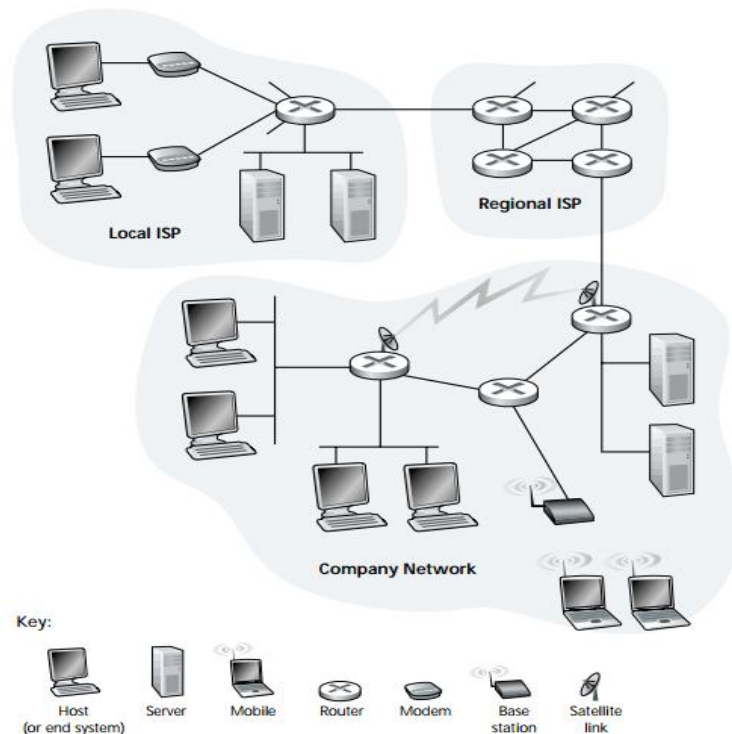# INTERNET

The public internet is a worldwide computer network, that is, a network that interconnects millions of computing devices throughout the world. Most of these computing devices are traditional desktop PC's, UNIX based workstations, and so called servers that store and transmit information such as web pages and email messages. The **Internet** is the global system of interconnected computer networks that use the Internet protocol suite (TCP/IP) to link billions of devices worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies.

The Internet standards describe a framework known as the Internet protocol suite. This is a model architecture that divides methods into a layered system of protocols. This protocol called the Internet Protocol Suite is the computer networking model and set of communications used on the Internet. The Internet protocol suite provides end-to-end data communication specifying how data should be packetized, addressed, transmitted, routed and received. This functionality is organized into four abstraction layers which are used to sort all related protocols according to the scope of networking involved. From lowest to highest, the layers are the link layer, containing communication methods for data that remains within a single network segment (link); the internet layer, connecting independent networks, thus providing internetworking; the transport layer handling host-to-host communication; and the application layer, which provides process-to-process data exchange for applications. Thus in simple language Internet is just like roads that connect the different cities and towns around the world, in this case the cities and towns are the computing devices and the roads are the communications links between these computing devices, now what travels on those roads/ communication links are called as Internet Services or applications.

Working of Internet

The thing that characterizes the Internet is how data are transferred from one

computer to another. Here is what happens to a piece of data (e.g. a Web page) when it is transferred over the Internet:

- It is broken into a lot of same-sized pieces (called packets).
- A header is added to each packet that explains where it came from, where it should end up and how it fits in with the rest of the packets.
- Each packet is sent from computer to computer until it finds its way to its destination. Each computer along the way decides where next to send the packet. This could depend on things like how busy the other computers are when the packet was received. The packets may not all take the same route.
- At the destination, the packets are examined. If there is any packet missing or damaged, a message is sent asking for that packet to be resent. This continues until all the packets have been received intact
- The packets are reassembled into their original form

Applications of Internet

Internet is like roads connecting cities while application/ services of internet are like the different kind of traffic utilizing the roads. There are different kinds of internet application each catering to the different kind of use. The internet is treated as one of the biggest invention. It has a large number of uses.

