Introduction

Congratulations on buying the *Web Technologies Black Book*! This book has been designed with comprehensive content on various technologies used to develop Web applications, such as PHP, HTML, JavaBeans, Servlet, JSP, ASP.NET, AJAX. These Web technologies provide Web developers with simple and consistent mechanism for extending the functionality of a Web server and accessing existing business systems. Today, developing interactive Web applications has become crucial for the Web developers. Various technologies can be used to create Web applications, such as online shopping cart, online banking system, and online music stores. This book helps you to explore and implement various concepts of each Web technology.

About this Book

In *Web Technologies Black Book*, you'll find as much details about the Web technologies as can fit between the covers. There are hundreds of topics covered in different chapters of this book, and each of them is discussed for the respective implementation, by providing running Web applications in the same chapter.

This book is divided into separate, easily accessible topics, and each topic addresses different concepts related to Web technologies. In this book, you can find comprehensive discussions on the following topics:

- Introduction to Web Technologies
- HTML and JavaScript Programming
- Introducing PHP
- Working with Variables and Constants
- Controlling Program Flow
- Working with Functions, Arrays, Files, and Directories
- Working with Forms and Database
- Exploring Cookies, Sessions, and PHP Security
- Getting Started with Web Applications in Java
- Working with JavaBeans
- Working with Servlet Programming
- Working with JSP
- Java Database Programming
- ASP.NET 3.5 Essentials
- Developing a Web Application
- Application Structure and State
- Web Forms: Standard Controls
- Navigation Controls: TreeView, Menu, and SiteMapPath
- Validation Controls

- ❑ Introducing Web Parts Controls
- ❑ Working with Database Controls
- ❑ Introducing Login Controls
- ❑ Inside Master Pages and Themes
- ❑ Managing Web Applications
- ❑ Application Globalization
- ❑ Developing Rich-Interactive Applications with Silverlight
- ❑ Working with XML
- ❑ AJAX: A New Approach
- ❑ Understanding JavaScript for AJAX
- ❑ Asynchronous data transfer with XMLHttpRequest
- ❑ Implementing AJAX Frameworks
- ❑ Developing ASP.NET AJAX Applications
- ❑ Integrating PHP and AJAX
- ❑ Consuming Web Services in AJAX
- ❑ Web Design Patterns

That's just a partial list—there's a great deal more. This book has special coverage for the latest versions of PHP, Servlets, JSP, JDBC, and ASP.NET. This book offers more coverage than any other book dedicated to the subject.

How to Use this Book

In this book, we have used the IIS and Apache Tomcat as the Web servers to run the Web applications. This book is shipped with a CD, in which you can find the code provided in the chapters of the book. You can also download the required software applications and components from different locations that have been provided in the related chapters.

Finding a topic in a particular chapter is also simple. All you have to do is open the first page of the chapter and move through the list of topics displayed, along with their page numbers.

Conventions for this Book

There are a few conventions in this book that you should take notice of. For example, all codes explained of this book have been shown through code listings. The code with listing number and caption will appear as shown below:

Listing 11.2: The FirstServlet.java File

```
package com.kogent;
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;
public class FirstServlet extends HttpServlet
{

    @Override
    public void init(ServletConfig config) throws ServletException
    {

            super.init(config);
            config.getServletContext().setAttribute("name", "Suchita Jain");
    }
    @Override
    public void doGet(HttpServletRequest request, HttpServletResponse response) throws
    IOException, ServletException
    {

            response.setContentType("text/html");
```

```
PrintWriter printwrite = response.getWriter();
printwrite.println("<html>");
printwrite.println("<head>");
String greet;
String name;
greet = getServletConfig().getInitParameter("greeting");
name=getServletContext().getAttribute("name").toString();
printwrite.println("<title>"+greet+"</title>");
printwrite.println("</head>");
printwrite.println("<body>");
printwrite.println("<h1>"+greet+"</h1>");
printwrite.println("<h2>"+name+"</h2>");
printwrite.println("</body>");
printwrite.println("</html>");
}
}
```

You'll also see notes, which are designed to give you some additional information:

NOTE

Before compiling the FirstServlet, you must ensure that you have configured the servlet-api.jar file in the classpath. The servlet-api.jar file is located in the lib folder of the Tomcat installation folder.

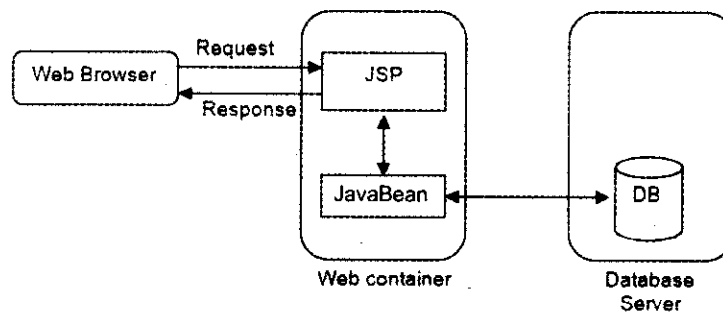Each of the figures has a caption to maintain clarity, as shown below:

Figure 12.1: JSP Model I architecture

The tables are placed just below its reference in the chapters with Table <no>, as shown below:

Table 12.1: Attributes of page directive

Language	Takes the scripting language as the value to be used in scripting tags. The default value is Java
Import	Takes comma separated list of Java classes as the value
extends	Takes a complete qualified class name extended by the servlet equivalent class written by the translator of the current JSP page
buffer	Takes the buffer size in kilobytes, for example none, 8kb, 16kb, 32kb, and 64kb. The default value is 8kb
autoFlush	Specifies whether the output has to be flushed automatically when the buffer is full. If this attribute is set to true, it automatically flushes the buffer as soon as the buffer is full. If this attribute is set to false, an exception is raised when buffer overflows. The default value of this attribute is true

Table 12.1: Attributes of page directive	
isThreadSafe	Takes true or false as its value; the default value is true. This attribute specifies whether or not a JSP page is thread safe. That is, whether or not the instance of the servlet equivalent class of the JSP page is capable of handling simultaneous requests. If this attribute is set to false, only one thread can use the service provided by one object. If the value of this attribute is true, simultaneous requests can be handled by this page
errorPage	Takes the URL path of the page to which a request has to be dispatched when an exception is raised in the current page
isErrorPage	Takes true or false as its value; the default value is false. This attribute specifies whether or not the current page is an error page. Note that if this attribute is set to true, an additional implicit object, exception, is available for the current JSP page
contentType	Takes the response content MIME type, and optionally, character encoding. The default value is text/html
Session	Takes true or false, which indicates whether or not the session is required; the default value is *true*. If this attribute is set to *false*, the JSP page cannot use the session implicit object
Info	Takes a string, which can be retrieved by using the getServletInfo( ) method
pageEncoding	Specifies the encoding type to be used by the Web container to compile a JSP page. Some of the encoding types are ISO-8859-1 and UTF-8

Other Resources

You can also find various resources on Internet explaining the Web technologies in detail. The following are some other useful resources where you can find text related to Web technologies:

- http://java.sun.com/products/servlet/
- http://www.roseindia.net/jsp/jsp.htm
- http://java.sun.com/javase/technologies/database/index.jsp
- http://www.php.net/
- http://www.w3schools.com/PHP/DEfaULT.asP
- http://www.asp.net/
- http://www.w3schools.com/ASPNET/default.asp
- http://www.w3schools.com/xml/default.asp
- http://www.asp.net/ajax/
- http://www.w3schools.com/Ajax/Default.Asp
- www.ajax.org

The Black Book Philosophy

Written by experienced professionals, *Black Books* provide immediate solutions to global programming and administrative challenges, helping you to complete specific tasks, especially critical ones that are not well documented in other books. Black Book helps you to understand a concept and then implement the concept by creating an application. Further, another concept is then discussed with its implementation. It is structured to help you use your knowledge, solve problems, and quickly master complex technical issues to become an expert. By breaking down complex topics into easily manageable components, you can quickly find what you are looking for; diagrams and code help you in appreciating concepts better. Written and edited by the Content and Editorial teams at *Kogent Learning Solutions Inc.* and *Dreamtech Press*, this book is conceptualized to give you everything you need on Web technologies.

PART 1
WEB PROGRAMMING
CONCEPTS

1

Introduction to Web Technologies

Today, the internet has become one of the most important technological advancements in the history of humanity. Everyone wants to get 'on line' to experience the wealth of information of the internet. The World Wide Web (commonly known as the Web or WWW) is a structure of interlinked documents accessed through the internet. These documents are called Web Pages. The Web Pages contain images, text, videos, and many other multimedia elements. A user can view the Web Pages in Web Browser. Let us now understand the World of World Wide Web.

History of the Web

The Internet, sometimes called simply "the Net," is a worldwide system of computer networks - a network of networks in which users at any one computer can, if they have permission, get information from any other computer (and sometimes talk directly to users at other computers). It was conceived by the Advanced Research Projects Agency (ARPA) of the U.S. government in 1969 and was first known as the Advanced Research Projects Agency Network. The original aim was to create a network that would allow users of a research computer at one university to be able to "talk to" research computers at other universities. A side benefit of Arpanets design was that, because messages could be routed or rerouted in more than one direction, the network could continue to function even if parts of it were destroyed in the event of a military attack or other disaster. Today, the Internet is a public, cooperative, and self-sustaining facility accessible to hundreds of millions of people worldwide. Physically, the Internet uses a portion of the total resources of the currently existing public telecommunication networks.

Later in 1989 the World Wide Web was developed by Tim Berners-Lee of the European Particle Physics Lab (CERN) in Switzerland. The initial purpose of the Web was to use networked hypertext documents to facilitate communication among the members, who were located in several countries. In addition to hypertext, the Web began to incorporate graphics, video, and sound. The use of the Web has reached global proportions and has become a defining aspect of human culture in an amazingly short period of time.

Before moving ahead towards the Web System architecture, let us first understand the OSI model. Without knowledge of OSI model, it is almost impossible to understand the Web System architecture as root of Web System are derived from the OSI.

OSI Reference Model

The International Standards Organization (ISO) developed what they called the Open Systems Interconnection (OSI) Reference Model. This Model proposed that all network protocols should consist of seven distinct layers (Figure 1.1). The principles that were applied to reach these seven layers were:

- ❑ Each layer should perform a well defined function of set of related tasks.
- ❑ The function of each layer should be designed to allow the widest set of network operations. That is, the function for a layer should not be such that only one network is possible.
- ❑ The layer boundaries should be chosen so that there is only a small amount of information flow across the boundary.
- ❑ The OSI model includes a set of protocols that attempt to define and standardize the data communications process. The OSI protocols were defined by the International Organization for Standardization (ISO). The OSI protocols have received the support of most major computer and network vendors, many large customers, and most governments, including the United States.
- ❑ The OSI model is a concept that describes how data communications should take place. It divides the process into seven groups, called layers. Into these layers are fitted the protocol standards developed by the ISO and other standards bodies, including the Institute of Electrical and Electronic Engineers (IEEE), American National Standards Institute (ANSI).
- ❑ The OSI model is not a single definition of how data communications actually takes place in the real world. Numerous protocols may exist at each layer. The OSI model states how the process should be divided and what protocols should be used at each layer. If a network vendor implements one of the protocols at each layer, its network components should work with other vendors' offerings.

