

SCS B204 WEB DEVELOPMENT TECHNOLOGIES

CHAPTER ONE: INTRODUCTION TO WEB DEVELOPMENT TECHNOLOGIES

History of the Internet

In the late 1950's the Advanced Research Projects Agency (ARPA) was founded in the United States with the primary focus of developing information technologies that could survive a nuclear attack. (Internet History) In 1967 ARPA University and private sector contractors met with representatives of the Department of Defense to discuss possible protocols for sharing information via computers. In 1969, two years before the calculator was introduced to consumers and the year after National Public Radio was established, the precursor of the Internet, ARPANET, was born. It connected four sites at the University of California at Los Angeles, the University of California at Santa Barbara, Stanford Research Institute, and the University of Utah. Throughout the 1970's researchers concentrated on developing protocols for controlling networks, moving messages across a system of networks, and allowing for remote access to the networks. There were computers connected at about two dozen sites when the first email was sent in 1972, but the number of sites and messages soon mushroomed. By 1975 there were 63 sites. In 1980, 400 host computers were connecting 20,000 people at university, military, and government locations. Twelve years later the number of hosts had grown to more than a million

internationally (BBN Timeline), and in January of 1999 there were more than 43 million. (Hobbes' Internet Timeline v4.1)

If the 1970's were a time of research, the 1980's were a time of development. The TCP/IP protocol was introduced in 1983, and at the University of Wisconsin the name server was developed. The next year domain name server (DNS) was established. In 1986, the National Science Foundation developed a system to connect the growing number of hosts. Regional networks were connected to a backbone network, which became known as the NSFNET. As the "Internet" continued to grow and prosper, ARPANET came to an end in 1989 (BBN Timeline) just before HTML protocol was introduced in 1990. HTML allowed graphics to be sent along with text to create hypertext pages customized to the sender's preference. (Internet History) Everything was now in place for explosive growth.

Commercial Development

In 1963 during the early days of computers and six years before ARPANET, students at MIT developed the first computer game called Space War. It would be twenty years before the TCP/IP protocol stimulated the growth of various networks and nearly thirty years (1991) before the United States government opened the Internet to private enterprise (BBN Timeline), but this game foreshadowed the commercialization of the Internet. In the 1970's and 80's people who were online put out information about furniture and cars they wanted to sell. Debates raged about whether this was an appropriate use of the new research tool, the Internet, but when the Commercial Internet Exchange (CIX) was formed in 1991 the genie would not go back in the bottle.

Commercial contractors have been involved in the development of ARPANET from its inception. As Tang and Teflon began as curiosities of the space program and later became common consumer products, so too have email, web research, and home shopping on the Web. It has only been ten years since the first relay between a commercial entity (MCI Mail) and the Internet was made. Since that time technologies have emerged that have fueled the growth of private enterprise on the Web. In 1992 Paul Linder and Mark McCahill at the University of Minnesota released Gopher, a tool that allowed researchers to retrieve specific data from myriad locations. The next year Mosaic, a web browser, was developed at the University of Illinois by Netscape founder Marc Andreessen, the World Wide Web became a public domain, and the Pentium processor was introduced by Intel to speed up the whole process. (The Past, Present, and Future of the Internet) As the technology advanced, the Internet became easier to use and the World Wide Web sites became more intricate and inviting. In 1994 shopping malls arrived on the Net. You could order pizza from Pizza Hut online or bank at First

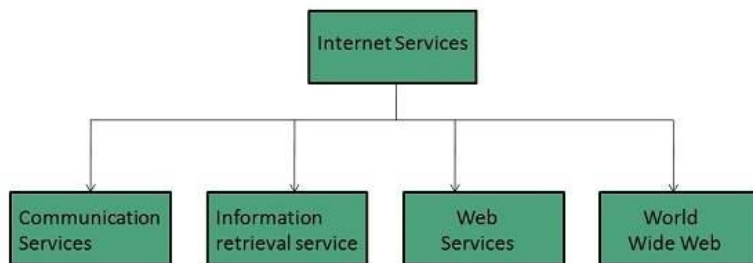
Virtual Bank, the first cyberbank. Of course, the advancements came with a downside. Vladimir Levin of Russia became the first publicly known Internet bank robber when he used the Internet to illegally transfer funds to his account. (Hobbes' Internet Timeline v4.1)

1995 saw the introduction of several emerging technologies such as JAVA and JAVAscript, Virtual Environments, and RealAudio which further enhanced the kind of product information which could be made available to consumers. Commercial users now outnumbered research and academic users by a two to one margin, and Bill Gates decided to redefine Microsoft as an Internet company. (The Past, Present, and Future of the Internet) Today one can shop online for books, food and wine, travel, and real estate. Other business activities include buying stocks and bonds, banking, and retirement planning. Online shopping accounted for over \$9 billion in 1997 and is expected to be \$30 billion by the year 2000. In light of this growth, the U.S. Commerce Department will begin studying the impact of online shopping on total retail activity. (Commerce Department to Measure Online Sales) Consumer spending via the Internet draws much interest, but business to business activity is also booming. The consulting group Piper Jaffray estimates that by the year 2001 Internet based business to business transactions will total US \$201.6 billion. Forrester Research estimates that by 2002 online business to business transactions will total US \$327 billion, (Internet Statistics), while other projections indicate that by 2003, consumers will spend \$108 billion, while businesses will spend \$1.3 trillion. (Spotlight: Corporate E-commerce Kicks Into Gear)

For further information on the history of the Internet, an extensive list of links may be found at the Internet Society Web site).

Services provided by the internet

Internet Services allows us to access huge amount of information such as text, graphics, sound and software over the internet. Following diagram shows the four different categories of Internet Services.