1. **Communication:** it is used for sending and receiving message from one and other through internet by using electronic mail. Some of the web sites providing this service are yahoomail.com Hotmail.com rediffmail.com etc.
2. **Job searches:** getting information regarding availability of job in different sectors and areas. You can publish your resume in online for prospective job. Some of the web sites providing this service are naukri.com, monster.com, summerjob.com, recuritmentindia.com etc.
3. **Finding books and study material:** books and other study material stored around the world can be easily located through internet.
4. **Health and medicine:** internet provides information and knowledge about field of health medicine people can have information about various diseases and can receive help .patient can be taken to virtual check room where they can meet doctors.
5. **Travel:** one can use internet to gather information about various tourist place. it can be used for booking Holiday tours , hotels, train and flights. Some of the web sites providing this service areindiatravelog.com, rajtravel.com, makemytrip.com.
6. **Entertainment:** one can download jokes, songs movies, latest sports updates through internet Some of the web sites providing this service arecricinfo.com, movies.com espn.com.
7. **Shopping:** internet is also used for online shopping. By just giving accounts details you

can perform the transaction. You can even pay your bills and perform bank related transaction.

8. **Stock market updates:** you can sell or buy shares while sitting on computer through internet. Several websites like ndtvprofit.com, moneypore.com, provide information regarding investment.

9. **Research:** a large number of people are using internet for research purposes you can download any kind information by using internet.

10. **Business use of internet:** different ways by which internet can be used for business are:

   - Information about the product can be provided can be provided online to the customer
   - Provide market information to the business
   - It help business to recruit talented people
   - Help in locating suppliers of the product
   - Fast information regarding customers view about companies product
   - Eliminate middle men and have a direct contact with contact with customer
   - Providing information to the investor by providing companies back ground and financial information on web site

Internet Services

Internet services can be divided into two **communication services** and **information services**. In the first group the Internet mediates in the communication between two or more individuals. In the second group the user turns to the Internet-service in search for some particular information. Communication services can roughly be compared to a telephone call, information services to a dictionary. The most important communication services on the Internet are electronic mail. Major information services are terminal emulation and file transfer, Gopher, WAIS, and World Wide Web.

EMAIL

E-Mail or Electronic Mail is a paperless method of sending messages, letters, video and graphics from one person to another or many people at the same time via Internet. E-mail is very fast, easy and much cheaper than the using the post office, takes only few seconds to arrive at the destination. It works 24 hours a day and seven days a week. There are many free web-based e-mail services available on the Internet.

   - Gmail
   - Yahoo mail
   - Rediffmail
   - Hotmail

Working of Email

Just as a letter makes stops at different postal stations along the way to its final destination, e-mail passes from one computer, known as a mail server, to another as it travels over the Internet. Once it arrives at the destination mail server, it is stored in an electronic mailbox until the recipient retrieves it. This whole process can take seconds, allowing you to quickly communicate with people around the world at any time of the day or night

To receive e-mail, you need an account on a mail server. This is similar to having a street address where you receive letters. One advantage over regular mail is that you can retrieve your e-mail from any location in the world, provided that you have Internet access. Once you connect to your mail server, just download your messages to your computer or wireless device.

To send e-mail, you need a connection to the Internet and access to a mail server that forwards your mail. The standard protocol used for sending Internet e-mail is called SMTP, short for Simple Mail Transfer Protocol.

When you send an e-mail message, your computer routes it to an SMTP server. The server looks at the e-mail address (similar to the address on an envelope), and then forwards it to the recipient's mail server, where it is stored until the addressee retrieves it. You can send e-mail anywhere in the world to anyone who has an e-mail address.

Components of Email Address

Internet e-mail addresses typically have two main parts:

myname@gmail.com

First part is the User ID (myname) that refers to the recipient's mailbox. Then there is an at sign (@). Next comes the host name (gmail), also called the domain name. This refers to the mail server, the computer where the recipient has an electronic mailbox. It is usually the name of a company or organization. The end of the domain name consists of a dot (".") followed by three

or more letters (such as .com and .gov) that indicate the top-level domain (TLD). This part of the domain name indicates the type of organization or the country where the host server is located.

TELNET

Telnet is a client-server protocol, based on a reliable connection-oriented transport. Typically, this protocol is used to establish a connection to Transmission Control Protocol (TCP) port number 23, where a Telnet server application (telnetd) is listening. Telnet, however, predates TCP/IP and was originally run over Network Control Program (NCP) protocols. Telnet is a network protocol used on the Internet or local area network LAN connections. The Telnet program runs on your computer and connects your PC to a server on the network. You can then enter commands through the Telnet program and they will be executed as if you are entering them directly on the server console. This enables you to control the server and communicate with other servers on the network. To start a Telnet session, you must log in to a server by entering a valid username and password. Telnet is a common way to remotely controlled Web servers.

