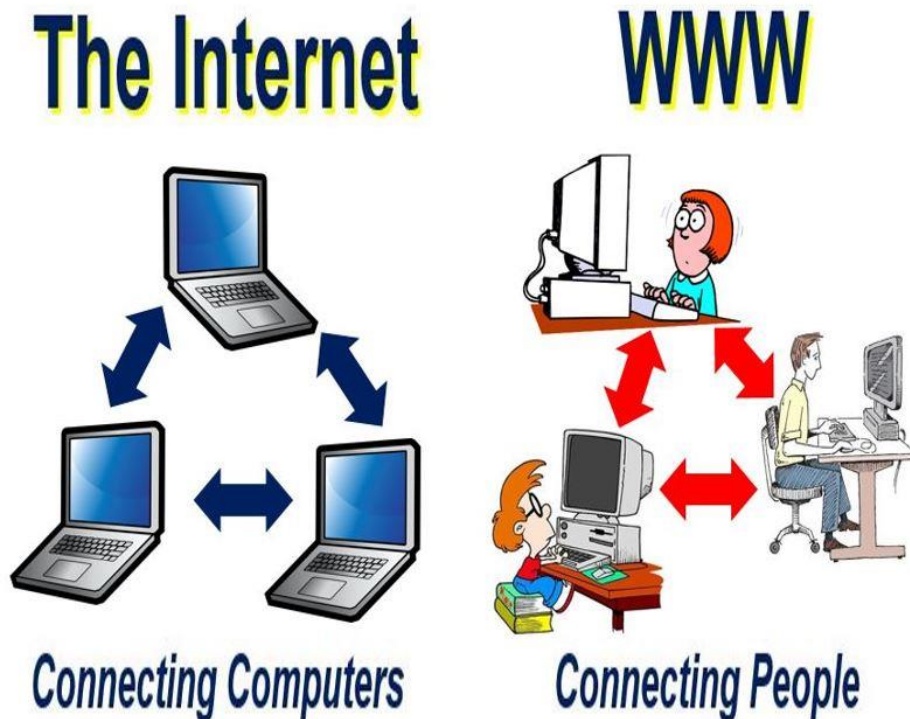


Unit-1

Internet: The Internet is a global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve billions of users worldwide. It is a *network of networks* that consists of millions of private, public academic, business, and government networks.



WWW: The World Wide Web, abbreviated as WWW and commonly known as the Web, is a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia and navigate between them via hyperlinks.

History of internet: The Internet had its roots during the 1960's as a project of the United States government's Department of Defense, to create a non-centralized network. This project was called ARPANET (Advanced Research Projects Agency Network), created by the Pentagon's Advanced Research Projects Agency established in 1969 to provide a secure and survivable communications network for organizations engaged in Defense-related research. In order to make the network more global a new sophisticated and standard protocol was needed. They developed IP (Internet Protocol) technology which defined how electronic messages were packaged, addressed, and sent over the network. The standard protocol was invented in 1977 and was called TCP/IP (Transmission Control Protocol/Internet Protocol). TCP/IP allowed users to link various branches of other complex networks directly to the ARPANET, which soon came to be called the Internet. Researchers and academics in other fields began to make use of the network, and eventually the National Science Foundation (NSF), which had created a similar and parallel network, called NSFNet, took over much of the TCP/IP technology from ARPANET and established a distributed network of networks capable of handling far greater traffic. In 1985, NSF began a program to establish Internet access

across the United States. They created a backbone called the NSFNET and opened their doors to all educational facilities, academic researchers, government agencies, and international research organizations. By the 1990's the Internet experienced explosive growth. It is estimated that the number of computers connected to the Internet was doubling every year. Businesses rapidly realized that, by making effective use of the Internet they could tune their operations and offer new and better services to their customers, so they started spending vast amounts of money to develop and enhance the Internet. This generated violent competition among the communications carriers and hardware and software suppliers to meet this demand. The result is that bandwidth (i.e., the information carrying capacity of communications lines) on the Internet has increased tremendously and costs have dropped. It is widely believed that the Internet has played a significant role in the economic success.