Communication Services

There are various Communication Services available that offer exchange of information with individuals or groups. The following table gives a brief introduction to these services:

S.N.	Service Description
1	Electronic Mail Used to send electronic message over the internet.
2	Telnet Used to log on to a remote computer that is attached to internet.
3	Newsgroup Offers a forum for people to discuss topics of common interests.
4	Internet Relay Chat (IRC) Allows the people from all over the world to communicate in

	real time.
5	Mailing Lists Used to organize group of internet users to share common information through e-mail.
6	Internet Telephony (VoIP) Allows the internet users to talk across internet to any PC equipped to receive the call.
7	Instant Messaging Offers real time chat between individuals and group of people. Eg. Yahoo messenger, MSN messenger.

Information Retrieval Services

There exist several Information retrieval services offering easy access to information present on the internet. The following table gives a brief introduction to these services:

S.N.	Service Description
1	File Transfer Protocol (FTP) Enable the users to transfer files.
2	Archie It's updated database of public FTP sites and their content. It helps to search a file by its name.
3	Gopher Used to search, retrieve, and display documents on remote sites.
4	Very Easy Rodent Oriented Netwide Index to Computer Achieved (VERONICA) VERONICA is gopher based resource. It allows access to the information resource stored on gopher's servers.

Web Services

Web services allow exchange of information between applications on the web. Using web services, applications can easily interact with each other.

The web services are offered using concept of **Utility Computing**.

World Wide Web (WWW)

WWW is also known as W3. It offers a way to access documents spread over the several servers over the internet. These documents may contain texts, graphics, audio, video, hyperlinks. The hyperlinks allow the users to navigate between the documents.

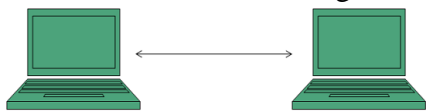
Video Conferencing

Video conferencing or Video teleconferencing is a method of communicating by two-way video and audio transmission with help of telecommunication technologies.

Modes of Video Conferencing

Point-To-Point

This mode of conferencing connects two locations only.



Multi-Point

This mode of conferencing connects more than two locations through **Multi-point Control Unit (MCU)**.

Email

Email is a service which allows us to send the message in electronic mode over the internet. It offers an efficient, inexpensive and real time mean of distributing information among people.

E-Mail Address

Each user of email is assigned a unique name for his email account. This name is known as E-mail address. Different users can send and receive messages according to the e-mail address. E-mail is generally of the form username@domainname. For example, info@kenet.com is an e-mail address where *info* is username and *kenet.com* is domain name.

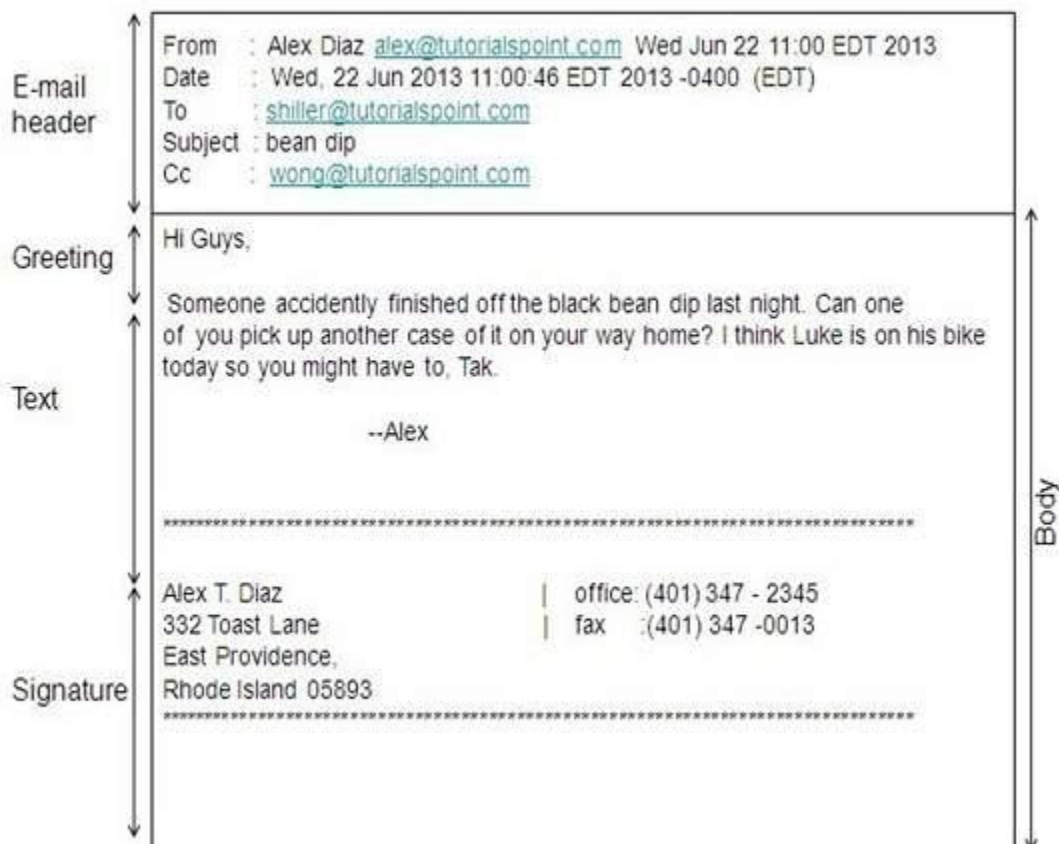
- The username and the domain name are separated by **& (at)** symbol.
- E-mail addresses are not case sensitive.
- Spaces are not allowed in e-mail address.