FTP

FTP or File Transfer Protocol is a commonly used protocol for exchanging files over any network that supports the TCP/IP protocol (such as the Internet or an Intranet). FTP is built on client-server model architecture and uses separate control and data connections between the client and the server. FTP users may authenticate themselves with a clear-text sign-in protocol, normally in the form of a username and password, but can connect anonymously if the server is configured to allow it. There are two computers involved in an FTP transfer. The first computer is an FTP server (host computer). This computer listens on the network for connection requests from other computers. Another computer (called the client) can make a connection to the FTP server by using FTP client software. Once connected, the client can do a number of file manipulation operations such as uploading files to the server, download files from the server, rename or delete files on the server and so on.

FTP is used to

- To promote sharing of files (computer programs and/or data).
- To encourage indirect or implicit use of remote computers.
- To transfer data reliably and efficiently.

E-COMMERCE

Electronic commerce, commonly written as **E-Commerce or eCommerce**, is the trading or facilitation of trading in products or services using computer networks, such as the Internet or online social networks. Electronic commerce draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, online

transaction processing,electronic data interchange (EDI), inventory management systems, and automated data collection systems.

- *E-commerce businesses may employ some or all of the following:*
- *Online shopping web sites for retail sales direct to consumers*
- *Providing or participating in online marketplaces, which process third-party business-to-consumer or consumer-to-consumer sales*
- *Business-to-business buying and selling*
- *Gathering and using demographic data through web contacts and social media*
- *Business-to-business electronic data interchange*
- *Marketing to prospective and established customers by e-mail or fax (for example, with newsletters)*
- *Engaging in pretail for launching new products and services*
- *Online financial exchanges for currency exchanges or trading purposes*

VIDEO CONFERENCE

A video conference is a live, visual connection between two or more people residing in separate locations for the purpose of communication. At its simplest, video conferencing provides transmission of static images and text between two locations. At its most sophisticated, it provides transmission of full-motion video images and high-quality audio between multiple locations. Videoconference is the conduct of a conference by a set of telecommunication technologies which allow two or more locations to communicate by simultaneous two-way video and audio transmissions. Videoconferencing uses audio and video telecommunications to bring people at different sites together. This can be as simple as a conversation between people in private offices (point-to-point) or involve several (multipoint) sites in large rooms at multiple locations. Besides the audio and visual transmission of meeting activities, allied videoconferencing technologies can be used to share documents and display information on whiteboards.

The core technology used in a videoconferencing system is digital compression of audio and video streams in real time. The hardware or software that performs compression is called a codec (coder/decoder). Compression rates of up to 1:500 can be achieved. The resulting digital stream of 1s and 0s is subdivided into labeled packets, which are then transmitted through a digital network of some kind (usually ISDN or IP).

E-BUSINESS

Electronic business, or e-business, is the application of information and communication technologies (ICT) in support of all the activities of business. This would include the buying and selling of goods and services, along with providing technical or customer support through the Internet. e-Business is a term often used in conjunction with e-commerce, but includes services in addition to the sale of goods. E-business includes e-commerce but also covers internal processes such as production, inventory management, product development, risk

management, finance, knowledge management and human resources. E-business strategy is more complex, more focused on internal processes, and aimed at cost savings and improvements in efficiency, productivity and cost savings.
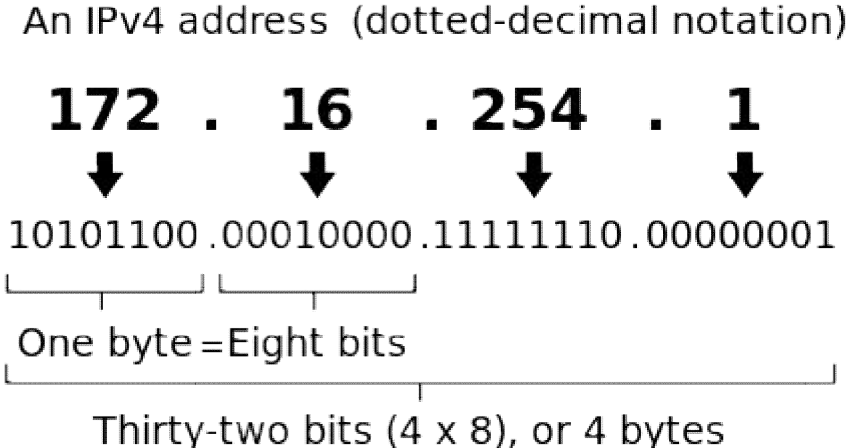
Internet Service Providers

