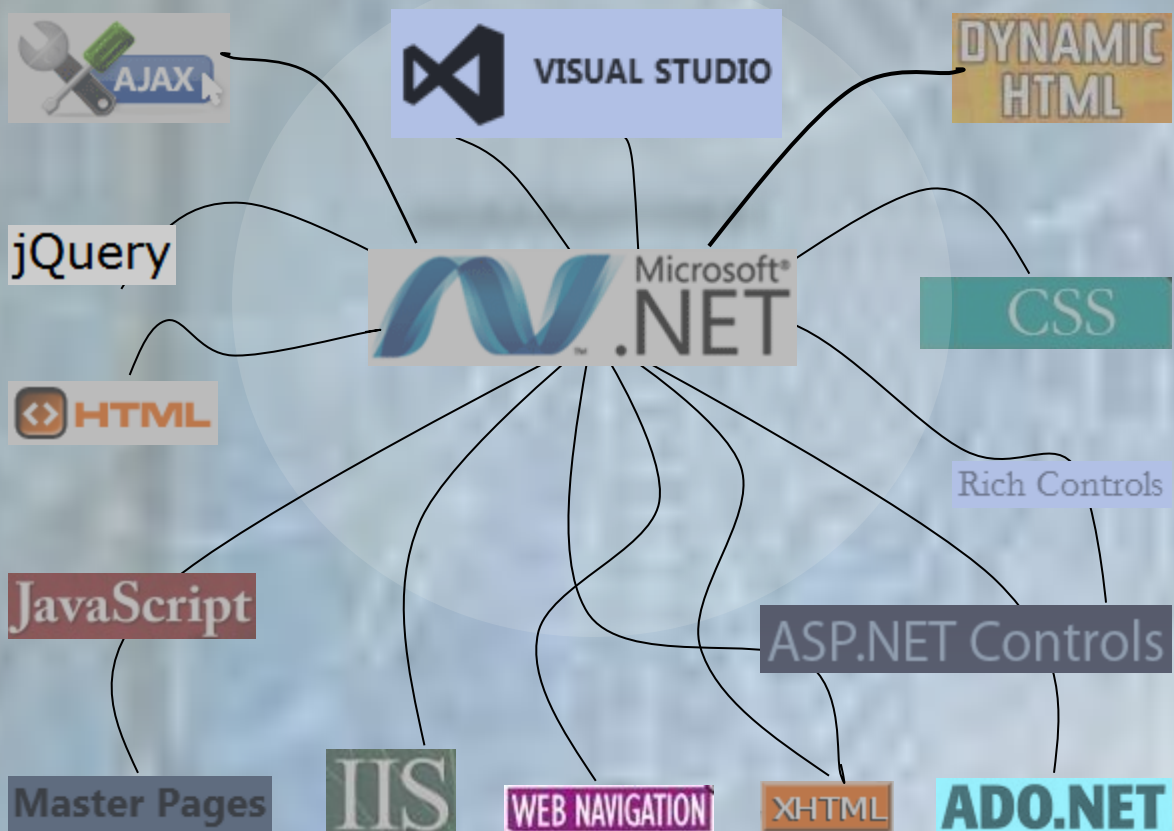




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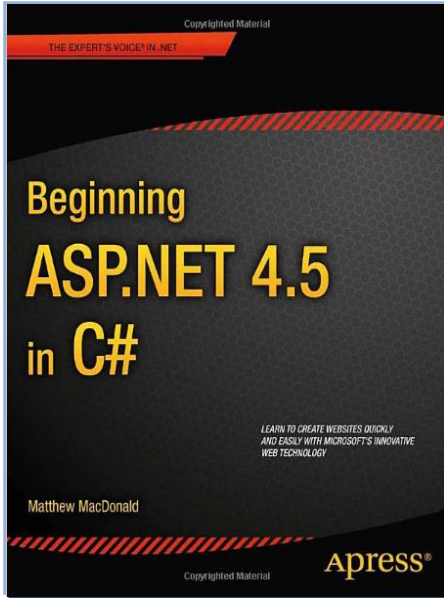
School of Science and Engineering