There are various categories of domains;

- com - Commercial institutions or organization
- edu - Educational institutions
- gov - Government site
- mil - Military site
- net - Gateways and administrative hosts
- org - Private organizations

E-mail Message Components

E-mail message comprises of different components: E-mail Header, Greeting, Text, and Signature. These components are described in the following diagram:



E-mail Header

The first five lines of an E-mail message is called E-mail header. The header part comprises of following fields:

From

The **From** field indicates the sender's address i.e. who sent the e-mail.

Date

The **Date** field indicates the date when the e-mail was sent.

To

The **To** field indicates the recipient's address i.e. to whom the e-mail is sent.

Subject

The **Subject** field indicates the purpose of e-mail. It should be precise and to the point.

Cc

CC stands for Carbon copy. It includes those recipient addresses whom we want to keep informed but not exactly the intended recipient.

Bcc

BCC stands for Black Carbon Copy. It is used when we do not want one or more of the recipients to know that someone else was copied on the message.

Greeting

Greeting is the opening of the actual message. Eg. Hi Sir or Hi Guys etc.

Text

It represents the actual content of the message.

Signature

This is the final part of an e-mail message. It includes Name of Sender, Address, and Contact Number.

Advantages

Reliable

Many of the mail systems notify the sender if e-mail message was undeliverable.

Convenience

There is no requirement of stationary and stamps. One does not have to go to post office. But all these things are not required for sending or receiving an mail.

Speed

E-mail is very fast. However, the speed also depends upon the underlying network.

Inexpensive

The cost of sending e-mail is very low.

Printable

It is easy to obtain a hardcopy of an e-mail. Also an electronic copy of an e-mail can also be saved for records.

Global

E-mail can be sent and received by a person sitting across the globe.

Generality

It is also possible to send graphics, programs and sounds with an e-mail.

Disadvantages

Forgery

E-mail doesn't prevent from forgery, that is, someone impersonating the sender, since sender is usually not authenticated in any way.

Overload

Convenience of E-mail may result in a flood of mail.

Misdirection

It is possible that you may send e-mail to an unintended recipient.

Junk

Junk emails are undesirable and inappropriate emails. Junk emails are sometimes referred to as spam.

No Response

It may be frustrating when the recipient does not read the e-mail and respond on a regular basis.

Requirements for connecting to the internet

Internet service provider - an internet service provider provides you with a connection to the internet and the software you will need to navigate.

telecommunication line - a telephone line is required to connect you to the internet service provider.

Modem - a modem converts a digital signal received from a computer into an analogue signal that can be sent along ordinary telephone lines, and back to digital at the other end.

Web browser - a web browser is software used to view and download Web pages and various types of files such as text, graphics and video. Examples are Microsoft Internet Explorer or Netscape Navigator.

Understanding the Differences Between Internet Connections

When determining which type of Internet connection is right for you or your family, it's important to understand the distinction between each connection. In today's age, there are numerous ways to connect laptops, desktops, mobile phones, gaming consoles, e-readers and tablets to the Internet. Some of the most widely used Internet connections are described below.

Wireless

Wireless internet is like satellite, however instead of using a satellite orbiting the earth you are using cell phone towers to connect to the internet. This is a little bit faster and cheaper than satellite (generally) however it is also slightly less convenient. It is still slower and more expensive than DSL and Cable. As for convenience, wherever you might get cell phone coverage you get internet, and as I'm sure you know you don't always get cell phone coverage, but for the most part you will get phone coverage in populated areas. Wireless is often the best options in rural and remote locations for the simple reason that it is often one of the only options.

Cellular. Cellular technology provides wireless Internet access through cell phones. The speeds vary depending on the provider, but the most common are 3G and 4G speeds. A 3G is a term that describes a 3rd generation cellular network obtaining mobile speeds of around 2.0 Mbps. 4G is the fourth generation of cellular wireless standards. The goal of 4G is to achieve peak mobile speeds of 100 Mbps but the reality is about 21 Mbps currently.

Hotspots

Hotspots are sites that offer Internet access over a wireless local area network (WLAN) by way of a router that then connects to an Internet service provider. Hotspots utilize Wi-Fi technology, which allows electronic devices to connect to the Internet or exchange data wirelessly through radio waves. Hotspots can be phone-based or free-standing, commercial or free to the public.

Dial-Up

Dial-up connections require users to link their phone line to a computer in order to access the Internet. This particular type of connection—also referred to as analog—does not permit users to make or receive phone calls through their home while using the Internet. Dial-up access is cheap but slow. A modem (internal or external) connects to the Internet after the computer dials a phone number. This analog signal is converted to digital via the modem and sent over a land-line serviced by a public telephone network. Telephone lines are variable in quality and the connection can be poor at times. The lines regularly experience interference and this affects the

speed, anywhere from 28K to 56K. Since a computer or other device shares the same line as the telephone, they can't be active at the same

Broadband

This high-speed Internet connection is provided through either cable or telephone companies. One of the fastest options available, broadband Internet uses multiple data channels to send large quantities of information. The term broadband is shorthand for broad bandwidth. Broadband Internet connections such as DSL and cable are considered high-bandwidth connections. Although many DSL connections can be considered broadband, not all broadband connections are DSL.

DSL

DSL, which stands for Digital Subscriber Line, uses existing 2-wire copper telephone line connected to one's home so service is delivered at the same time as landline telephone service. Customers can still place calls while surfing the Internet. DSL uses a router to transport data and the range of connection speed, depending on the service offered, is between 128K to 8 Mbps.

Cable

Cable Internet connection is a form of broadband access. Through use of a cable modem, users can access the Internet over cable TV lines. Cable modems can provide extremely fast access to the Internet. There are different speeds depending on if you are uploading data transmissions or downloading. Since the coax cable provides a much greater bandwidth over dial-up or DSL telephone lines, you can get faster access. Cable speeds range from 512K to 20 Mbps.