An **Internet service provider** (**ISP**) is an organization that provides services for accessing and using the Internet. Internet service providers may be organized in various forms, such as commercial, community-owned ,non-profit, or otherwise privately owned. ISPs provide Internet access, employing a range of technologies to connect users to their network. Available technologies have ranged from computer modems with acoustic couplers to telephone lines, to television cable (CATV), wireless Ethernet (wi-fi), and fiber optics.

Internet Address

An **Internet Protocol address** (**IP address**) is a numerical label assigned to each device (e.g., computer, printer) participating in a computer network that uses the Internet Protocol for communication. The designers of the Internet Protocol defined an IP address as a 32-bit number[1] and this system, known as Internet Protocol Version 4 (IPv4), is still in use today. However, because of the growth of the Internet and the predicted depletion of available addresses, a new version of IP (IPv6), using 128 bits for the address, was developed in 1995.

IPv4

In IPv4 an address consists of 32 bits which limits the address space to 4294967296 (2^{32}) possible unique addresses. IPv4 reserves some addresses for special purposes such as private

An IPv4 address (dotted-decimal notation)

172 . 16 . 254 . 1

10101100 . 00010000 . 11111110 . 00000001

One byte = Eight bits

Thirty-two bits (4 x 8), or 4 bytes

networks (~18 million addresses) or multicast addresses (~270 million addresses) IPv4 addresses are canonically represented in dot-decimal notation, which consists of four decimal numbers, each ranging from 0 to 255, separated by dots, e.g., 172.16.254.1. Each part represents a group of 8 bits (octet) of the address.

An IP address has two parts: the identifier of a particular network on the Internet and an identifier of the particular device (which can be a server or a workstation) within that network.

The Network Part of the IP Address
The Internet is really the interconnection of many individual networks (it's sometimes referred to as an *internetwork*). So the Internet Protocol (IP) is basically the set of rules for one network communicating with any other (or occasionally, for broadcast messages, all other networks). Each network must know its own address on the Internet and that of any other networks with which it communicates. This unique network number is included in any packet sent out of the network onto the Internet.

The Local or Host Part of the IP Address
In addition to the network address or number, information is needed about which specific machine or host in a network is sending or receiving a message. So the IP address needs both the unique network number and a host number (which is unique within the network). (The host number is sometimes called a *local* or *machine address*.)

This early method soon proved inadequate as additional networks developed that were independent of the existing networks already designated by a network number. Classful network design served its purpose in the startup stage of the Internet, but it lacked scalability in the face of the rapid expansion of the network in the 1990s. The class system of the address space was replaced with Classless Inter-Domain Routing (CIDR) in 1993

Domain Name System
The Domain Name System (DNS) is a central part of the Internet, providing a way to match names (a website you're seeking) to numbers (the address for the website). Anything connected to the Internet - laptops, tablets, mobile phones, websites - has an Internet Protocol (IP) address made up of numbers. Your favorite website might have an IP address like 64.202.189.170, but this is obviously not easy to remember. However a domain name such as facebook.com is something people can recognize and remember. DNS syncs up domain names with IP addresses enabling humans to use memorable domain names while computers on the Internet can use IP addresses.

DNS is like a phone book for the Internet. If you know a person's name but don't know their telephone number, you can simply look it up in a phone book. DNS provides this same service to the Internet.

Working on DNS

When you visit a domain such as **www.facebook.com**, your computer follows a series of steps to turn the human-readable web address into a machine-readable IP address. This happens every time you use a domain name, whether you are viewing websites, sending email.

Request information

The process begins when you ask your computer to resolve a hostname, such as visiting **http:www.facebook.com** The first place your computer looks is its local DNS cache, which stores information that your computer has recently retrieved.

If your computer doesn't already know the answer, it needs to perform a **DNS query** to find out.

Ask the recursive DNS servers

If the information is not stored locally, your computer queries (contacts) your ISP's **recursive DNS servers**. These specialized computers perform the legwork of a DNS query on your behalf. Recursive servers have their own caches, so the process usually ends here and the information is returned to the user.