❑ An ISO standard for worldwide communications that defines a framework for implementing protocols in seven layers. Control is passed from one layer to the next, starting at the application layer in one station, and proceeding to the bottom layer, over the channel to the next station and back up the hierarchy.

❑ All networks are based on a theoretical model called the Open System Interconnection (OSI) model with defines how network devices interact with each other. It is an ISO standard for worldwide communications that defines a framework for implementing protocols in seven layers.

OSI (Open Systems Interconnection) is specifies standards to exchange messages between two computers over a telecommunication network. The OSI model comprises of seven layers which defines functions for computers communicating with each other over a network. OSI was developed by representatives of major computer and telecommunication companies and work on OSI starts in 1983. The main purpose of OSI was providing detailed specification for different vendors to follow standard guidelines over a telecommunication network.
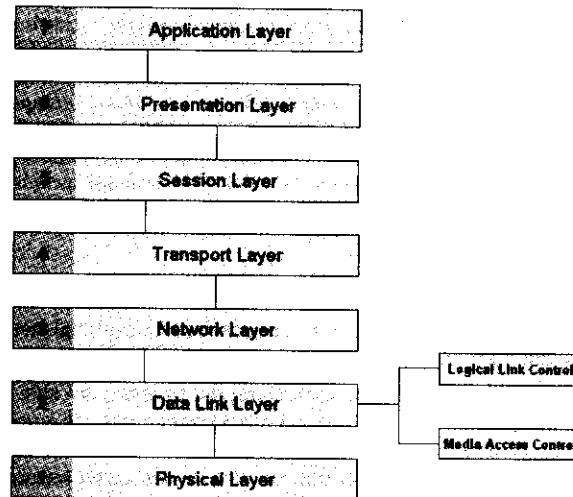

Figure 1.1: OSI Reference Model

The main idea in OSI is that the process of communication between two end users in a telecommunication network can be divided into layers, with each layer adding its own set of special, related functions. Each communicating user is at a computer equipped with these seven layers of function. So, in a given message between users, there will be a flow of data through each layer at one end down through the layers in that computer and, at the other end, when the message arrives, another flow of data up through the layers in the receiving computer and ultimately to the end user. The actual programming and hardware that furnishes these seven layers of function is usually a combination of the computer operating system, applications (such as your Web browser), TCP/IP or alternative transport and network protocols, and the software and hardware that enable you to put a signal on one of the lines attached to your computer.

Although each layer of the OSI model provides its own set of functions, it is possible to group the layers into two distinct categories. The first four layers- physical, data link, network, and transport-provide the end-to-end services necessary for the transfer of data between two systems. These layers provide the protocols associated with the communications network used to link two computers together.

The top three layers-the application, presentation, and session layers-provide the application services required for the exchange of information. That is, they allow two applications, each running on a different node of the network, to interact with each other through the services provided by their respective operating systems. Open Systems Interconnection (OSI) is a standard reference model for communication between two end users in a network. It is used in developing products and understanding networks.

An existing network product or program can be described in part by where it fits into this layered structure. For example, TCP/IP is usually packaged with other Internet programs as a suite of products that support

3

communication over the Internet. This suite includes the File Transfer Protocol (FTP), Telnet, the Hypertext Transfer Protocol (HTTP), e-mail protocols, and sometimes others. Although TCP fits well into the Transport layer of OSI and IP into the Network layer, the other programs fit rather loosely (but not neatly within a layer) into the Session, Presentation, and Application layers.

Table 1.1: Seven layers of OSI reference model

1. Physical	Handles voltages, electrical pulses, connectors, and switches so that data can be transmitted over network media.
2. Data link	Controls grouping data into blocks (message packets) and transferring blocks from one point in the network to another.
3. Network	Controls the routing of data and messages through the channels of a network.
4. Transport	Controls data transfer for the complete transmission path, from sending point to receiving point.
5. Session	Establishes and terminates communications links between computers.
6. Presentation	Formats data for transfer between different systems.
7. Application	Provides network services to users and user applications, including file transfer.

Let us now understand the Web System Architecture.

Understanding Web System Architecture

The Internet is a worldwide network of computers all attached in a global networking scheme. This scheme known as TCP/IP, assigns and uses unique address to communicate between computers on the Internet.

The World Wide Web is a network of computers that, using the Internet, are able to exchange text, graphics, and even multimedia content using standard protocols. Web servers-- special computers that are set up for the distant purpose of delivering content - are placed on the Internet with specific content for others to access. Web clients - which are generally personal computers but can also be dedicated terminals, mobile devices, and many more - access the server's content via a browser. The browser is a specialized application for displaying Web content.