Satellite

In certain areas where broadband connection is not yet offered, a satellite Internet option may be available. Similar to wireless access, satellite connection utilizes a modem. Satellite accesses the internet via a satellite in Earth's orbit. The enormous distance that a signal travels from earth to satellite and back again, provides a delayed connection compared to cable and DSL. Satellite connection speeds are around 512K to 2.0 Mbps

ISDN

ISDN (Integrated Services Digital Network) allows users to send data, voice and video content over digital telephone lines or standard telephone wires. The installation of an ISDN adapter is required at both ends of the transmission—on the part of the user as well as the Internet access provider. . DSL uses a router to transport data and the range of connection speed, depending on the service offered, is between 128K to 8 Mbps

Fiber Optics

Optical or fiber optic internet is the replacement for DSL and Cable. It has a very high max speed, and the speed can be continually upgraded as time brings better technology without having to change the physical cable.

Factors to Consider When Choosing an ISP

– Business or residential?

ISPs usually distinguish between the services they offer to business users and to home users. Business-class connections provide more reliability, greater upload speeds, and other advantages important to some organizations. However, they'll usually cost a lot more. If your needs are limited, your organization might not need a business-grade connection.

– How reliable? Are there Service Level Agreements?

Most business-class Internet connections come with assurances regarding uptime, latency, and other metrics. For example, your ISP might guarantee that 99.9 percent of the time your connection will work and, if it doesn't meet that target, it will refund some of your money. These promises are usually captured in a formal document known as a Service Level Agreement (SLA). An example of a [Service Level Agreement](#) can be found at [Speakeasy.net](#).

– ***How long does the contract last?***

ISPs will sometimes offer reduced rates in exchange for a long-term contract. Be cautious about any contract that lasts for more than two years. Services, prices, providers, and technologies are changing all the time. You don't want to be locked into a long-term contract when a cheaper, faster service shows up in your community a year from now.

– ***What are the terms of the contract?***

Some ISP contracts restrict what you can use your Internet connection to do. For example, some ISPs expressly forbid customers with residential service contracts from hosting websites or other online services. There may also be caps on the amount of data you can upload and download over the course of a month.

– ***What are the upload and download speeds?***

While you probably spend most of your time on the Internet downloading files and information, you should still pay attention to upload speeds. This is especially true if you host your own website or other online services, or make frequent use of cloud-based services such as file storage and online backup. Most broadband connections marketed to home users are asymmetric. In other words, the upload speed is much lower than the download speed. Business-class broadband connections will usually provide more bandwidth for uploading than residential connections.

– ***Does the ISP offer integrated voice and data service?***

It's becoming more and more common to get both voice and data services from the same vendor, over the same lines, sharing much of the same equipment. Integrated services can be less expensive and less complicated to manage than separate voice and data services.

– ***Are there equipment and installation costs?***

Residential plans usually have low equipment and installation costs. In contrast, for business-class Internet connections, the installation and setup fees will usually be much higher, and the equipment can be hugely expensive. You may be able to roll some of these initial costs into your monthly bill by renting equipment from your ISP, but you'll trade lower up-front costs for higher ongoing costs.

– ***What are your redundancy options?***

Sooner or later, your Internet access will go down. So it's helpful to plan ahead by thinking about other ways you can access critical online resources and information in the event you lose your primary Internet connection. For example, if your cellular phone network is still up and running, you can use mobile devices to access information online, even if your organization's Internet connection is down.

Benefits of the Internet

- Provides faster communication channel like e-mail, instant messaging, file transfer and file sharing. With this, users will be able to communicate effectively and can save time and effort.
- Provides latest news and online references. Most of the newspapers today are now online. Users can browse the internet web sites to read the latest news, research on online encyclopedias, and join forums to learn new things from other people. With this, accessing information is faster.
- Provides entertainment like uploaded movies, movie guides, video streaming, and music downloads. Users can now listen to online radio stations and download the songs they want.
- Provides commerce services like online shopping, travel bargains, plane schedules, and buy and sell. With ecommerce, users can buy items online by just using their credit card or any

form of bank transactions and without the need to go to the mall. They can just wait for the items to be delivered on their doorstep.

- Provides jobs to people who want to make money online like buy and sell services, blogs and web design

There are many advantages of using the Internet, such as :

1) **Global Audience**

Content published on the World Wide Web is immediately available to a global audience of users. This makes the World Wide Web a very cost-effective medium to publish information. Reaching more than 190 countries.

2) **Operates 24 hours, 7 days a week**

You don't need to wait until resources are available to conduct business. From a consumer's perspective as well as a provider's business can be consummated at any time. The fact that the Internet is operational at all times makes it the most efficient business machine to date.

3) **Relatively Inexpensive**

It is relatively inexpensive to publish information on the Internet. At a fraction of the cost to publish information by traditional methods, various organizations and individuals can now distribute information to millions of users. It costs only a few thousand dollars to establish an Internet presence and publish content on the Internet.

4) **Product Advertising**

You can use the World Wide Web to advertise various products. Before purchasing a product, customers will be able to look up various product specification sheets and find out additional information.. The Web allows a business to provide timely information, you can simply place the information on the Web page and it is available immediately for your customers.

5) **Distribute Product Catalogs**

The World Wide Web is a very effective medium for distributing product catalogs. In the old days, putting together a product catalog used to be very costly in terms of time and money needed to publish and distribute it. The World Wide Web changes all this by allowing content developers to put together a sales catalog and make it available to millions of users immediately.