History of web: In 1980, Tim Berners-Lee, an English independent contractor at the European Organization for Nuclear Research (CERN) in Switzerland, built ENQUIRE, as a personal database of people and software models, but also as a way to play with hypertext; each new page of information in ENQUIRE had to be linked to a page.

The World Wide Web (WWW) allows computer users to position and view multimedia-based documents (i.e., documents with text, graphics, animations, audios and/or videos) on almost any subject. Even though the Internet was developed more than three decades ago, the introduction of the WWW was a relatively recent event. In 1990, Tim Berners-Lee of CERN (the European Laboratory for Particle Physics) developed the World Wide Web and several communication protocols that form the backbone of the WWW. The Internet and the World Wide Web will surely be listed among the most significant and profound creations of humankind. In the past, most computer applications ran on stand alone computers. (i.e., computers that were not connected to one another) Today's applications can be written to communicate among the world's hundreds of millions of computers. The Internet makes our work easier by mixing computing and communications technologies. It makes information immediately and conveniently accessible worldwide. It makes it possible for individuals and small businesses to get worldwide contact. In the last decade, the Internet and World Wide Web have altered the way people communicate, conduct business and manage their daily lives. They are changing the nature of the way business is done.

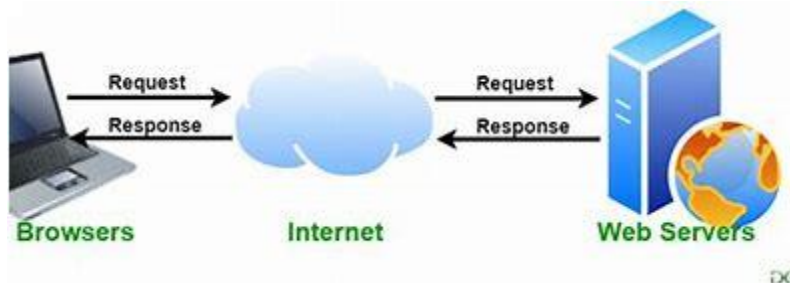
Emergence of Web: Between the summers of 1991 and 1994, the load on the first Web server ("info.cern.ch") rose steadily by a factor of 10 every year.

In 1992 academia, and in 1993 industry, was taking notice. World Wide Web Consortium is formed in September 1994, with a base at MIT in the USA, INRIA in France, and now also at Keio University in Japan.

With the dramatic flood of rich material of all kinds onto the Web in the 1990s, the first part of the dream is largely realized, although still very few people in practice have access to intuitive hypertext creation tools.

The second part has yet to happen, but there are signs and plans which make us confident. The great need for information about information, to help us categorize, sort, pay for own information is driving the design of languages for the web designed for processing by machines, rather than people. The web of human readable document is being merged with a web of machine-understandable data. The potential of the mixture of humans and machines working together and communicating through the web could be immense.

WEB Servers: To view and browse pages on the Web, all you need is a web browser. To publish pages on the Web, you need a web server. A web server is the program that runs on a computer and is responsible for replying to web browser requests for files. You need a web server to publish documents on the Web. When you use a browser to request a page on a website, that browser makes a web connection to a server using the HTTP protocol. The browser then formats the information it got from the server. Server accepts the connection, sends the contents of the requested files and then closes.

