later will form a collective file (here, the browser will gather all the small packets and rearrange them just like a puzzle) and then you'll be able to see the contents of that website.

iii. Difference Between World Wide Web and the Internet

World Wide Web	Internet
The world wide web is a service.	The Internet is an infrastructure.

The world wide web is a subset of the Internet.	The Internet is the superset of the world wide web.
The world wide web is software-oriented.	The Internet is hardware-oriented.
The world wide web uses HTTP.	The Internet uses IP Addresses.

Difference between Web Site and Application Server

i. What is a Web Server?

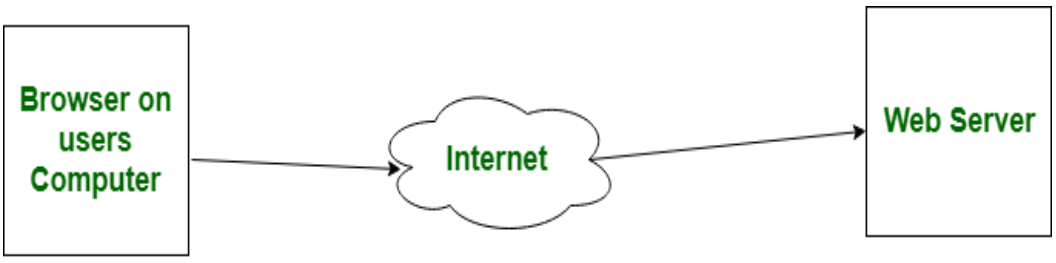
A website is a collection of many web pages, and web pages are digital files that are written using HTML (HyperText Markup Language). To make your website available to every person in the world, it must be stored or hosted on a computer connected to the Internet round a clock. Such computers are known as a **Web Server**.

ii. What is a Web Server?

A Web Server is a computer program or device that serves web content, primarily hosting websites and handling HTTP requests from clients (usually web browsers). It accepts requests for data and sends the specified documents, primarily static content such as HTML, CSS, and images. However, web servers can also handle dynamic content by interacting with server-side scripts.

Example of Web Servers:

- Apache HTTP Server
- Nginx
- Microsoft IIS
- Resin



Web Server

iii. What is an Application Server?

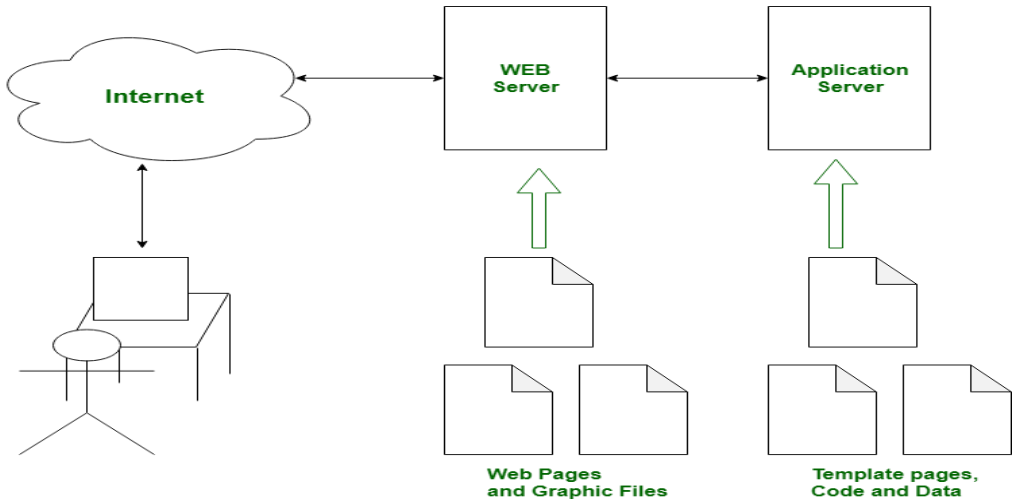
An Application Server provides a more comprehensive environment for running enterprise applications. It includes both a web container and an EJB (Enterprise

JavaBeans) container, supporting a wide range of applications, including dynamic content and complex business operations.

Application servers handle not just HTTP, but also other protocols like RMI (Remote Method Invocation) and RPC (Remote Procedure Calls), making them suitable for hosting both the logic and user interface of applications.

Examples of Application Server:

- WebLogic
- JBoss
- WebSphere
- GlassFish



iv. Differences Between Web Servers and Application Servers

S.NO	Web Server	Application Server
1.	Web server encompasses web container only.	While application server encompasses Web container as well as EJB container.
2.	Web server is useful or fitted for static content.	Whereas application server is fitted for dynamic content.
3.	Web server consumes or utilizes less resources.	While application server utilize more resources.

S.NO	Web Server	Application Server
4.	Web servers arrange the run environment for web applications.	While application servers arrange the run environment for enterprises applications.
5.	In web servers, multithreading is supported.	While in application server, multithreading is not supported.
6.	Web server's capacity is lower than application server.	While application server's capacity is higher than web server.
7.	In web server, HTML and HTTP protocols are used.	While in this, GUI as well as HTTP and RPC/RMI protocols are used.