For example, Google maintains many Web servers that connect to their database of content on the Web. You use your home office PC to connect to the servers via the browser such as Microsoft's Internet Explorer or Mozilla's Firefox. In the Figure 1.2, you can see the Microsoft Internet Explorer Web browser.
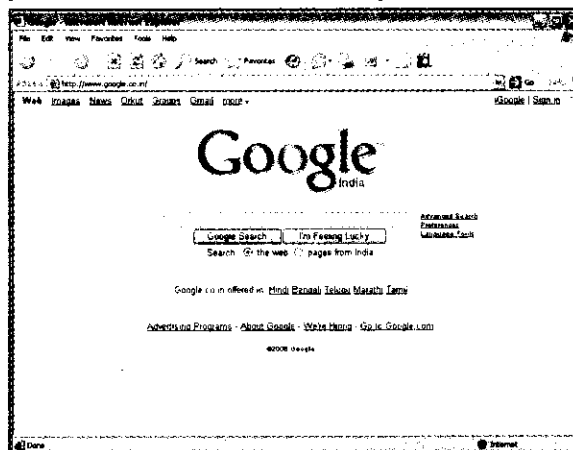

Figure 1.2: Internet Explorer

Understanding 3-Tier Web Architecture

Three-tiered application is a client-server architecture in which the user interface, functional process logic, computer data storage and data access are developed and maintained as independent modules on separate platforms.

The 3-Tier architecture, shown in Figure 1.3, has the following three tiers:

❏ **Presentation Tier** — Displays information related to services, as browsing, and information on various products to the user for online shopping. It communicates with other tiers by outputting results to the browser/client tier and all other tiers in the network.

❏ **Application Tier** — Controls an application's functionality by performing detailed processing.

❏ **Data Tier** — Consists of database servers. Here information is stored and retrieved.
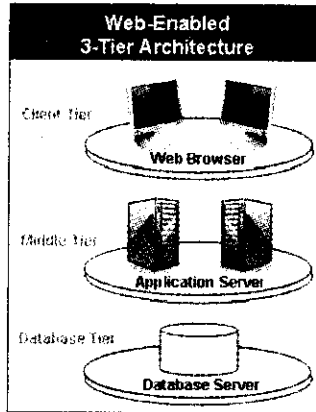
Figure 1.3: The Three-Tier Architecture

Layers in the TCP/IP Model

The TCP/IP model was created by DARPA (a defense agency of US) in 1970. The TCP/IP Suite defines a set of rules for computers to format, assign address, and deliver data over best possible route in a network. TCP/IP specification defines protocols for different types of communication between computers and provides a framework for more detailed standards. Unlike OSI model, the TCP/IP model comprises of five layers – Physical layer, Link layer, Internet layer, Transport layer, and Application layer. The Session and Presentation layers are removed from the TCP/IP model. In TCP/IP model, top layers work closely with the user application, while layers at the bottom side in the hierarchy of layers are specially meant for transmission of the data over the network.

Let's understand the working of each layer in TCP/IP model.

Physical

The Physical layer provides the electrical and mechanical interface to the network medium (the cable). The Physical layer consists of simply the wire or media by which the network signal is conducted. Physical layer includes hardware: wires, plugs and sockets, signal generators, etc. The Physical layer is responsible for passing bits and receiving them from the connecting medium. This layer conveys the bit stream through the network at the electrical and mechanical level.

Link Layer

The Link Layer is used to move packets between the Internet Layer interfaces of two different hosts on the same link. The processes of transmitting packets on a given link and receiving packets from a link can be controlled both in the software device driver for the network card, as well as on firmware or specialist chipsets. These will perform data link functions such as adding a packet header to prepare it for transmission, then actually transmit

5

the frame over a physical medium. The TCP/IP model includes specifications of translating the network addressing methods used in the Internet Protocol to data link addressing, such as Media Access Control (MAC), however all other aspects below that level are implicitly assumed to exist in the Link Layer, but are not explicitly defined.

Internet Layer

The Internet layer of TCP/IP model is responsible for sending data packets across different networks, that is, sending data packets from source network to the destination network and vice-versa. In the Internet Protocol Suite, IP performs the basic task of getting packets of data from source to destination. IP can carry data for a number of different upper layer protocols. These protocols are each identified by a unique protocol number: ICMP and IGMP are protocols 1 and 2, respectively.

Transport Layer

The Transport layer is network neutral and responsible for sending messages. The Transport layer ensures that message reaches to the destination safely without any error or loss. To accomplish this task, Transport layer connects applications to the service ports and use TCP/IP protocols for sending messages. End to end message transmission or connecting applications at the transport layer can be categorized as either:

1. Connection-oriented e.g. TCP
2. Connectionless e.g. UDP

Application Layer

The Application Layer refers to the higher-level protocols used by most applications for network communication. Examples of application layer protocols include the File Transfer Protocol (FTP) and the Simple Mail Transfer Protocol (SMTP). Data coded according to application layer protocols are then encapsulated into one or more transport layer protocols (such as the TCP or UDP), which in turn use lower layer protocols to effect actual data transfer.

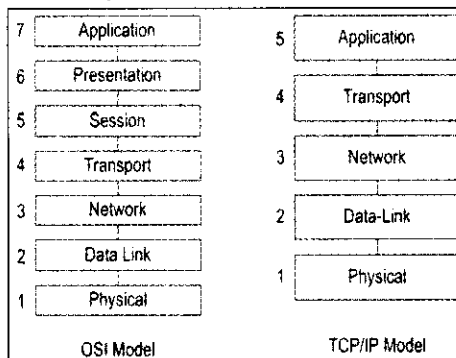Comparison between OSI and TCP/IP Layers is shown in Figure 1.4:

Figure 1.4: Comparison between OSI and TCP/IP Layers

Web Browsers

To access the World Wide Web, you must have a Web browser. A browser is a software, which allows users to access and navigate the World Wide Web. There are two types of browsers known as Graphical and Text. Let us now discuss these Web browsers in detail:

❑ **Graphical** — Graphical browsers are the browsers that contain text, images, audio, and video. These all elements are retrievable through a graphical software program such as Internet Explorer, Firefox, Netscape, Mozilla and Opera. These browsers are available for Windows, Apple, Linux and other operating systems. Navigation is accomplished by pointing and clicking with a mouse on highlighted words and graphics. You can install a graphical browser on your computer. Also, these browsers get automatically installed at the

time of operating system installation. For example, Internet Explorer is a part of the Windows operating system, and is also available on the Microsoft site: http://www.microsoft.com/. Firefox is available for downloading from http://www.mozilla.org/products/firefox/ and Safari is available from http://www.apple.com/safari/.