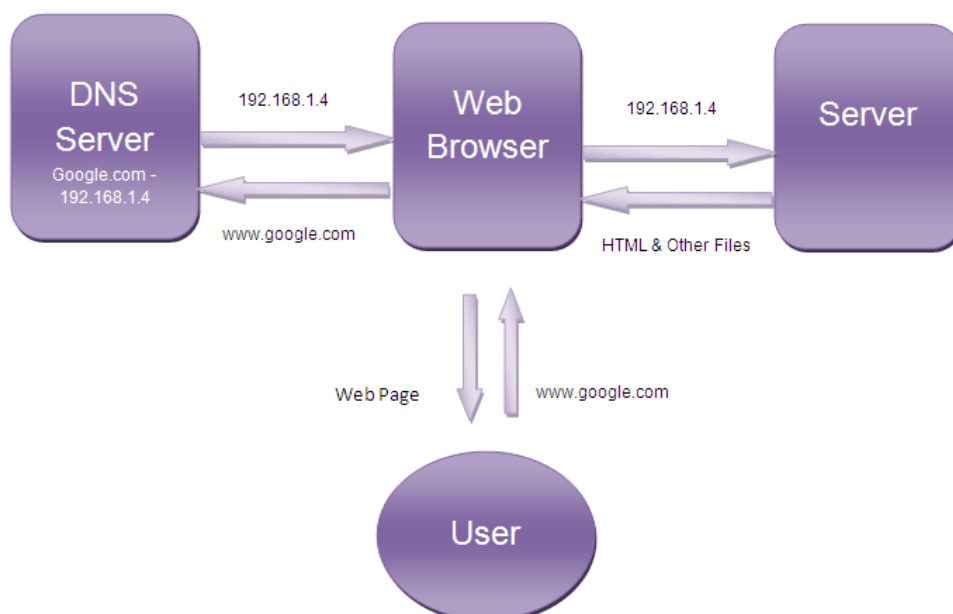


Example: Apache Web Server, Microsoft's Web Server, IIS, Tomcat etc.

WEB Browsers:

A web browser is the program you use to view pages and navigate the World Wide Web. A wide array of web browsers is available for just about every platform you can imagine. Microsoft Internet Explorer, for example, is included with Windows and Safari is included with Mac OS X. Mozilla Firefox, Netscape Navigator, and Opera are all available for free.

What the Browser Does The core purpose of a web browser is to connect to web servers, request documents, and then properly format and display those documents. Web browsers can also display files on your local computer, download files that are not meant to be displayed. Each web page is a file written in a language called the Hypertext Markup Language (HTML) that includes the text of the page, a description of its structure, and links to other documents, images, or other media.



Protocols governing Web

Protocols: In computing, a protocol is a set of rules which is used by computers to communicate with each other across a network. A protocol is a convention or standard that controls or enables the connection, communication, and data transfer between computing endpoints.

Classification:

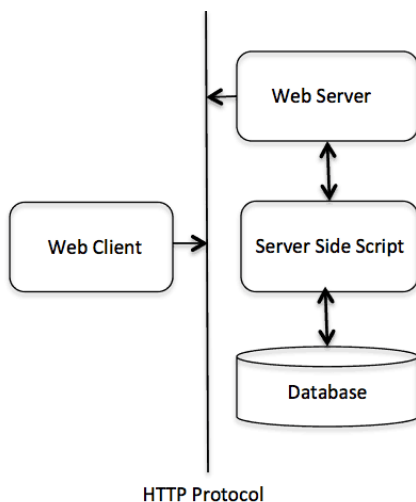
- a. HTTP
- b. TCP/IP
- c. FTP
- d. E-MAIL

HTTP: HTTP full form Hypertext Transfer Protocol used mainly to access data on the World Wide Web. HTTP is a Server and Client communication Protocol, which is primarily set of rules for formatting and transferring webpage data (text, images, video and Multimedia files) over the world wide web. This is the Protocol used to create communication between Web Servers and Web Users. HTTP is an application layer Protocol that works on the top of the TCP/IP suite of Protocols.

HTTP protocol basically uses server and client model. It acts as a request-response protocol. For Example, A client which is use web browser and a server is a Web host that hosts the website. Whenever a client transmits a request to the Website server, HTTP protocol proceeds that request and creates a connection between client and server through TCP. After that HTTP sends a request to the server, which picks up the requested data and HTTP sends the response back to the client.

Basic Architecture

The following diagram shows a very basic architecture of a web application and depicts where HTTP sits:



The HTTP protocol is a request/response protocol based on the client/server based architecture where web browsers, robots and search engines, etc. act like HTTP clients, and the Web server acts as a server.