Web Application Development CSCI4320 & CINF4320



Instructor – Kumar Peeris





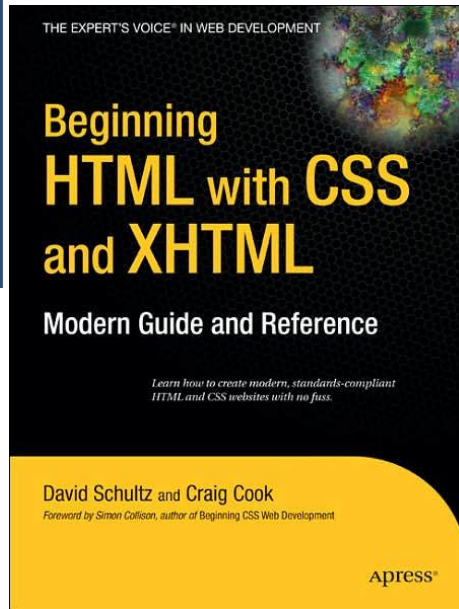
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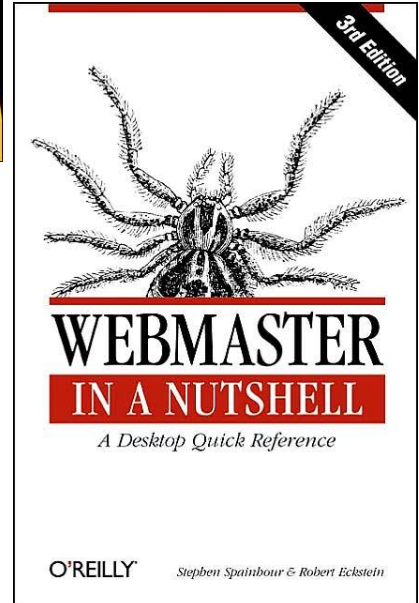


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Introduction

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Unit 1

Introduction

➤ Introduction

▪Internet Effect

The software industry has become much more complex since the introduction of the Internet or commonly called the 'web'. Users have become both more sophisticated and less sophisticated at the same time. People who had never touched a computer less than five years ago are now comfortably including the Internet in their daily lives. Meanwhile, the technophile or professional computer user has become much more advanced, as have their expectations from software.

It is this collective expectation from software that drives our industry. Each time a software developer creates a successful new idea, they raise user expectations for the next new feature. In a way this has been true for years. But now software developers face the added challenge of addressing the Internet and Internet-users in many applications that in the past were largely unconnected. It is this new challenge that development environments such as the .NET Framework directly addresses.

▪Evolution of Web Development

Very primitive theories behind the web and hypertext goes back to 1945. But Tim Berners-Lee invented of the Web. In 1989-1990 period. Since then the industry has changed significantly. The Internet **has gone from an ugly text-based data storage and transmittal device for scientists, to an interactive knowledge, information, and entertainment portal for anyone** who has Internet access and a Web browser.

Modern Websites need to also have **an appealing design that indicates a well-organized navigational structure, visual hierarchy, graphical elements, and well-written, concise digital content.** As such, contemporary Web Development professionals need a fundamental understanding and working knowledge of graphic design and Web writing principals.

➤ Introduction

■What is a Internet Protocol (IP)

The Internet Protocol (IP) is the principal communications protocol used for relaying datagrams (also known as network packets) across an internetwork. It is Responsible for routing packets across network boundaries, it is the primary protocol that establishes the Internet. Historically, IP is the connectionless datagram service – which uses a “send and Forget” mechanism.

■What is Transmission Control Protocol (TCP)

TCP is another important protocol in communications. TCP enables two hosts to establish a connection and exchange streams of data. TCP guarantees delivery (It is NOT send and forget) of data and also guarantees that packets will be delivered in the same order in which they were sent.

