

Introduction to Internet Technology

1. Introduction

The Internet is a collection of computers around the world connected to each other via a high speed series of networks. The Internet becomes the main method in exchanging cultures and transferring knowledge between people.

All connected computers and networks exchange information and use various services. Hence, the Internet is not the World Wide Web (WWW or W3). The World Wide Web (or Web) is just one of the services that the Internet offers to its users although it is the most commonly used service.

The Internet is the global system of interconnected computer networks. The Internet carries an unlimited range of information resources and services, such as the inter-linked hypertext documents and applications of the Web, electronic mail, telephony, and file sharing.

2. The Web Concepts

The Web was developed to be a pool of human knowledge, and human culture, which would allow collaborators in remote sites to share their ideas and all aspects of a common project.

The Web consists of a vast assortment of files and documents that are stored on these computers and written in some form of Hyper Text Markup Language (HTML) that tells browsers how to display the information. The computers that store the files are called servers because they can serve requests from many users at the same time. Users access these HTML files and documents via applications called browsers. The main Web concepts are:

Web Page

The Web page is a space of information on the Internet that presents information about a particular person, business, or organization or cause.

- The Web consists of files, called Web pages (documents).
- It is containing links to resources (text, images, audios, videos, and other data), throughout the Internet

Web Site

Web site can be defined as a collection of web pages which are grouped together and usually connected together in various ways. Often called a "web site" or simply a "site." The web site usually presents information about a particular person, business, organization or cause.

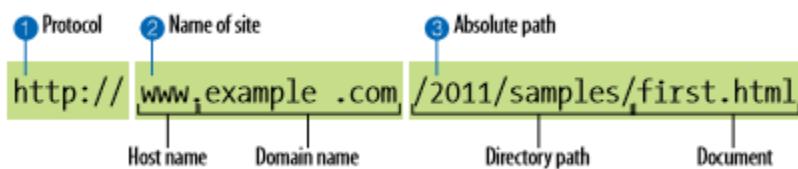
Generally there are two types of website styles, Static and Dynamic website:

- **A static Website** is one that has web pages stored on the server in the same form as the user will view them.
- **A dynamic Website** is one that does not have web pages stored on the server in the same form as the user will view them. Instead, the web page content changes automatically and/or frequently based on certain criteria. There are two meaning for dynamic website. The first is that the web page code is constructed dynamically, piece by piece. The second one is that the web page content displayed varies based on certain criteria. The criteria may be pre-defined rules or may be based on variable user input.

3. The Web Terms

Uniform Resource Locator (URL)

It is the complete address of World Wide Web page and consists of a three components that identifies where the web page is stored on the Internet. These parts are: the protocol, the site name, and the absolute path to the document or resource as shown in the following example



- protocol name (e.g., HTTP)
http:// The first thing the URL does is define the protocol that will be used for that particular transaction. The letters HTTP let the server know to use Hypertext Transfer Protocol, or get into “web mode.”
- domain name/ hostname (servers address that a user wants to connect with), for example, www.google.com. **www.example.com** The next portion of the URL identifies the website by its domain name. In this example, the domain name is example.com. The “www.” part at the beginning is the particular host name at that domain. For example, there might also be **development.example.com**, **clients.example.com**, and so on.
- File name is optional, implies the access to a file/directory into the principal webpage.

/2012/samples/first.html This is the absolute path through directories on the server to the requested HTML document, first.html. The words separated by slashes are the directory names, starting with the root directory of the host.

Example: http://www.icci.org/studies/ips.html .

1. Protocol: http.
2. Host computer name: www.
3. Second-level domain name: icci.
4. Top-level domain name: org.
5. Directory name: studies.
6. File name: ips.html.

Several Top-level domain are common:

com: commercial enterprise. شركات

edu: educational institution. للمؤسسات التعليمية

gov: government entity. للمؤسسات الحكومية

mil: military entity. للموقع العسكرية

net: network access provider. للمواقع ذات النشاط الخاص

org: usually nonprofit organizations منظمة رسمية غير حكومية

biz: Businesses مواقع الاعمال التجارية

pro: Professionals, such as doctors and attorneys

Web hosting

After we create a website, it is necessary to store it in a place where it is always available for users. We use Web hosting services/companies for this purpose. They own web servers that have the ability to store content.

Search engine

Search engines allow us to search in the Internet for information, images and other types of files stored in various locations available throughout the network. Search engines work according to certain algorithms that show the user relevant, requested search results. At first, information from the various websites is collected and stored and then analyzed to organize and save them in the database for future use. When a user enters an inquiry into the search engine, the database is organized by an index and the user is presented with results that match best the entered search terms. Therefore, it is important to understand that by using the search engine one does not search the entire Internet but the search engine's database. Therefore, we might get different results each time we use different web engines.