Http Client: The http client makes the request in the form of a request method. Which is followed by the message body over a TCP/IP connection.

Http Server: The request sent by the client, is responded by the server in the form of a status line followed by the other necessary information with the message body.

HTTP Request Methods

Http Protocol can use two case sensitive request-response Methods between client/server such as GET and POST that are used to handle form submissions.

GET Method

A GET Requests data from a specified resource using a given URI to retrieve data.

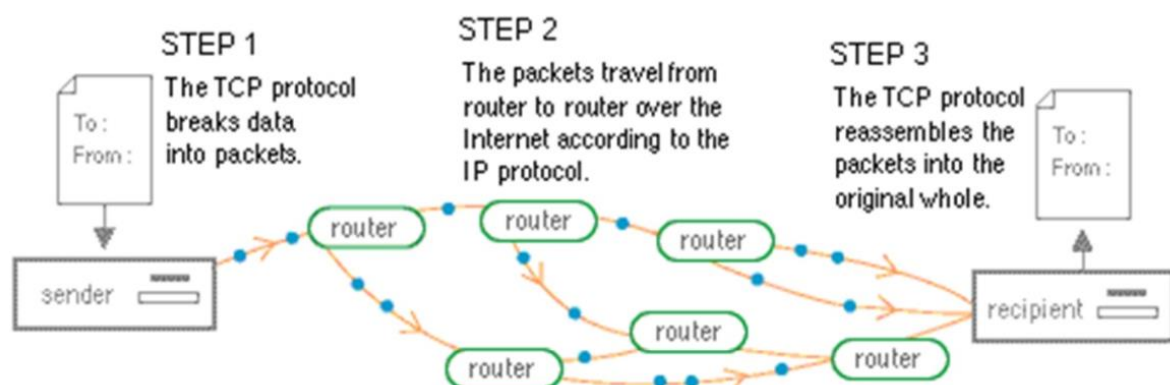
POST Method

A POST request Submits data to be processed to a specified resource to the server.

TCP/IP: It is a set of rules that an application can use to package its information for sending across the networks of networks.

Internet Protocol Suite: The Internet Protocol Suite is the set of communications protocols used for the Internet and other similar networks. It is commonly also known as TCP/IP named from two of the most important protocols in it: The Transmission Control Protocol (TCP) and the Internet Protocol (IP), which were the first two networking protocols defined in this standard.

How TCP/IP Works



TCP/IP Model Architecture:

Layer #	Layer Name	Protocol	Protocol Data Unit	Addressing
5	Application	HTTP, SMTP, etc...	Messages	n/a
4	Transport	TCP/UDP	Segments/ Datagrams	Port #s
3	Network or Internet	IP	Packets	IP Address
2	Data Link	Ethernet, Wi-Fi	Frames	MAC Address
1	Physical	10 Base T, 802.11	Bits	n/a

FTP

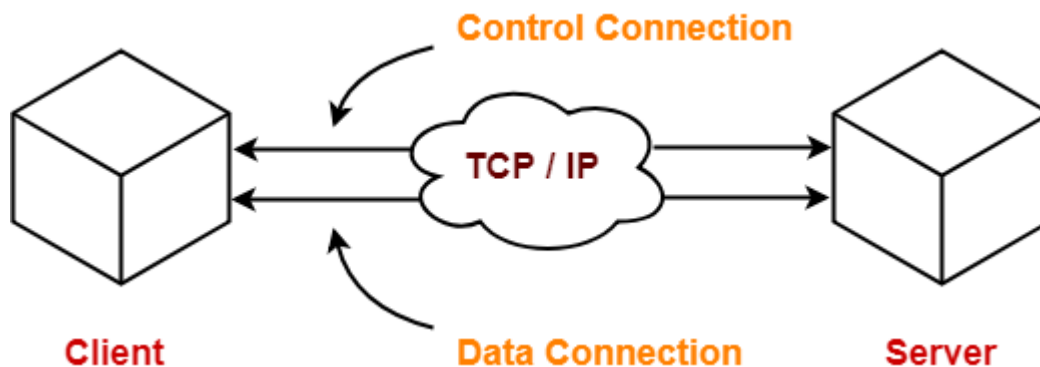
FTP is short for File Transfer Protocol. FTP Protocol is an application layer protocol. FTP in computer networks is used to transfer files over the internet. FTP is a stateful protocol. FTP uses port 21 for control connection and port 20 for data connection.