■What is TCP/IP

TCP/IP is short for Transmission Control Protocol/Internet Protocol, the suite of communications protocols used to connect hosts on the Internet. TCP/IP uses several protocols, the two main ones being TCP and IP. TCP/IP is the de facto standard for transmitting data over networks

■What is a IP address

IP address is short for Internet Protocol (IP) address.

An IP address is an identifier for a computer or device on a TCP/IP network. Networks using the TCP/IP protocol route messages based on the IP address of the destination.

■What are IPv4 and IPv6

IPv4 (Internet Protocol Version 4) is the fourth revision of the Internet Protocol (IP) used to identify devices on a network through an addressing system. The standard pattern of a IPv4 identification address is 999.999.999.999. Ipv4 addressing system uses 32-bit (4 byte) addressing system. Therefore it can accommodate maximum of 2^{32} (or 4,294,967,296) addresses.

➤ Introduction

IPv6 is a newer numbering system that provides a much larger address pool than IPv4. It was deployed in 1999 and should meet the world's IP addressing needs well into the future. It uses a 128-bit numbering system. It can accommodate 2^{128} (or 340,282,366,920,938,463,463,374,607,431,768,211,456) IP addresses.

■What is 'localhost'

"Localhost" refers to the local computer that a program is running on. For example, if you are running a Web browser on your computer, your computer is considered to be the "localhost." While this does not need to be specified when using a single computer, the localhost does need to be defined when running programs from multiple computers. For example, a network administrator might use his local machine to start a Web server on one system and use a remote access program on another. These programs would run from computers other than the localhost.

In the example above, the two non-local computers must be defined by their IP addresses. The local machine is defined as "localhost," which gives it an IP address of 127.0.0.1. **This is considered a "loopback" address because the information sent to it is routed back to the local machine.** Localhost is often used in Web scripting languages like PHP and ASP when defining what server the code should run from or where a database is located.

■What is a 'Host' computer

The 'Host' is the main or controlling computer connected to other computers or terminals to which it provides data or computing services via a network. It is similar to a server in a client-server architecture. In the modern peer to peer networking (such as networking over the Internet) every computer is a peer and also a host to every other computer connected to the network.

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■What is a Web Application?

A computer software application that is accessed via a web browser over a network such as the Internet or an intranet is a **web application**. This may also implies an application that is hosted in a browser controlled environment (e.g. a .NET Web Application or a Java applet) or coded in a browser-supported language (such as .NET/C#, JavaScript, possibly combined with a browser-rendered markup language like HTML) and reliant on a common web browser to render the application executable.

Web applications are popular due to free availability of web browsers, and the convenience of using a web browser as a client, sometimes called a thin client. The ability to update and maintain web applications without distributing and installing software on potentially thousands of client computers is a key reason for their popularity, as is the inherent support for cross-platform compatibility. Common web applications include webmail, online retail sales, online auctions, wikis and many other functions.

■What is a Web Page?

■A web page is a document, typically written in plain text interspersed with formatting instructions of Hypertext Markup Language (HTML, XHTML). A web page may incorporate elements from other websites with suitable markup anchors. Web pages are accessed and transported with the Hypertext Transfer Protocol (HTTP), which may optionally employ encryption (HTTP Secure, HTTPS) to provide security and privacy for the user of the web page content. The user's application, often a web browser, renders the page content according to its HTML markup instructions onto a display terminal.

■What is a Website?

A website (also spelled web site) is a collection of related web pages, images, videos or other digital assets that are addressed with a common domain name or IP address in an Internet Protocol-based network. A web site is hosted on at least one web server, accessible via a network such as the Internet or a private local area network.

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■What is a URL?

The pages of a website can usually be accessed from a simple **Uniform Resource Locator** (URL) called the homepage. The URLs of the pages organize them into a hierarchy, although hyperlinking between them conveys the reader's perceived site structure and guides the reader's navigation of the site.

■What is WWW?

The World Wide Web, abbreviated as WWW and W3 and commonly known as '**The Web**', is a system of interlinked hypertext documents contained on the Internet . These are publicly accessible websites. Collectively these web sites constitute the World Wide Web.