4. Internet protocols

- **TCP/IP protocol:** TCP / IP: This protocol is the main protocol for Internet communication. It defines the rules that computers need to follow to communicate with other computers via a network.
- **HTTP (Hypertext Transfer protocol):** is a network protocol that ensures the exchange of almost all types of resources on the web. With resources, we mean files, pages, images, search results, etc. It is basically, the web browsers language to send requests to the server. There is also the HTTPS version, which is a secure and encrypted version for HTTP communications.

- **FTP(File Transfer Protocol):** is used to load (upload) or retrieve (download) files between the client and server communication, or between two computers on the Internet. In other words, this protocol is responsible for file transfer on the Internet.
- **Internet Service Provider (ISP):** Is an organization that provides individuals and other companies' access to the Internet and other related services such as e-mail.

Web Design: Client-Server Architecture

1. Client-Server Architecture

Computers on the Internet use client/server architecture. This means that the remote server machine provides files and services to the user local client machine.

Client-Server Example



1.1 Web Server

A Web Server is a computer purposed to runs special serving software. That software "serves" HTML pages and the files associated with those pages when requested by a client, usually a Web browser. The computer is secured so that only authorized people can access it to make changes to the data, so, If a person is on the same network as the Web Server, he or she may be able to save the data directly onto the Web Server computer (if authorized).

Server-side:

- JSP (Java Server Pages)
- ASP (Active Server Pages)
- ASP.NET (next generation of ASP)
- PHP
- Python

1.2 Client

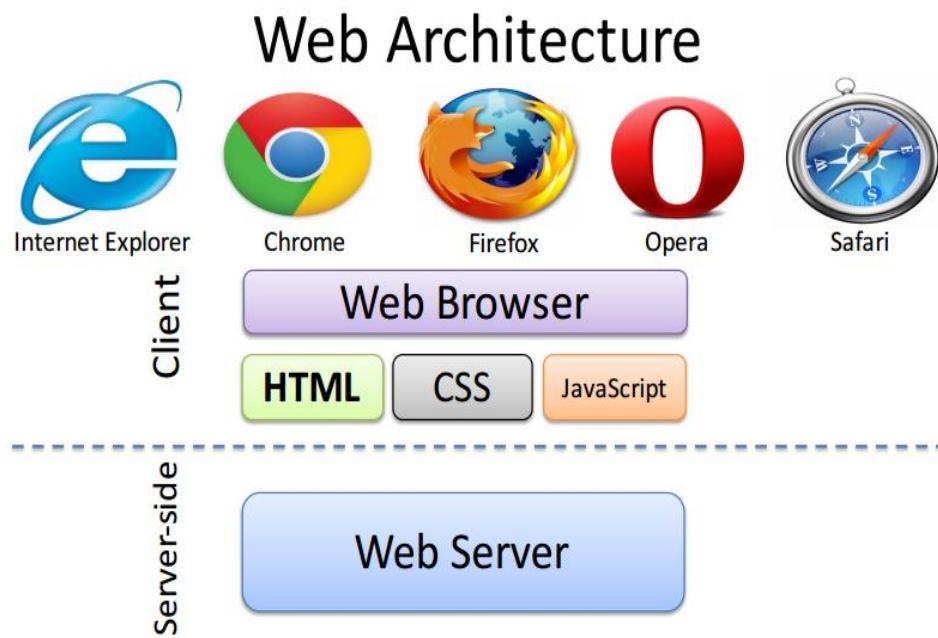
The Client (front end) or user side of the Web, it typically refers to the Web browser in the user's machine. It may also refer to plug-ins and helper applications that enhance the browser to support special services from the site. The term may imply the entire user machine or refer to a handheld device that provides Web access.

Client-side:

- HTML / XHTML (Extensible Hyper Text Markup Language)
- CSS (Cascading Style Sheets)
- JavaScript / VBScript (client-side scripting).

1.3 Web Browsers

Generally, a web browser is a software application or program for retrieving, displaying, and traversing information resources on the World Wide Web. An information resource is identified by a Uniform Resource Identifier (URI) and may be a web page, image, video, or other piece.