Purpose

- It is used for exchanging files over the internet.
- It enables the users to upload and download the files from the internet.

Working

- FTP establishes two TCP connections between the client and the server.
- One connection is used for transferring data.
- Other connection is used for transferring control information.

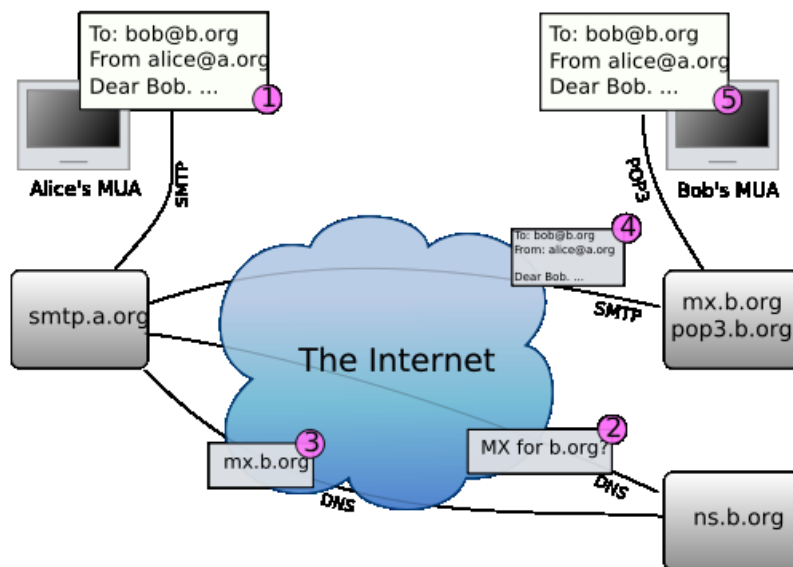


Note: Email cannot be send through this protocol. This is because-

- FTP requires the connection establishment between the client and server before transferring the files.
- So, both have to be online at the same time.
- That is why, emails are not sent using FTP.

E-mail(SMTP protocol)

E-mail, short for electronic mail, is a system in which a computer user can exchange messages with other computer users using a communications network. To use e-mail, you must have access to a computer that is linked to the outside world, via a modem, phone line or fiber optic cable (Ethernet).



1. In the first stage the Alice's message in Internet e-mail format uses the Simple Mail Transfer Protocol (SMTP) to pass the message to the local server.
2. The (**M**essage **T**ransfer **A**gent) MTA looks at the destination address provided in the SMTP protocol, in this case bob@b.org. The part before the @ sign is the **local part** of the address, often the username of the recipient, and the part after the @ sign is a domain name. The MTA looks up this domain name in the Domain Name System to find the mail exchange servers accepting messages for that domain.
3. The DNS server for the b.org domain, is ns.b.org, responds with an MX record listing the mail exchange servers for that domain, in this case mx.b.org, a server run by Bob's ISP.
4. smtp.a.org sends the message to mx.b.org using SMTP, which delivers it to the mailbox of the user bob.
5. Bob presses the "get mail" button in his MUA, which picks up the message using the POP or IMAP Protocol

Mail clients

E-mail messages are generally sent to an e-mail server that stores received messages in the recipient's e-mail mailbox. The user later retrieves these messages with either a web browser or an e-mail client that uses one of a number of e-mail retrieval protocols. There are different types of mail clients protocol used to retrieve the user's mail account from mail server they are --- **Post office protocol and Internet Message Access Protocol**

- **Post Office Protocol**

POP is one of the email client uses TCP/IP Protocol. The design of POP3 and its procedures supports end-users with intermittent connections (such as dial-up connections), allowing these users to retrieve e-mail when connected and then to view and manipulate the retrieved messages without needing to stay connected.