■Web Clients and Browsers

Web clients are a combination of hardware and software. The hardware may be a PC, workstation, tablet, PDA, phone or other user device. The software is known as a browser. Many hardware and software combinations are possible. Web browser software sends HTTP requests to web servers. The software sends a URL to request specific static or dynamic pages. **Browsers support different web services and standards. Services to be considered when selecting a browser are static and dynamic display features, authentication, file transfer and e-mail etc.**

A Web browser allows anyone to “browse the World Wide Web” by simple point and click navigation, bypassing the need to know commands used in software languages. Some of the web browsers available today are:



Internet Explorer



HotJava



Fire Fox



Verizon Online



Safari



Chrome



Msn

What is the most popular browser?

➤ Introduction

▪Thin Clients

A **Thin Client** is an Online Application. Typically these applications are browser based where continuous connectivity to an application server is required. Most of the data required are processed on the server side. Very little processing work is done by the client machine.

▪Thick Clients

A **Thick Client** is an Offline Application. Typically the client software is installed locally and connectivity to a server is not required. All required data for processing is local. (Synchronizing of data at some point may be provided)

▪Smart Clients

A **Smart Client** is an occasionally connected application. The client software is installed locally where connectivity to a server is required regularly but not continuously. Thus, is a program like Outlook a Thick Client or a Smart Client application? I usually say it is both, since it will work fine on its own (e.g. for Contacts, Tasks, Calendar) and yet it requires a regular connection for others (e.g. Email, Meeting requests). If a good user experience for you means instantaneous email Send/Receive then Outlook is a Smart Client, but if you only need to check email once a day or every few days then it is a Thick Client.

▪Web Servers

Web servers are a combination of hardware and software. The hardware may be industry standard or proprietary. The software is known as a web server. Many hardware and software combinations are possible.

Web server software receives HTTP requests from web browsers. The software translates URL path to request specific static or dynamic pages. Servers support different web services and standards. Features to be considered when selecting are cost, authentication, file transfer and e-mail.

List of Web Servers : http://en.wikipedia.org/wiki/Comparison_of_web_server_software

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▪ Static vs. Dynamic Web Pages

Static Web Pages:

A Web site that is static can only supply information that is written into the HTML (text, CSS etc) and this information will not change unless the change is written into the source code. When a Web browser requests the specific static Web page, a server returns the page to the browser and the user only gets whatever information is contained in the HTML code.

Dynamic Web Pages:

Dynamic web pages contain information that are generated in real-time. These pages include Web scripting code, such as Java/Javascript, ASP.NET, PHP etc. When a dynamic page is accessed, the code within the page is parsed on the Web server and the resulting HTML is sent to the client's Web browser. Dynamic web pages are easier to maintain than static web pages. This is because static pages each contain unique content, meaning they must be manually opened, edited, and published whenever a change is made. Dynamic pages, on the other hand, access information from a database. Therefore, to alter the content of a dynamic page, the webmaster may only need to update a database record. This is especially helpful for large sites that contain hundreds or thousands of pages. It also makes it possible for multiple users to update the content of a website without editing the layout of the pages.

Programming languages (such as .NET/C#, Java) often help you in creating dynamic pages which would also enable you to manage the web site content dynamically or at runtime. You would access the web site through the browser and edit the content or, to some extent, even the look and feel of the website. Such web sites are normally called the content management systems. There might be some conditions such as displaying the web site content based on users demographics, or tracking where the user came from, or collecting the user information and storing it so that you can send your newsletters with your affiliate programs. Such actions call for a dynamic web site.

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▪Components of a URL

The Scheme : When looking at a web address, the first part you will generally see is "http://." This portion of the web address is called the scheme. The scheme tells the Internet browser what protocol needs to be followed to pull up the address. "Http://" stands for hypertext transfer protocol. Other common schemes are "ftp://" (file transfer protocol) and "mailto://" (email protocol).

The Host : The second portion of the web address signifies the host. Typically the host will start with "www," which stands for World Wide Web. This lets the Internet browser know that the site is located on the "Internet." If the web address is an "intranet" web address it will not begin with www because it is an internal website that can only be viewed by internal computers. Following the www will be the domain name for a particular person, company or organization. For example, Microsoft's domain name is Microsoft.com.