6) **Online Surveys**

Traditional methods of performing surveys are often relatively slow and expensive compared to online surveys conducted on the Internet. For example, in order to fill out various needs of customers or what they would like to see in a future product, it's often necessary to compile a list of address and mail a questionnaire to many customers. The success of such an attempt is not always guaranteed and can be very costly in terms of mailing the questionnaires and entering responses to a databases and analyzing it. On the other hand, you can use the World Wide Web to automate the whole process. For example, you can set up a CGI script to conduct online surveys. Results of such a survey can be automatically updated to a database. This database can then be used to keep a pulse on various opinions and needs of customers.

7) **Announcements**

With the World Wide Web, you can distribute various announcements to millions of users in a timely manner. Because there is virtually no time lag from the time it takes to publish information to making the information available to users, the Web is an ideal medium to publicize announcements.

Provide Technical Support

You can also use Web site to provide technical support to users. Because Web pages can

be updated immediately with new information, various technical support literature can be immediately modified in light of new findings and developments. This can be accomplished without having to distribute changes to all users affected by any changes using traditional mediums of information distribution, which are often quite costly compared to the World Wide Web.

8) **Create Online Discussion Forums**

By using applications such as WebBoard, it's possible to set up online discussion forums on the Web.

9) **Obtain Customer Feedback**

The interactive nature of the World Wide Web is ideal for obtaining customer feedback. You can easily set up a CGI script to obtain customer feedback about a product or service. Because customer feedback submitted by customers can be read immediately, it's possible to respond to various customer concerns in a timely manner, increasing customer satisfaction and quality of customer service.

10) **Immediate Distribution of Information**

When information is added to a Web site, it's immediately available for browsing by millions of Internet users. The World Wide Web is an ideal medium of information distribution because it takes away the time lag associated with publishing content and actually making it available to users

11) **Easy Integration with Internal Information Systems**

Internet information systems deployed on the Internet can be easily integrated with internal information systems managed with office productivity applications such as Microsoft Office.

12) **Powerful Content Publishing Tools**

A new breed of Internet aware applications will start emerging in software stores by the time you read this. These applications will enable users to develop content for the World Wide Web by simply saving as an HTML file. In addition to software developers making existing applications Internet aware, various new, powerful, and easy-to use Internet content publishing applications are also being developed. These applications will make the task of publishing content on the Internet even easier. Most of these applications are developed for Windows users.

13) **Multimedia**

The capability to incorporate multimedia into Web pages is a major advantage of using World Wide Web to publish information. For example, many Web sites use sounds and video clips to make the content easier and more interesting to browse.

14) **Formatting Capabilities**

Content published on the World Wide Web can be richly formatted by using various HTML tags and graphic formats. The capability to do this is a major reason for the success of the World Wide Web. In addition to using HTML tags and various multimedia formats in Web pages, various interactive controls can also be added to a web page. This capability allows Web site content developers to create "active" Web sites. For example, before a user sends some information to a Web server for processing, a VBScript or JavaScript subroutine can be used to verify information typed in by the user. Various formatting capabilities, along with technologies such as Java and VBScript, make the World Wide Web a richly interactive medium that you can use to distribute information to millions of users.

Important Components of the Web

Web Server

Web server can refer to either the hardware (the computer) or the software (the computer application) that helps to deliver content that can be accessed through the Internet. The most common use of Web servers is to host Web sites but there are other uses like data storage or for running enterprise applications. A web server is a computer programs that delivers (serves) content, such as web pages, using the Hypertext Transfer Protocol (HTTP), over the World Wide Web.

A **web browser** is a software application for retrieving, presenting 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 of content. Hyperlinks present in resources enable users easily to navigate their browsers to related resources. A web browser can also be defined as an application software or program designed to enable users to access, retrieve and view documents and other resources on the Internet.

Although browsers are primarily intended to use the World Wide Web, they can also be used to access information provided by web servers in private networks or files in file systems. The major web browsers are Chrome, Firefox, Internet Explorer, Opera, Safari, etc.

The primary purpose of a web browser is to bring information resources to the user ("retrieval" or "fetching"), allow them to view the information ("display", "rendering"), and then access other information ("navigation", "following links").

This process begins when the user inputs a Uniform Resource Locator (URL) (URL), for example <http://en.wikipedia.org/>, into the browser. The prefix of the URL, the Uniform Resource Identifier, determines how the URL will be interpreted. The most commonly used kind of URI starts with *http:* and identifies a resource to be Retrieved over the Hypertext Transfer Protocol (HTTP). Many browsers also support a variety of other prefixes, such as *https:* for HTTPS, *ftp:* for the File Transfer Protocol, and *file:* for local files.

Information resources may contain hyperlinks to other information resources. Each link contains the URI of a resource to go to. When a link is clicked, the browser navigates to the resource indicated by the link's target URI, and the process of bringing content to the user begins again.

Most major web browsers have these user interface elements in common:

- *Back* and *forward* buttons to go back to the previous resource and forward respectively.
- A *refresh* or *reload* button to reload the current resource.
- A *stop* button to cancel loading the resource. In some browsers, the stop button is merged with the reload button.
- A *home* button to return to the user's home page.
- An address bar to input the Uniform Resource Identifier (URI) of the desired resource and display it.
- A search bar to input terms into a search engine. In some browsers, the search bar is merged with the address bar.
- A status bar to display progress in loading the resource and also the URI of links when the cursor hovers over them, and page zooming capability

A **web search engine** is designed to search for information on the World Wide Web and FTP servers. The search results are generally presented in a list of results and are often called hits. The information may consist of web pages, images, information and other types of files. Some search engines also mine data available in databases or open directories. Unlike Web directories, which are maintained by human editors, search engines operate algorithmically or are a mixture of algorithmic and human input. Examples of search engines are yahoo, google, msn etc

Web crawler is an automated Web browser which follows every link it sees. The contents of

each page are then analyzed to determine how it should be indexed (for example, words are extracted from the titles, headings, or special fields called meta tags). Data about web pages are stored in an index database for use in later queries. Some search engines, store all or part of the source page (referred to as a cache) as well as information about the web pages, whereas others, store every word of every page they find. When a user enters a query into a search engine the engine examines its index and provides a listing of best-matching web pages according to its criteria, usually with a short summary containing the document's title and sometimes parts of the text. Exclusions from web crawler can be made by the use of robots.txt.