❑ **Text**—Lynx is a browser that provides access to the Web in text-only mode. Navigation is accomplished by highlighting emphasized words in the screen with the arrow up and down keys, and then pressing the forward arrow (or ENTER) key to follow the link. In these days of graphical browsers, it may be hard to believe that Lynx was once very popular.

Retrieving Documents on the Web: The URL and Domain Name System

URL stands for Uniform Resource Locator. The URL specifies the Internet address of a stored file on a host computer connected through the Internet. Every file on the internet has a unique URL, no matter what is its access procedure. Web browsers use the URL to retrieve the file from the host computer and the specific directory in which it resides. This file is downloaded to the user's client computer and displayed on the monitor connected to the machine.

URLs are translated into numeric addresses using the Domain Name System (DNS). The DNS is a worldwide system of servers that stores location pointers to Web sites. The numeric address, called the IP (Internet Protocol) address, is actually the "real" URL. Since numeric strings are difficult for humans to use, alphneumeric addresses are employed by end users. Once the translation is made by the DNS, the browser can contact the Web server and ask for a specific file located on its site.

For example, this is a URL on the Web site of the U.S. House of Representatives:

http://www.house.gov/house/House_Calendar.shtml

This URL is representation of addresses hosted in domains in the United States. Structure of this URL:

1. Protocol: http
2. Host computer name: www
3. Second-level domain name: house
4. Top-level domain name: gov
5. Directory name: house
6. File name: House_Calendar.html

You can see how much information about the content of the file is present in this well-constructed URL. Several commonly used top-level domains (TLDs) are listed in Table 1.2.

Table 1.2: Commonly used TLDs

.com	Used for commercial entities. It is the most popular top-level domain.
.edu	Four-year, accredited colleges and universities.
.net	Originally used for networking organizations such as Internet Service Providers and backbone providers.
.org	Designed for miscellaneous organizations, including non-profit groups.

New domain names were approved in November 2000 by the Internet Corporation for Assigned Names and Numbers (ICANN): .biz, .museum, .info, .pro (for professionals) .name (for individuals), .aero (for the aerospace industry), and .coop (for cooperatives). ICANN continues to investigate proposals for adding additional domain names, for example, .mobi for sites designed for mobile devices, and .jobs for the human resources community.

In addition, dozens of domain names have been assigned to identify and locate files stored on host computers in countries around the world. These are referred to as two-letter Internet country codes, and have been standardized by the International Standards Organization as ISO 3166. Some country domains are listed in Table 1.3:

7

Table 1.3: Country domains list

in	India
ch	China
de	Germany
jp	Japan
uk	United Kingdom
ca	Canada

As the technology of the Web evolves, URLs have become more complex. This is especially the case when content is retrieved from databases and served onto Web pages. A domain name is easy to remember and use, and is chosen as an instrument of commercial enterprise. It facilitates the ability of consumers to navigate the internet to find Websites they are looking for, but and also specify its corresponding online internet location at the same time. Consequently a domain name as an address is a necessity. Its unique domain name is used in connection with the business for maintaining an exclusive identity.

Overview of HTTP

HTTP stands for Hypertext Transfer Protocol. The Web operates by sending data using specific protocols. The main protocol used for the Web is Hypertext Transfer Protocol (HTTP). HTTP defines how the computers on the Web, specifically the server and client, exchange data. Consider a situation, when you browse the Web you actually sit at your computer and want to see a document commonly known as Web page on the Web. For browsing the Web you use URLs. Since the document you are browsing resides somewhere else in the world, probably very far away from you. However, the browser cannot read the document directly from the disk where it is stored, if that disk in on another continent. So, to be able to read the document from such a long distance you need a Web server. A Web server is a kind of computer program that listens for the request from Web browsers and then execute them accordingly.

Next, the browser then contacts to the server and requests the server to deliver the document to it. The delivery contains the server response in the form of document and the Web browser at the user's end displays the document happily. The server also tells the browser about the kind of document, whether this is HTML file, PDF file, ZIP file etc. The browser then shows the document with the program it was configured.

These request and response procedure are issued in a special language called HTTP. The HTTP defines how the browser and the Web server can communicate to each other. The actual working of moving bits and bytes back and forth across the network is done through TCP and IP.

NOTE

Any software program that retrieve document from the Web server as a Web browser do is called a client in network terminology and a user agent in Web terminology. Also the server is properly the server program, and not the computer.

Much like other protocols, an HTTP conversation consists of a handful of commands from the client and a stream of data from the server. Let us now understand the procedure of request and response.

Sending the Request

The protocol used for sending the request is "http". To retrieve a document via HTTP the browser transmits the following request to the server: "GET /request-URI HTTP/version", where version tells the server which HTTP version is used. The server only takes the request string. So the server doesn't care if the request came from a browser, a link checker, a validator, a search engine or if you typed it in manually. It just performs the request and returns the result.