The Extension : The ".com" extension is used by commercial organizations, companies or individuals who are trying to sell something. The ".info" extension is typically used for informational websites, with no selling involved. The ".org" extension is used by organizations: ".gov" by official government websites; and ".edu" by educational institutions. All of the domain extensions are monitored and regulated by ICANN, the Internet Corporation for Assigned Names and Numbers..

The Path : The path is the last portion of the web address. The path tells the browser what file to pull from the domain's file directory. For example /pictures.html might be the name of the web page that stores your pictures and /mycars.html might be the page that lists your favorite cars.

➤ Introduction

■ Client –Server Architecture

In most network based businesses today commonly has a client-server architecture, also known as a two-tier architecture. No matter what it is called, this type of architecture is a [division of labor](#) for the computing functions required by the business.

Under the structure of the client-server architecture, a business's computer network will have a server computer, which functions as the "brains" of the organization, and a group of distributed client computers, which are commonly called '*clients*'. In a Web Based application, the client computer has 'browsers' working as clients. The server part of the client-server architecture will be a large-capacity computer with a large amount of data and functionality stored on it. The client portions of the client-server architecture are smaller computers that employees use to perform their computer-based responsibilities.

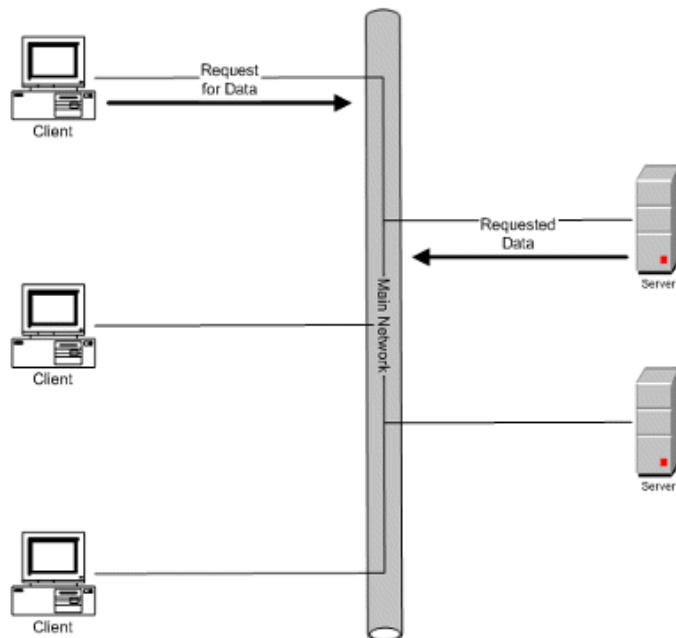


Figure I-1

➤ Introduction

▪Client Side Applications

Client-side applications(programs) are [little programs](#) that you write and attach to HTML [documents](#) that run on a user's [browser](#) while he is viewing said documents. Soon we shall take a look at how these scripts interact with HTML and CSS and what you should take care to do with your documents and [style sheets](#) before playing around with scripts.