Although most clients have an option to *leave mail on server*, e-mail clients using POP generally connect, retrieve all messages, store them on the user's PC as new messages, delete them from the server, and then disconnected. The main disadvantage of POP is the mail gets scattered wherever they access their account.

- **Internet Message Access Protocol**

IMAP supports both connected (online) and disconnected (offline) modes of operation. E-mail clients using IMAP generally leave messages on the server until the user explicitly deletes them. This and other facets of IMAP operation allow multiple clients to access the same mailbox. Most e-mail clients support either POP3 or IMAP to retrieve messages; however, fewer Internet Service Providers (ISPs) support IMAP. IMAP4 offers access to the mail store; the client may store local copies of the messages, but these are considered to be a temporary cache; the server's store is authoritative.

IMAP is often used in large networks; for example, a college campus mail system. IMAP allows users to access new messages instantly on their computers, since the mail is stored on the network. With POP3, users either **download** the e-mail to their computer or access it via the web. Both methods take longer than IMAP, and the user must either download any new mail or "*refresh*" the page to see the new messages.

Search Engines

A program that searches for and identifies items in a database that correspond to keywords or characters specified by the user, used especially for finding particular sites on the World Wide Web. The engines are referred to as a Robot. In essence, a Robot is a specialized program designed to move through the World Wide Web, collecting data from each Website it encounters. This data usually includes the text from that page's title, headings and main body. This recorded text is sent by a Robot to a data-base where it is indexed and stored.

A query is sent to a search engine to do a search. It looks through this data-base for the words entered into its "query box".

It should be known that a search engine is not an intelligent thing. If asked to search for "travel in India", it would not go out and find all the sites on the Internet that area about collecting information on travelling in India. What it would do is look through all the Internet pages it has indexed in its data-base for the ones that contain the words "travel" and "India" and ignoring "in" or close matches to them, and then give you a list of the sites containing those words. It is very important to understand that the search engine is only matching the words given to the words in its index. So, just because an Internet site has the query word (or words) in it somewhere does not mean that it has the real content one is looking for

In addition, if several words are entered into a search engine's query box, the list of sites it returns may include pages that contain only one out of all the words you entered. Search engines will find a huge number of sited on the Internet that contains the word or words that one is looking for. So, to be helpful, they will put the ones that were most "relevant" to the

search at the top of the list. This “relevancy” is based on many things, including how many times the word or words appeared in the site, how close they were to the beginning of the page’s text how closely they match the word or words entered.

Web Development Strategies

Web development strategy is the most important thing to achieve goals and capture your website visitors. There will be no positive outcome without it and you will not be able to convert your website visitors into prospective clients.

- **Write a project mission statement**

Write the specific mission statement that you want to do.

- **Identify Objectives:**

- i. Specific
- ii. Measurable
- iii. Attainable
- iv. Realistic
- v. Time limited

- **Identify your target users**

The matter of a website will be determined by the users whom you want to visit the site. This is totally depend upon

- i. Market research
- ii. Focus group
- iii. Understanding intranet audiences

- **Determine the scope**

By supporting documents and client’s approval.

- **Budget**

- i. Assumption for budgets.
- ii. Budget categories.
- iii. Determine hidden costs and tools.

- **Planning issues**

- i. Discuss client’s existing information system.
- ii. Project team and developing infrastructure.
- iii. Where the website will place.

- **Marketing**

Marketing is an outlier function for many businesses. It is a needed department for managing how potential customers are introduced to products and service.

- **Tracking and tuning**

Web tracking is the practice by which operators of websites collect, store and share information about a particular user's activity on the World Wide Web. Analysis of an individual user's behaviour may be used to provide content that helps them to update their website accordingly so that they can stay in the market.

Assignment-1

What is Web application?

- **Why we need Web application?**
- **Features of Web application**
- **Advantage and disadvantage of Web application**

What is website?

- **Why we need Website?**
- **Features of Website**
- **Difference between Static and dynamic web pages**