The Server Response

When the server receives the HTTP request it locates the appropriate document and returns it. However, an HTTP response is required to have a particular form. It must look like this:

```
HTTP/[VER] [CODE] [TEXT]
Field1: Value1
Field2: Value2

...Document content here...
```

The first line shows the HTTP version used, followed by a three-digit number (the HTTP status code) and a reason phrase meant for humans. Usually the code is 200 (which basically means that all is well) and the phrase "OK". The first line is followed by some lines called the header, which contains information about the document. The header ends with a blank line, followed by the document content. This is a typical header:

```
HTTP/1.0 200 OK
Server: Netscape-Communications/1.1
Date: Tuesday, 06-May-2008 01:22:04 GMT
Last-modified: Wednesday, 07-May-2007 10:44:53 GMT
Content-length: 6372
Content-type: text/html

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 3.2 Final//EN">
<HTML>
...followed by document content...
```

We see from the first line that the request was successful. The second line is optional and tells us that the server runs the Netscape Communications Web server, version 1.1. the next line is the current date and when the document was modified last, followed by the size of the document in bytes and the most important field: "Content-type".

The content-type field is used by the browser to tell about the format of the document it receives. HTML is identified with "text/html", ordinary text with "text/plain", a GIF is "image/gif" and so on. The advantage of this is that the browser can easily recognize the type of document.

Using Cookies to Remember User Information

A cookie is a piece of text that a Web server can store on a user's hard disk. Cookies allow a Websites to store information on a user's machine and later it can be retrieved. The pieces of information that a cookie store are structured as name-value pairs.

For example, a Web site might generates a unique ID number for each visitor and store the ID number on each user's machine using a cookie file.

If you use Microsoft's Internet Explorer to browse the Web, you can see all of the cookies files gets stored on your machine in a cookies folder. You can find this cookies folder somewhere in a directory called C:\Users\Kogent7\Documents\....., as this is the most common place where cookies reside. When you look in that directory on your machine you will find files many text files (Cookies file). Each file is a text file that contains name-value pairs, and there is one file for each Web site that has placed cookies on your machine.

You can see in the directory that each of these files is a simple, normal text file. You can see which Web site placed the file on your machine by looking at the file name (the information is also stored inside the file). You can open each file by clicking on it.

For example, I have visited google.com, and the site has placed a cookie on my machine. The cookie file for google.com contains the following information:

```
UserID    2e88c198291a0dea7421210    www.google.com/
```

Google.com has stored on my machine a single name-value pair. The name of the pair is UserID, and the value is 2e88c198291a0dea7421210. The first time I visited google.com, the site assigned me a unique ID value and stored it on my machine.

9

NOTE

There may be several other values stored in the file after UserID   2e88c198291a0dea7421210   www.google.com/. These are housekeeping information for the browser.

The Website yahoo.com stores a bit more information on my machine. When you open the cookie file of yahoo has created on the machine, it contains the following:

```
session-id-time 9067880093  yahoo.com/
session-9067880093vctr3timeslog.yahoo.com/ x-main
```

Exploring Web Technologies

A Web technology is mechanism to save, filter, secure and display information to the user over the World Wide Web. Since a Web technology cannot guarantee full-roof solutions, sometimes two Web technologies are used together. Now these days various Web technologies are available in the market – paid as well free. Depending upon the purpose and mode of deployment, user can choose a Web technology out of HTML, XML, ASP.NET, JAVA, PHP or AJAX.

HTML

The Hypertext Markup Language is a computer language used to create Web pages. Each page created in HTML contains the data to be included in the Web page and the HTML tags. The Web Browser understands these tags and displays the corresponding Web page. We browse the World Wide Web using a Web Browser.

All text, graphics and design elements of a Web page are "tagged" with codes that instruct the Web browser how to display the files. You can recognize these files easily because they contain the file extension of 'html' or 'htm'.HTML is not case sensitive and can be easily updated after the file is created. To format a simple text file into HTML, the user creates tags that start and finish with angle brackets. To end the formatting or change to another format, type the first angle bracket, a backslash, then repeats the command and closes the bracket. For example, <H1>Understanding HTML </H1> is the code used to create the heading.

Just consider the following hierarchy of HTML document shown in Figure 1.5.
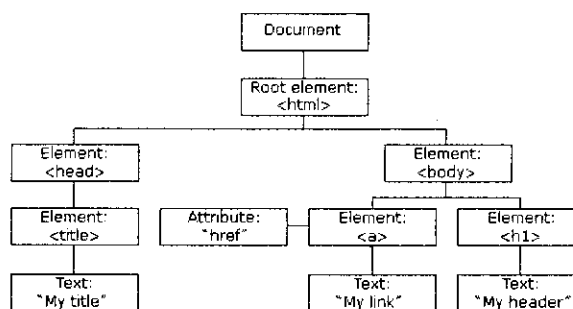
Figure 1.5: Hierarchy of HTML document

HTML Editors

An HTML editor is a software application for creating Web pages. Although the HTML markup of a Web page can be written with any text editor, specialized HTML editors can offer convenience and added functionality. For example, many HTML editors work not only with HTML, but also with related technologies such as CSS, XML and JavaScript. In some cases they also manage communication with remote Web servers via FTP and WebDAV.

Some commonly used HTML Editors are listed here under:

❏   Adobe Dreamweaver is a Web development application available for both Mac and Windows operating systems. Recent versions have incorporated support for Web technologies such as CSS, JavaScript, and

various server-side scripting languages and frameworks including ASP.NET, ColdFusion, JavaServer Pages (JSP), and PHP.