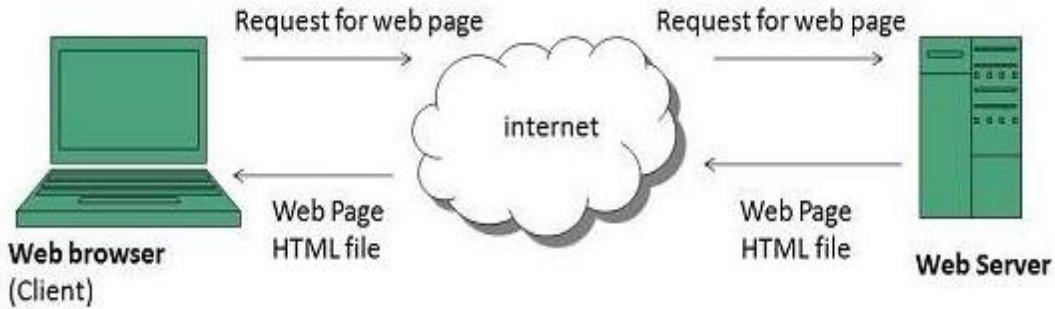


2. Web Operations

The Web works on client- server approach. Following steps explains how the web works:

1. User enters the URL (say, <http://www.tutorialspoint.com>) of the web page in the address bar of web browser.
2. Then browser requests the Domain Name Server for the IP address corresponding to www.tutorialspoint.com.

3. After receiving IP address, browser sends the request for web page to the web server using HTTP protocol which specifies the way the browser and web server communicates.
4. Then web server receives request using HTTP protocol and checks its search for the requested web page. If found it returns it back to the web browser and close the HTTP connection.
5. Now the web browser receives the web page, it interprets it and display the contents of web page in web browser's window.



3. Site Structure

Every Web site was built in inherits structure and should have a consistent and simple organization called a site structure. A site is a collection of HTML files, documents and images contained in a single master folder (the root folder). Within this root folder you can save your documents and subfolders organized in a manner that makes sense to you, as well as to others in your department that may need to edit the information.

Therefore, it is recommended that the structure of Web site include:

1. A root folder that contains the Web site.

2. A Web page entitled index.htm (or index.html) that resides within the root folder to represent the default homepage for the Web site.
3. May be images folder that contains the graphics, illustrations, images and photographs used in the Web pages.
4. Additional folders for organizing the content.



3.1 Hyperlinks

Hyperlinks are the primary method used to navigate between pages and Web sites. Links can point to other web pages, web sites, graphics, files, sounds, e-mail addresses, and other locations on the same web page. When text is used as a hyperlink, it is usually underlined and appears as a different color. There are four types of hyperlinks.

- Text hyperlink – Uses a word or phrase to take visitors to another page, file or document.
- Image hyperlink – Uses an image to take visitors to another page, file or document.

- Bookmark hyperlink – Uses text or an image to take visitors to another part of a web page.
- E-mail hyperlink – Allows visitors to send an e-mail message to the displayed e-mail address.

3.2 How Browsers Display Web pages

When a Web page is opened in a browser, the browser reads and interprets the HTML file and formats the Web page for display. If there are references to external files, such as images or multimedia, these files are downloaded from the server and displayed in the browser window. It is important to note that HTML files are text files that only contain references to the external files – you do not “embed” these files into the Web page.



4. Types of Web Sites

There are many types of Web sites, each catering to a particular type of content or use. Hence, few illustrative but not exhaustive cases are given below:

- 1) Blog (Web Log): site generally used to post online diaries which may include discussion forums.
- 2) Social Networking Site: where users could communicate with one another and share media, such as pictures, videos, music and blogs with other users. These may include games and Web applications.
- 3) Wiki Site: which users collaboratively edit (such as Wikipedia and Wikihow).
- 4) Web Portal: that provides a starting point or a gateway to other resources on the Internet.
- 5) Search Engine Site: a site that provides general information and is intended as a gateway or lookup for other sites like Google, Yahoo, Bing search engines.
- 6) Education Site: where teachers, students, or administrators can post information about current events at or involving their school.

5. Website Design Issues

There are many points one should keep in mind while designing a Web site. These points make a site usable and easily accessible to the users, which are discussed below:

- 1) Information Availability-- All the information that helps a visitor make informed decisions should be in the Web site. The general benchmark of a good Web site is that it should be providing 80-90 % of what a user/visitor is looking for.
- 2) Page layout: How the content is displayed on the page -- The page should be laid in such a way people should be able to find relevant content quickly.

Else they lose interest and leave the site. Page should be simple to enhance the usability of the page.

- 3) Colors -Standard colors should be used as colors can affect the usability of the site. For example, the standard colors used for links (blue for links; violet for visited links; and red for active links) should be maintained as one runs the risk of confusing the visitors.
- 4) Web Accessibility- Web accessibility means accessibility to all including people with disabilities (like visual, audio, physical, speech) can interact or contribute to the Web. As more and more accessible Web sites and software are made available, people with disabilities should be able to use and contribute the Web more effectively.
- 5) User-friendly Site- web site should be creating based on what the audience requires.
- 6) Download Speed - The download speed cannot determine by a Web designer. Some considerations are optimizing the graphics (images not larger than 10 kb), making smaller pages, and avoiding nested tables.