Ask the root nameservers

If the recursive servers don't have the answer, they query the **root nameservers**. A **nameserver** is a computer that answers questions about domain names, such as IP addresses. The thirteen root nameservers act as a kind of telephone switchboard for DNS. They don't know the answer, but they can direct our query to someone that knows where to find it.

Ask the TLD nameservers

The root nameservers will look at the first part of our request, reading from right to left — **http:www.facebook.com** — and direct our query to the **Top-Level Domain (TLD) nameservers** for **.com**. Each TLD, such as *.com*, *.org*, and *.us*, have their own set of nameservers, which act like a receptionist for each TLD. These servers don't have the information we need, but they can refer us directly to the servers that **do** have the information.

### *Ask the authoritative DNS servers*

The TLD nameservers review the next part of our request — **www.facebook.com** — and direct our query to the nameservers responsible for this **specific** domain. These **authoritative nameservers** are responsible for knowing all the information about a specific domain, which are stored in **DNS records**.

Retrieve the record

The recursive server retrieves the record for **www.facebook.com** from the authoritative nameservers and stores the record in its local cache. If anyone else requests the host record for **www.facebook.com**, the recursive servers will already have the answer and will not need to go through the lookup process again. All records have a **time-to-live** value, which is like an expiration date. After a while, the recursive server will need to ask for a new copy of the record to make sure the information doesn't become out-of-date.

Receive the answer

Armed with the answer, recursive server returns the record back to your computer. Your computer stores the record in its cache, reads the IP address from the record, then passes this information to your browser. The browser then opens a connection to the webserver and receives the website.
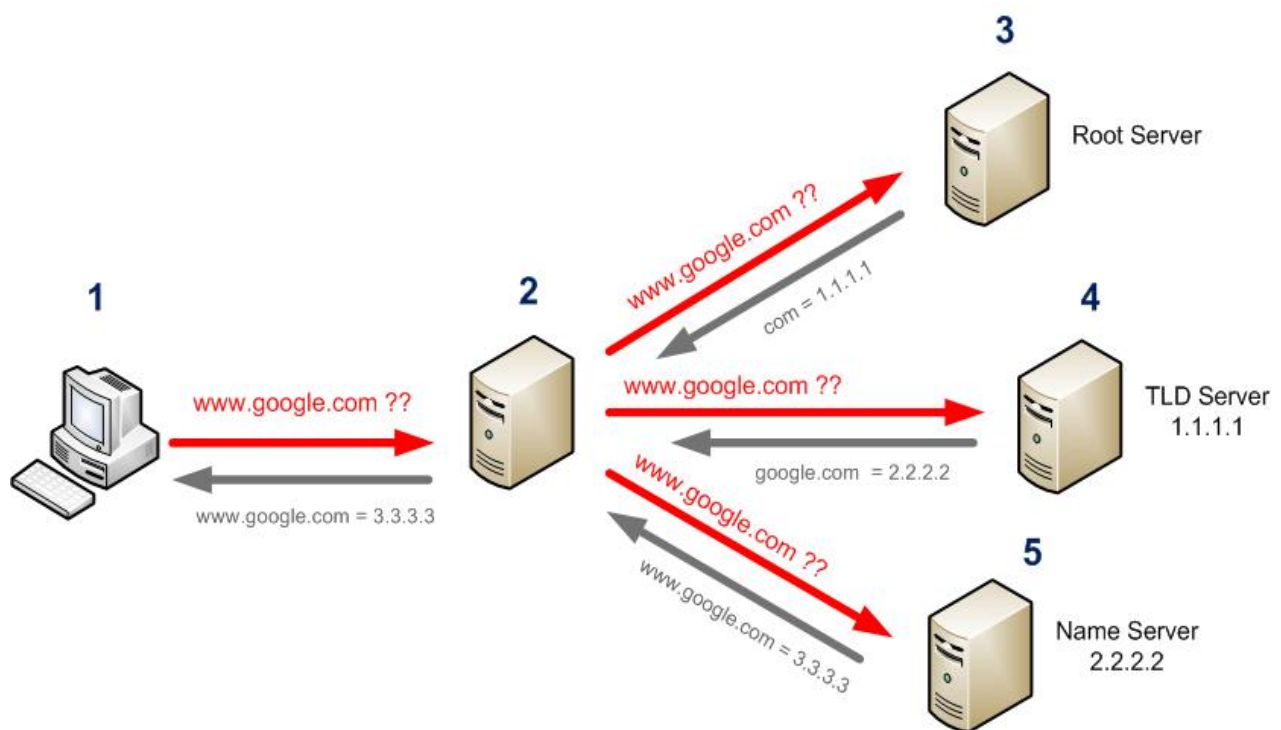
WORLD WIDE WEB