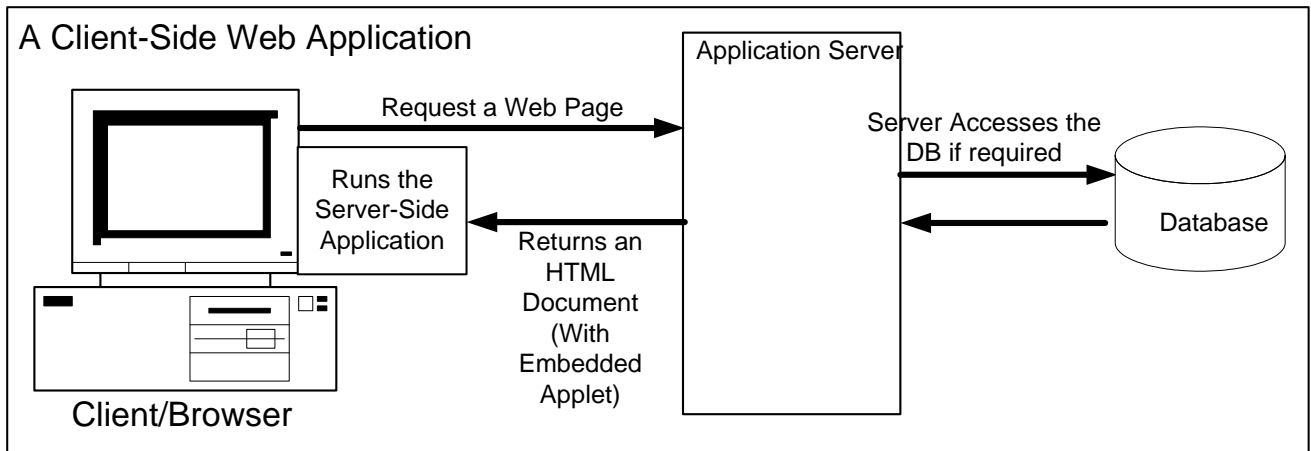


Figure I-2

➤ Introduction

▪Server Side Applications

Server-side programming is a web server technology in which a user's request is fulfilled by running a script directly on the web server to generate dynamic HTML pages. It is usually used to provide interactive web sites that interface to databases or other data stores. This is different from client-side scripting where scripts are run by the viewing web browser, usually in C# & Script. The primary advantage to server-side scripting is the ability to highly customize the response based on the user's requirements, access rights, or queries into data stores.

When the server serves data in a commonly used manner, for example according to the HTTP or FTP protocols, users may have their choice of a number of client programs (most modern web browsers can request and receive data using both of those protocols). In the case of more specialized applications, programmers may write their own server, client, and communications protocol, that can only be used with one another.

Programs that run on a user's local computer without ever sending or receiving data over a network are not considered clients, and so the operations of such programs would not be considered client-side operations.

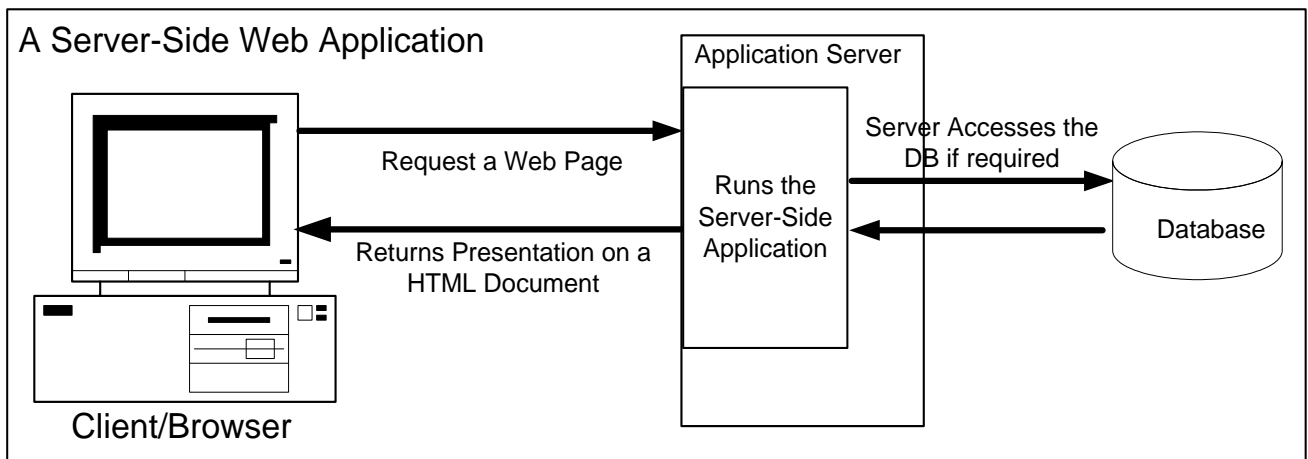


Figure I-3