Domain Name System (DNS) is a hierarchical naming system for computers, services, or any resource connected to the Internet or a private network. It associates information with domain names assigned to each of the participants. Most importantly, it translates domain names meaningful to humans into the numerical (binary) identifiers associated with networking equipment for the purpose of locating and addressing these devices worldwide.

The Domain Name System makes it possible to assign domain names to groups of Internet users in a meaningful way, independent of each user's physical location. Internet domain names are easier to remember than IP addresses such as 208.77.188.166 (IPv4) or 2001:db8::1f70:6e8 (IPv6). The Domain Name System distributes the responsibility of assigning domain names and mapping those names to IP addresses by designating authoritative name servers for each domain. Authoritative name servers are assigned to be responsible for their particular domains, and in turn can assign other authoritative name servers for their sub-domains. The DNS database of Domain names and the corresponding IP addresses can not be held on one machine. As a truly distributed resource, it is maintained by many organisations, each manages a little bit of it. DNS defines a tree structure, and each node on the tree is owned by one of the naming authorities. The owner of a node can create any number of child nodes, but each must have a unique name.

URLs Addresses for web sites are called URLs (Uniform Resource Locators). Most of them begin with http (HyperText Transfer Protocol), followed by a colon and two slashes. For example, the URL for the Florida Centre for Instructional Technology is <http://fcit.usf.edu/>.

Some of the URL addresses include a directory path and a file name. Consequently, the addresses can become quite long. For example, the URL of a web page may be: <http://fcit.usf.edu/holocaust/default.htm>. In this example, "default.htm" is the name of the file which is in a directory named "holocaust" on the FCIT server at the University of South Florida.

Top-level domain Each part of a domain name contains certain information. The first field is the host name, identifying a single computer or organization. The last field is the top-level domain, describing the type of organization and occasionally country of origin associated with the address.

Top-level domain names include:

.com	Commercial
.edu	Educational
.gov	US Government
.int	Organization
.mil	US Military
.net	Networking Providers
.org	Non-profit Organization

Domain name country codes include, but are not limited to:

.au	Australia
.de	Germany
.fr	France
.nl	Netherlands
.uk	United Kingdom

.us United States
.ke Kenya

Routers

Routers are specialized computers that send your messages and those of every other Internet user speeding to their destinations along thousands of pathways. The routers determine where to send information from one computer to another. A router has two separate, but related, jobs:

- ☐ It ensures that information doesn't go where it's not needed. This is crucial for keeping large volumes of data from clogging the connections of "innocent bystanders."
- ☐ It makes sure that information does make it to the intended destination.

In performing these two jobs, a router is extremely useful in dealing with two separate computer networks. It joins the two networks, passing information from one to the other. It also protects the networks from one another, preventing the traffic on one from unnecessarily spilling over to the other.

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. An IP address serves two principal functions: host or network interface identification and location addressing. Its role has been characterized as follows: "A name indicates what we seek. An address indicates where it is. A route indicates how to get there."

The designers of the Internet Protocol defined an IP address as a 32-bit number and this system, known as Internet Protocol Version 4 (IPv4), is still in use today. However, due to the enormous 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.

IP addresses are binary numbers, but they are usually stored in text files and displayed in human readable notations, such as 172.16.254.1 (for IPv4), and 2001:db8:0:1234:0:567:8:1 (for IPv6).

Web hosting - This is the business of providing server space, Web services and file maintenance for Web sites controlled by individuals or companies that do not have their own Web servers. Many Internet Service Providers, will allow subscribers a small amount of server space to host a personal Web page. Other commercial ISPs will charge the user a fee depending on the complexity of the site being hosted.

Web Design Tools

Website design means planning, creation and updating of websites. Website design also involves information architecture, website structure, user interface, navigation ergonomics, website layout, colors, contrasts, fonts and imagery (photography) as well as icons design.

Web design tools refer to software programs and reference materials used to create a pleasing and effective Internet screen for a website.

Examples of Web Design Tools

5. Fireworks

Adobe Fireworks is a commercial raster and vector graphics editor hybrid from Adobe that's available for the Mac and Windows operating systems. Designed specifically for web designers (unlike Photoshop), Fireworks brings you a plethora of tools and options that make full web layout prototyping a breeze.

Among its notable features are: "slices" for slicing and dicing a design mockup into HTML/CSS for rapidly creating prototypes (though you should avoid using auto-generated source code for the end-build), the ability to package an entire site design as a PDF with clickable components for interactive and impressive site prototypes, and optimization tools for making your web graphics as lightweight as possible.

4. Dreamweaver

Adobe Dreamweaver is a commercial application for web development that's available for the Mac and Windows operating systems. Its featured-packed suite of tools and options include: syntax highlighting and very smart Code Hinting, a built-in FTP client, project management and workflow options that make team work effortless, and Live View – which shows you a preview of your source code. Dreamweaver tightly integrates with other popular Adobe products such as Photoshop, allowing you to share Smart Objects for quick and easy updating and editing of graphics components.