The **World Wide Web** (abbreviated **WWW** or **the Web**) is an information space where documents and other web resources are identified by Uniform Resource Locators (URLs), interlinked by hypertext links, and can be accessed via the Internet. The world wide web consists of billions of pages linked to each other that contain text, graphics, multimedia files, and other interactive software that are accessed using a browser. The term is often mistakenly

used as a synonym for the Internet itself, but the Web is a service that operates over the Internet, just as e-mail also does.

The Web finds its roots at CERN, the European Organization for Particle Physics Research, in 1989 when Tim Berners-Lee and Robert Cailliau designed a system called Enquire. This system would allow documents to have links between different pieces of data whether they be files on the local computer or stored on a remote computer. The main motivation is said to have been the ability to access library information that was spread across multiple servers at CERN.

On November 12th, 1990, Tim Berners-Lee published a formal proposal called "Information Management: A Proposal" that outlined the World Wide Web as we know it today by using a system for displaying information called HyperText, which was first described 1945 by a man named Vannevar Bush, to link documents into a large scale information pool. The following day on November 13th, 1990, Tim Berners-Lee created the first web page and that following December wrote the first web browser and web server. The name of this program that was created, was called the World Wide Web. Thus we have the name we use today.

As development of the World Wide Web continued, more people from around the world started to get involved , until in 1992 one of the first web browsers that supported graphics was introduced called Pei-Yuan Wei's Viola. This led to Marc Andreessen of NCSA, releasing in 1993 a program for UNIX called Mosaic. Mosaic was the spark that marked the rise in popularity of the World Wide Web and no longer kept it confined in the academic circles. Marc Andreesen went on to form Mosaic Communications, which then evolved into Netscape Communications. Netscape was the first mainstream graphical Web Browser.

Working of WEB

The web works on three standards. These standards are generally adhered to by all companies that make products that work with the World Wide Web.

URL (Uniform Resource Locator):

These are the addresses that you enter into your web browser to connect to a web site. The URL is broken up into 4 parts which are the protocol, the hostname, the port number, and the path that you are requesting.
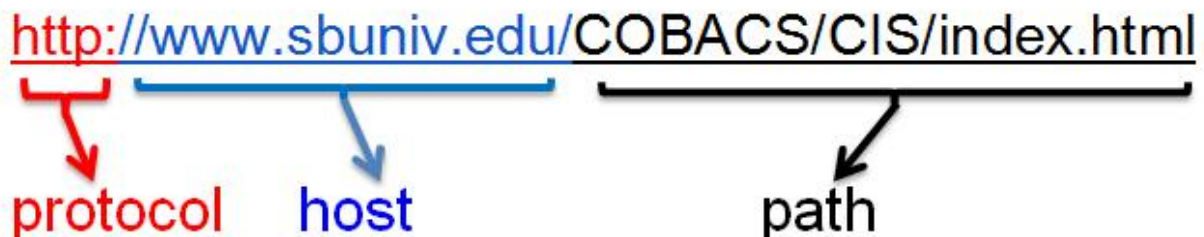
Protocol:

     The protocol part of an URL is the funny string of characters that you see before the hostname. Examples are http, ftp, telnet:, etc. They are separated from the hostname with a colon and two forward slashes (**://**). These protocols tell your browser what type of service to use when you connect with the web browser to the hostname. If you leave the protocol off your address, by default the Web Browser will assume you are using the HTTP protocol.

Hostname:

     The hostname is the address you are going to.

Port Number:

     The port number is a number that you can append to the hostname with a colon (:) between them. This tell the port on the server computer.

Path:

     This is the path on the server, culminating with the filename you are trying to reach. This path corresponds to an actual directory structure on the web server.

HTTP (Hyper Text Transfer Protocol):

This is a defined process of how to transfer information between a web browser and a web server. All web browsers and web servers follow this process. HTTP functions as a request–response protocol in the client–server computing model. HTTP defines methods

GET

     The GET method requests a representation of the specified resource. Requests using GET should only retrieve data and should have no other effect

HEAD

     The HEAD method asks for a response identical to that of a GET request, but without the response body. This is useful for retrieving meta-information written in response headers, without having to transport the entire content.