INTERNET TECHNOLOGY OVERVIEW

Internet is a global communication system that links together thousands of individual networks. It allows exchange of information between two or more computers on a network. Thus internet helps in transfer of messages through mail, chat, video & audio conference, etc. It has become mandatory for day-to-day activities: bills payment, online shopping and surfing, tutoring, working, communicating with peers, etc.

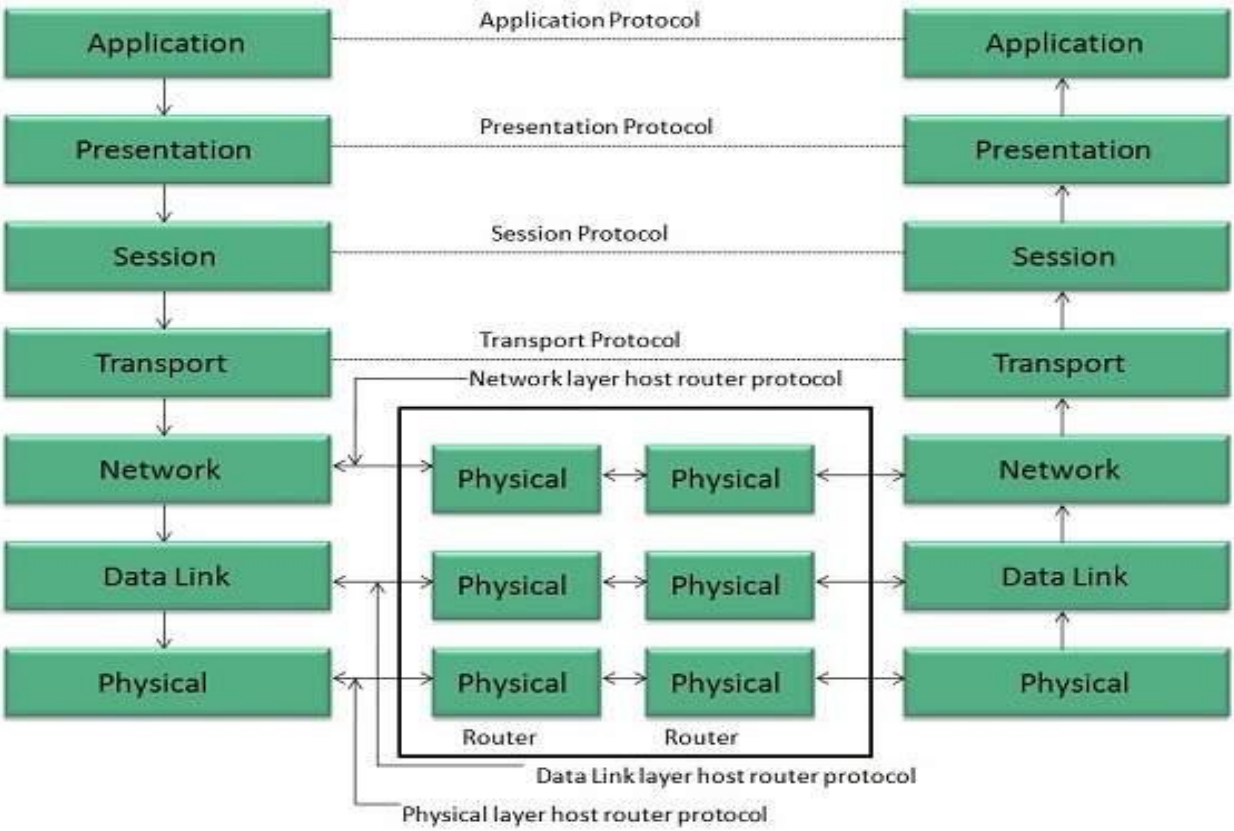
Internet

- Internet is a world-wide global system of interconnected computer networks.
- Internet uses the standard Internet Protocol (TCP/IP).
- Every computer in internet is identified by a unique IP address.
- IP Address is a unique set of numbers (such as 110.22.33.114) which identifies a computer location.
- A special computer DNS (Domain Name Server) is used to give name to the IP Address so that user can locate a computer by a name.

i. Internet Reference Models - OSI Reference Model

OSI is acronym of Open System Interface. This model is developed by the International organization of Standardization (ISO) and therefore also referred as ISO-OSI Model.

The OSI model consists of seven layers as shown in the following diagram. Each layer has a specific function, however each layer provides services to the layer above.