3. Panic Coda

Panic Coda is a shareware web development application for the Mac OS X operating system. It seeks to reduce the amount of applications (such as an FTP client, CSS editor, a version control system, etc.) you need to develop websites and to improve your team's workflow. Coda's one-window web development philosophy uses a tabbed interface for text editing, file transfers, SVN, CSS, and even "Books" which embeds web books that are searchable (it comes with The Web Programmer's Desk Reference but you can add your own).

It's simple and intuitive interface allowed Coda to garner the Apple Design Awards Best Mac OS X User Experience in 2007.

2. Photoshop

Adobe Photoshop is a very popular commercial graphics editor available for the Mac and Windows operating system. Created for professional photographers and designers, it is the ideal application for manipulating images and creating web graphics. Photoshop has all the necessary tools and options you need such as: Filters – which automatically adds effects to your image or a selected section of your image, extensibility and automation with Brushes, Actions and Scripting, and workflow enhancement features like Layer Comps and the Revert option.

1. Firebug

Firebug is a free, open source in-browser web development tool for the Firefox web browser. It's many features include: on-the-fly HTML and CSS editing for tweaking or debugging, a Console for logging, analyzing and debugging JavaScript, and an intuitive Document Object Model (DOM) inspection tool to help you quickly see how the elements of a web page relates to one another.

Firebug's popularity is so immense it's one of the few Firefox extensions that have its own extensions (like [YSlow](#) and [FirePHP](#))!

Features of web design tools

- **Photo Galleries** - Multiple photo gallery or image rotator tools for display of images in gallery or content modes.
- **Multimedia** - Video, audio, and streaming media tools for displaying multimedia content.
- **Social Media Links** - Social media bookmarking links to all major social bookmarking and social sharing network sites.
- **Banner Advertising System** - Display and text banner ads management system for serving ads across selected page regions and website zones.
- **RSS Content Syndication** - RSS feeds for selected channels or content groups as well as an overall new website content feeds.
- **Custom Web Design** - Each new site design is created based on a review of the style and web presentation elements that supports your publication online. Mock design layouts are created prior to development for publisher approval prior to development and site configuration.
- **Web-Based Database** - Open source web based content management software provides the MySQL powered databases to manage all content on the website. Web content staff, editors,

and contributors can be assigned separate permission levels for posting and approving content to go live.

- **Advertiser / Resource Directory** - Category and sub-category directory database with logo and custom fields for magazine niche focused resources. Site administrator or visitor entered listings with editor approval prior to live presentation.
- **Script Element Control** - Script based accommodation for third-party magnets and web tools to display off-site information, feeds, or functions.

Web Authoring

This is a category of software that enables the user to develop a Web site in a desktop publishing format. The software will generate the required HTML coding for the layout of the Web pages based on what the user designs. Typically, the user can toggle back and forth between the graphical design and the HTML code and make changes to the Web page in either the design of the accompanying code.

It is to design and create a Web site, from writing the site's underlying code to writing the text to managing the site's upkeep.

Web authoring tool: Software for designing and presenting web pages.

Authoring Tool is any software, or collection of software components, that authors can use to create or modify web content for use by other people. Authoring tools, at their best, should allow all of us to publish to a universal space of web content, read by people from all over the world, in many different languages, on many different computers, using many different input and output devices.

Examples of authoring tools

"Authoring tools" covers *any* software used to write the web, from enterprise content management systems (CMSs) through to microblogging mobile apps, whether web-based, non-web-based or a combination. Examples include:

- web page authoring tools (e.g., WYSIWYG HTML editors)
- software for directly editing source code or markup
- software for converting to web content technologies (e.g., "Save as HTML" features in office suites)
- integrated development environments (e.g., for web application development)
- software that generates web content on the basis of templates, scripts, command-line input or "wizard"-type processes
- software for rapidly updating portions of web pages (e.g., blogging, wikis, online forums)
- software for live collaboration over the web
- software for updating social media profiles, microblogging, and photo and video sharing
- software for generating/managing entire web sites (e.g., content management systems, courseware tools, content aggregators)
- email clients that send messages in web content technologies
- multimedia authoring tools
- debugging tools for web content
- software for creating mobile web applications
- scripting libraries
- web application frameworks, IDEs and SDKs

Types of Web Authoring Tools

Pure WYSIWYG (What You See Is hat You Get: pronounced "wiz-ee-wig") editor:

With a pure WYSIWYG editor, you work entirely in an interface that resembles a desktop publishing program. These programs are best suited for those wanting a great-looking site that's not very hard to build. NetObjects Fusion and Drumbeat are examples of WYSIWYG editors.

Pure code-based editor:

With pure code-based editor, you work directly with raw HTML tags and set your own rules about how to lay out and organize your code. You have total control over you code. HomeSite, HotDog Professional, HTMLed Pro, WebberActive, and WebEdit examples of pure code-based editors.

Compound editor (Pure WYSIWG editors + Pure code-based editors):

With a compound editor, you can accomplish most tasks in a WYSIWG editing mode but switch from the word processor-style editing window to a source code view to modify the page's underlying HTML. Macromedia Dreamweaver, Microsoft FrontPage, QuickSite, and Visual Page are examples of compound editors.

Description of some web authorising tools

1. Microsoft FrontPage 2000 is a Web authoring tool that gives you everything you need to create and manage exactly the site you want, whether you're creating a personal Web page or a corporate Internet or intranet site

Features:

- ☐ Microsoft FrontPage gives you excellent control over creating a site with a consistent look and feel. Its site management features are rated the best, including a graphical view of your site.
- ☐ Microsoft FrontPage lets you see a graphical map of your site, and you can easily add pages to it from there. Your new page comes template the look and feel you created for the rest of your site, saving lots of time.
- ☐ Microsoft FrontPage lets you use any combination of text- and graphics-based layouts and navigation tools. Graphic "themes" optionally apply a consistent look to sites' banners, buttons, text and background. The program comes with 50 themes that consist of similar elements for bullets, font, images, navigation bars, and other page elements.