POST

     The POST method requests that the server accept the entity enclosed in the request as a new subordinate of the web resource identified by the URI. The data posted might be, for example, an annotation for existing resources; a message for a bulletin board, newsgroup, mailing list, or comment thread; a block of data that is the result of submitting a web form to a data-handling process; or an item to add to a database.

PUT

     The PUT method requests that the enclosed entity be stored under the supplied URI. If the URI refers to an already existing resource, it is modified; if the URI does not point to an existing resource, then the server can create the resource with that URI.

OPTIONS

     The OPTIONS method returns the HTTP methods that the server supports for the specified URL. This can be used to check the functionality of a web server.

HTML (Hyper Text Markup Language):

This is the language used in web pages to format text, images, and page layout. This language is in pure text and is entered into a file that has an ending of html. It is possible to put HTML in documents that do not end in html, but for the purpose of this tutorial, we are only focusing on pure HTML documents. The text in these documents contain special codes, called tags, that tell the web browser when it reads the file how to format the text. Lets try an example below.

Web Browser

In order for the Web to work you need web browsers and web servers which work hand in hand. The web browser is a piece of software that is used to interpret the information found in an HTML document and display the content of that document based upon the HTML tags found within it. When a web browser connects to a web server, the web server sends the requested document, if it exists, back to the web browser for display. In short, you type URLs into your browser or click a link, and the browser requests and displays those pages for you. Web browser can show text, audio, video, animation and more. It is the responsibility of a web browser to interpret text and commands contained in the web page.. The various browser used mostly are Google chrome, Firefox, Opera. Each web browser besides providing the basic function displaying the web page also has various features like history, password maintaining, favorites, bookmarks etc.

Web Servers

A web server is a computer that stores HTML documents or scripts that generate html pages, otherwise known as web pages, and waits for connections from web browsers. The web server machine needs to be switched on, ready, and connected to the internet at all times. It is essentially waiting for an incoming request which could happen at any time. The web server program runs all the time, handling any incoming requests. For simple web pages, the web server program identifies a directory (aka a folder) as the **web-root** of the files to serve. The "path" part of the url maps into the web-root directory. The various server software used are Apache, IIS.

Web server respond to the client request in either of the following two ways:

- Sending the file to the client associated with the requested URL.

- Generating response by invoking a script and communicating with database
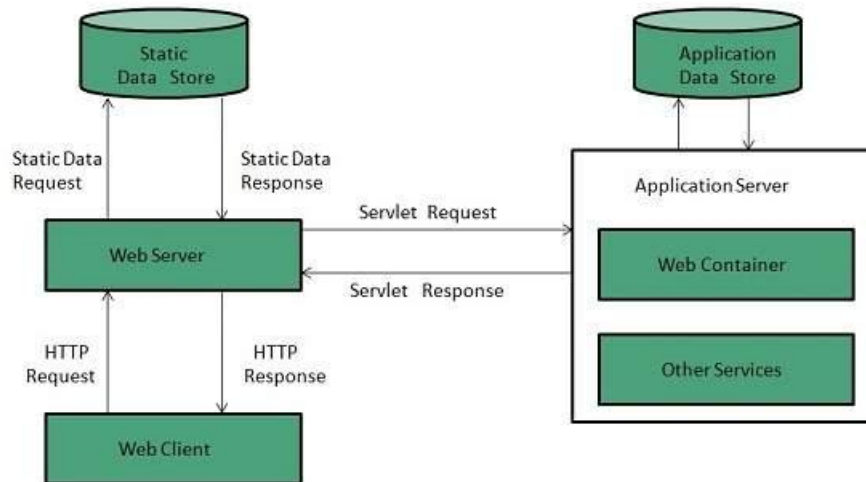
Apache HTTP Server

This is the most popular web server in the world developed by the Apache Software Foundation. Apache web server is an open source software and can be installed on almost all operating systems including Linux, UNIX, Windows, FreeBSD, Mac OS X and more. About 60% of the web server machines run the Apache Web Server.

Internet Information Services (IIS)

The Internet Information Server (IIS) is a high performance Web Server from Microsoft. This web server runs on Windows NT/2000 and 2003 platforms (and may be on upcoming new Windows version also). IIS comes bundled with Windows NT/2000 and 2003; Because IIS is tightly integrated with the operating system so it is relatively easy to administer it.