Physical Layer	Activating, maintaining and deactivating the physical connection. Defining voltages and data rates needed for transmission.
Data Link Layer	Performs synchronization and error control for the information which is to be transmitted over the physical link.
Network Layer	To route the signals through various channels to the other end.
Transport Layer	It decides if the data transmission should take place on parallel paths or single path. It performs multiplexing, splitting on the data.
Session Layer	Manages the messages and synchronizes conversations between two different applications.
Presentation Layer	This layer makes it sure that the information is delivered in such a form that the receiving system will understand and use it.
Application Layer	It provides different services such as manipulation of information in several ways, retransferring the files of information, distributing the results etc.

ii. Advantages of the Internet:

- It is the best source of a wide range of information. There is no better place to conduct research than the internet.
- Online gaming, talking, browsing, music, movies, dramas, and TV series are quickly becoming the most popular ways to pass the time.
- Because there are hundreds of thousands of newsgroups and services that keep you updated with every tick of the clock, the Internet is a source of the most recent news.

iii. Disadvantages of the Internet:

- Spending too much time on the internet is hazardous for the young generation's physical and mental health.
- Children who use the internet develop an addiction, which is quite dangerous.
- It is now quite easy to decipher someone's chat or email messages thanks to the hacking community.

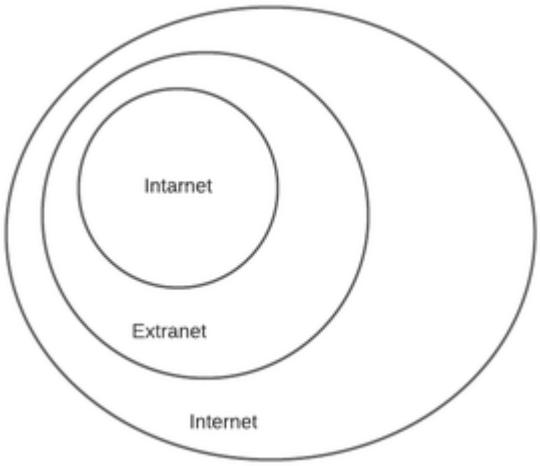
UNDERSTANDING THE DIFFERENCE BETWEEN INTERNET AND INTRANET

i. What is the Internet?

The Internet is used to connect the different networks of computers simultaneously. It is a public network therefore anyone can access the internet. On the internet, there are multiple users and it provides unlimited information to the users.

ii. What is an Intranet?

Intranet is the type of internet that is used privately. It is a private network therefore anyone can't access the intranet. On the intranet, there is a limited number of users and it provides a piece of limited information to its users.



Types of network

iii. Difference Between the Internet and Intranet

Internet	Intranet
Internet is used to connect different networks of computers simultaneously.	Intranet is owned by private firms.

Internet	Intranet
On the internet, there are multiple users.	On an intranet, there are limited users.
Internet is unsafe.	Intranet is safe.
On the internet, there is more number of visitors.	In the intranet, there is less number of visitors.
Internet is a public network.	Intranet is a private network.
Anyone can access the Internet.	In this, anyone can’t access the Intranet.
The Internet provides unlimited information.	Intranet provides limited information.

HTML5.2 and CSS 3.0

i. What is HTML5?

HTML5 is a revision of the HTML standard. It’s a massive improvement over HTML4 because HTML4 did not allow web developers to add features to their sites that were not HTML-supported. To do so required the use of proprietary technologies and the installation of browser plugins.

HTML5 is the current web development standard, quickly becoming the go-to choice for developers worldwide. HTML5 is a markup language designed to improve upon its predecessors in several ways.

One of the most significant benefits of HTML5 is its ability to create rich and interactive web experiences without additional software or plugins.

ii. What is HTML5.2?

HTML5. 2 introduces several improvements in form controls, providing better native options for web developers.

One of the standout features is the element, which simplifies the creation of modal dialogs. Instead of relying on JavaScript and CSS for basic dialogs, you can now manage them natively.

iii. Understanding CSS and CSS3

1. CSS:

CSS stands for Cascading Style Sheets. It is primarily used to provide styling to web pages, including color, layout, background, font, and border properties. The main objective of CSS is to improve content accessibility, provide enhanced flexibility and control, and specify presentation characteristics.

2. CSS3:

CSS3 stands for Cascading Style Sheets Level 3. It is an advanced version of CSS, used for structuring, styling, and formatting web pages. CSS3 introduces several new features and is supported by all modern web browsers. One of the most significant advancements in CSS3 is the splitting of CSS standards into separate modules, making it simpler to learn and use.

3. New Features of CSS3

1. **Combinator**: CSS3 introduces a new general sibling combinator, which matches sibling elements using the tilde (~) combinator.
2. **CSS Selectors**: CSS3 selectors are more advanced than the simple selectors offered by CSS, providing a sequence of easy-to-use and simple selectors.
3. **Pseudo-elements**: CSS3 adds many new pseudo-elements for easier and more detailed styling. The new convention of double colons (::) is also introduced.
4. **Border Style**: CSS3 includes new border styling features like border-radius, border-image-slice, border-image-source, and values for “width stretch”.
5. **Background Style Properties**: CSS3 introduces new background style properties such as background-clip, background-size, background-style, and background-origin.