2. NetObjects Fusion 5.0 is a Web authoring tool that is the solution for small business Web sites, from planning, building, and managing your site to promoting and growing your online business quickly and effectively.

Features:

- ☐ It is a true WYSIWYG tool than an HTML editor. You can drag images, text, and other objects anywhere on the page and simply drop them in.
- ☐ NetObjects Fusion was the first program to remove the tedious hand coding from creating pixel-precise page layouts in HTML.
- ☐ The visual NetObjects Fusion 5.0 environment makes building Web sites fast and easy. You can build or update a site by simply dragging and dropping text, graphics, and multimedia.
- ☐ NetObjects Fusion includes a dazzling set of 55 graphics styles for buttons, navigation bars, borders, and other visual elements.

3. Macromedia Dreamweaver 3 is a Web authoring tool that is the solution for professional Web site design and production.

Features of Macromedia Dreamweaver:

- ☐ For hand-coding, Deamweaver calls up an external HTML source editor. A quick click of Dreamwaver's External Editor button, and you are editing source code. Switch back to Dreamwaver, and it integrates your changes into the WYSIWYG view automatically.
- ☐ Macromedia Dreamweaver keeps the HTML code you graphically

create as pristine as if you did it by hand.

- **Dynamic HTML:** Animation made easy. Macromedia Dreamweaver's timelines help you create your layers on Web pages and define events to create Dynamic HTML. Producing your effects is a simple matter of dragging and dropping the browser object you want to move.

Basic features of web authoring software/tools

Feature #1: Views

Most web authoring software provides multiple views of the web page you're working on.

- **Standard, normal, or design view** - This is typically the default view, which is a blank screen on which you type, paste, or insert content. This is very similar to a word processor screen.
- **Code view** - Allows you to view and work directly with the HTML code.
- **Split** - Both of the above views are displayed simultaneously in separate windows.

Examples from common applications

- In Macromedia Dreamweaver, you can switch between views using the View menu.
- In Microsoft FrontPage, you can switch between views using tabs that appear in the lower left corner of the application window.
- In Netscape Composer, you can switch between views using either of the above methods.

Feature #2: Creating Headings and SubHeadings

In Normal or Design View, Web authoring software is very similar to word processing software. One or more toolbars appear across the top of the application window. A text formatting toolbar typically includes buttons for bolding and italicizing text, and probably additionally includes some means of identifying a heading or subheading.

Examples from common applications

Example #1

The following is a sample toolbar from Macromedia Dreamweaver. To create an <h1> heading in Dreamweaver, simply select the button labeled **h1**, type your heading text, then press Enter.



Feature #3: Inserting Links

In many web authoring software products, you add a link to a document by selecting *Insert* from the menu, then *Link* or *Hyperlink*. A dialog box will appear, prompting you for the link text that you want to display, the destination of the link, and possibly other information

Feature #4: Inserting Images

In many web authoring software products, you add an image to a document by selecting *Insert* from the menu, then *Image* or *Picture*. A dialog box will appear, prompting you for the location of the image. After you have inserted the image into your webpage, you can edit its attributes in a Properties dialog box or panel.

Good web design features

Category:

Text

- Background does not interrupt the text
- Text is big enough to read, but not too big
- The hierarchy of information is perfectly clear

Columns of text are narrower than in a book to make reading easier on the screen

Navigation

Navigation buttons and bars are easy to understand and use

Navigation is consistent throughout web site

Navigation buttons and bars provide the visitor with a clue as to where they are, what page of the site they are currently on

Frames, if used, are not obtrusive

A large site has an index or site map

Links

Link colors coordinate with page colors

Links are underlined so they are instantly clear to the visitor

Graphics

Buttons are not big and dorky

Every graphic has an alt label

Every graphic link has a matching text link

Graphics and backgrounds use browser-safe colors

Animated graphics turn off by themselves

General Design

Pages download quickly

First page and home page fit into 800 x 600 pixel space

All of the other pages have the immediate visual impact within 800 x 600 pixels

Good use of graphic elements (photos, subheads, pull quotes) to break up large areas of text

Every web page in the site looks like it belongs to the same site; there are repetitive elements that carry throughout the pages

General features

1. **Consistent design** - Each page in the website should look as if it belongs to the same website. Visitors should not have to guess if they are still at the same website or if they have left.
2. **Easy navigation** - Where are the buttons? The most standard position for navigational buttons are at the top or the left. Not to say that the buttons can't be anywhere else, but you don't want your visitors to have to hunt for them.
3. **Consistency in colors, font, and alignment** - One can always tell the amateur website designers because they have each sentence in a different color or font, and some sentences are left-justified, while others are centered. This is distracting to the visitor, which can result in the visitor leaving the site.
4. **Correct spelling** - Errors in spelling reflect badly upon the organization as well as the web designer.
5. **No horizontal scrolling** - We are used to scrolling vertically (down), but no visitor should EVER have to scroll horizontally.
6. **Contact information is clear** - You WANT people to find you. Contact information should be easy to find and on every page.
7. **Images should not be too large** - Not everyone has broadband Internet access, and time is precious. If a visitor has to wait too long for images to load, she will leave.
8. **Not too many images** - A good website is not cluttered with graphics and images. You want the visitor to immediately have a sense of what the information is and where he may want to go.

9. **Not too many bells and whistles** - Flash, animated graphics, and the like are fun, but one can overload on them. As an example, how many times have you clicked "Skip intro"?
10. **Sense of the organization** - The design of the website should be in keeping with the mission and image of the organization. A serious corporation is not going to have cartoons on its site.