❑ Visual Web Developer Express is a freeware Web development tool that allows developers to evaluate the Web development and editing capabilities of the other Visual Studio 2008 editions at no charge. Its main function is to create ASP.NET Websites. It has a WYSIWYG interface, drag-and-drop user interface designer; enhanced HTML & code editors; a (limited) database explorer; support for other Web technologies (e.g. CSS, JavaScript, XML).

❑ Microsoft FrontPage (also known as Microsoft Office FrontPage) is a WYSIWYG HTML editor and Web site administration tool from Microsoft for the Microsoft Windows line of operating systems. It was branded as part of the Microsoft Office suite from 1997 to 2003. A Macintosh version was also released in 1998. Microsoft FrontPage has since been replaced by Microsoft Expression Web and Sharepoint Designer, which were released in December 2006.

Introduction to XML

eXtensible Markup Language (XML) is a text-based markup language that enables you to store data in a structured format by using meaningful tags. The term "eXtensible" implies that you can extend your ability to describe a document by defining meaningful tags for your application. XML is a cross-platform, hardware and software independent markup language. XML allows computers to store data in a format that can be interpreted by any other computer system and therefore, XML can be used to transfer structured data between heterogeneous systems. XML is used as a common data interchange format in a number of applications. In the case of the B2B e-commerce model, XML is used for exchanging data between various trading partners.

Advantages of XML

Using XML to exchange information offers many benefits. Advantages of XML include the following:

❑ XML uses human, not computer, language. XML is readable and understandable, even by novices, and no more difficult to code than HTML.

❑ XML is completely compatible with Java and 100% portable. Any application that can process XML can use your information, regardless of platform.

❑ XML is extendable. Create your own tags, or use tags created by others, that use the natural language of your domain, that have the attributes you need, and that makes sense to you and your users.

The following example illustrates, in a simplified way, the readability and extensibility of XML:

HTML example	XML example
``` <HTML> <H1 ID="MN">State</H1> <H2 ID="12">City</H2> <DL> <DT>Name</DT> <DD>Johnson</DD> <DT>Population</DT> <DD>5000</DD> </DL> <H2 ID="15">City</H2> <DL> <DT>Name</DT> <DD>Pineville</DD> <DT>Population</DT> <DD>60000</DD> </DL> <H2 ID="20">City</H2> ```	``` <?XML VERSION="1.0" STANDALONE="yes" ?> <STATE STATEID="MN"> <CITY CITYID="12"> <NAME>Johnson</NAME> <POPULATION>5000</POPULATION> </CITY> <CITY CITYID="15"> <NAME>Pineville</NAME> <POPULATION>60000</POPULATION> </CITY> <CITY CITYID="20"> <NAME>Lake Bell</NAME> <POPULATION>20</POPULATION> </CITY> </STATE> ```

11

HTML example	XML example

`<DL>`
  `<DT>Name</DT>`
 	
    `<DD>Lake Bell</DD>`
  `<DT>Population</DT>`
    `<DD>20</DD>`
`</DL>`
 	
`</HTML>`	

HTML tag names reveal nothing about the meaning of their content. The example above uses an HTML definition list, but the problems inherent in using HTML occur if the data were contained in a table or some other kind of HTML tags. Examples follow:

❑ Many of the HTML tags are acronyms, so they are not as readable as common language.

❑ HTML tags represent data (in this example, city names and populations) as items to display, for example, as definitions in a list or cells in a table. This makes it difficult to manipulate the data or to exchange it between applications.

The XML tag names are readable and convey the meaning of the data. The information structure is easily discerned by both humans and computers as each XML tag immediately precedes the associated data. The data structure follows a noticeable and useful pattern, making it easy to manipulate and exchange the data.

ASP.NET

Since the release of .NET Framework 1.0, Microsoft has put in consistent effort in developing and improving ASP.NET, which is a part of .NET Framework for building rich Web applications. This first release brought a radical change over the older Microsoft technology to build Websites using a server-side script engine, called Active Server Pages (ASP). Despite many advantages of ASP.NET over ASP, new programmers found it difficult to start with ASP.NET because of its complexity and the knowledge needed to build applications.

After the initial release in 2002, another version of .NET Framework named .NET 1.1 was released with Visual Studio 2003. Most people considered this release as a mere service pack for the initial release, though it also had new improvements in both the framework and the development environment.

Later in November 2005, Microsoft released Visual Studio 2005, which integrated ASP.NET 2.0. Again, Microsoft made drastic improvements in this version and reduced the complexity of the initial version. This new version had many new wizards and controls that reduced the amount of code required in building applications, thus increasing productivity.

Now, Microsoft's latest release is ASP.NET 3.5, which includes new features for creating Web-based applications.

New Features in ASP.NET 3.5

ASP.NET 3.5 was released along with Visual Studio 2008 on November 19, 2007. ASP.NET 3.5 uses the same engine as that of ASP.NET 2.0, with some additional features. ASP.NET 3.5 has simplified the process of building Websites, making it easier than ever. Now, let's discuss the following new features added to ASP.NET 3.5:

❑ ASP.NET AJAX Support

❑ The ListView Control

❑ The DataPager Control

❑ Support for WCF Services

❑ WCF Support for RSS, JSON and Partial Trust

❑ Support for Nested Master Pages at Design Time

❑ Merge Tool in ASP.NET 3.5

❏ Improved Support for JavaScript Debugging
❏ Support for Microsoft Office Applications

Java

In 1995, James Gosling at Sun Microsystems introduced Java programming language. The syntax used in Java is more or less similar to the syntax used in C and C++. Java applications are first compiled to bytecode, which can be executed on any Java virtual machine (JVM). Thus JVM is prerequisite to use Java and Java based technologies. Two important components of Java are Java Servlets and Java Server Pages (JSPs). They can be combined together to design efficient content publishing systems that support separation of presentation and business logic of Web applications.

While building the server-side Web applications, we separate the presentation and the logic. This allows the less-experienced Web designers to generate the Web pages with dynamic content easier and faster. This separation process is highly beneficial where content changes frequently, and helps present new information to Web site visitors faster.

Earlier, Web applications faced maintenance problems. Using the Model/View/Controller (MVC) paradigm for building user interfaces has solved this problem. In MVC, the back-end system is the Model, the templates for creating the look and feel of the response is the View, and the code that combines them all together is the Controller. Sun Microsystems introduced two solid technologies for implementing MVC architecture, which are Java Servlets and JSP. JSPs fit perfectly into this solution as a way of creating a dynamic response or View. Servlets contain the logic for managing requests and act as the Controller, while the existing business rules act as the Model. Since the introduction of Java Servlet and JSP technology, additional Java technologies and frameworks for building interactive Web applications have been developed. Both Servlets and JSP use Java Database Connectivity (JDBC) for handling database operations in Web applications.

AJAX

AJAX, Asynchronous JavaScript and XML, is a new technique. Its primary components are JavaScript and XML. AJAX is a technique, which describes how other technologies, JavaScript, DOM (Document Object Model), and XML can be used together to create interactive Web applications.

In early days, when we used to create a Web application with these technologies, the applications based on these technologies were known separately. Even the end-user couldn't work on the Web application as desktop-based application. To overcome this, Jesse James Garrett of Adaptive Path combined JavaScript, XML, and DOM together to form a new technique, called AJAX. In this technique, the request to the Web server is send by using the XMLHttpRequest object. This object, a part of JavaScript technology, helps in sending asynchronous request to the server. With this request, Web applications can now interact with Web server asynchronously. The time taken to refresh the page also gets minimized which makes the Web application behave like a desktop application. That is why, in AJAX-based Web applications, Web pages need not be refreshed repeatedly, when only a part of the page is changing.

PHP

PHP is server side scripting language and best suited for Web based applications. It works similar to other server-side scripting languages that provide dynamic content from a Web server to a client, such as Active Server Pages and JavaServer Pages.

PHP generally runs on a Web server. Any PHP code in a requested file is executed by the PHP runtime to create dynamic Web page. PHP can be deployed on Web servers, operating systems, relational database management systems. PHP is available free of cost and vendor of PHP (PHP Group) offers complete source code to users. As per the requirement, user can customize the PHP source code and own it. Since PHP 4, the PHP parser compiles input to produce bytecode for processing by the Zend Engine, giving improved performance over its interpreter predecessor.

13

Introduction to Web Services

Web services (sometimes called application services) are services (usually including some combination of programming and data, but possibly including human resources as well) that are made available from a business's Web server for Web users or other Web-connected programs. Providers of Web services are generally known as application service providers. Web services range from such major services as storage management and customer relationship management (CRM) down to much more limited services such as the furnishing of a stock quote and the checking of bids for an auction item. The accelerating creation and availability of these services is a major Web trend.

Users can access some Web services through a peer-to-peer arrangement rather than by going to a central server. Some services can communicate with other services and this exchange of procedures and data is generally enabled by a class of software known as middleware. Services previously possible only with the older standardized service known as Electronic Data Interchange (EDI) increasingly are likely to become Web services. Besides the standardization and wide availability to users and businesses of the Internet itself, Web services are also increasingly enabled by the use of the Extensible Markup Language (XML) as a means of standardizing data formats and exchanging data.

XML is the foundation for the Web Services Description Language (WSDL). As Web services proliferate, concerns include the overall demands on network bandwidth and, for any particular service, the effect on performance as demands for that service rise. A number of new products have emerged that enable software developers to create or modify existing applications that can be "published" (made known and potentially accessible) as Web services.

Difference between Web site and Web services

A Web site is a site intended for use by humans. It must have a user friendly interface, must be able to interact with a human being. A Web service is a service intended for use by another program, via Web. One program interacts to another via its Web service port. Google search maybe use in both forms. You can use directly or you can write a small program to call the search Web service, obtain the result and display it embedded in your application.

About IIS

Internet Information Services (IIS) help network administrators to create, manage, and control access to Web sites. In Windows Server 2008, IIS version 7 has come as built-in feature and generally referred as Web server. IIS comprises of different types of services, which help network administrators to efficiently manage Web site. For example, the File Transfer Protocol (FTP) service provided by the IIS is used to upload and download files from the server; the Simple Mail Transfer Protocol (SMTP) service provided by the IIS allows users to exchange e-mails. Apart from services, IIS is smoothly integrated with ASP.NET feature. The new ASP.NET feature is the Web application framework, which is developed by the Microsoft and used to build dynamic Web sites and Web applications.

In this section, you learn about Web server (IIS 7) and the services supported by Web server (IIS 7) in Windows Server 2008. Further, you learn how to install Web server (IIS 7). Finally, you learn to administer the Web server remotely and to create Web sites.

Let's begin the chapter with the discussion on roles supported by Web server (IIS 7).

Services Supported by IIS 7

Web server (IIS 7) provides the better platform for the services that includes ASP.NET, FTP publishing services, World Wide Web (WWW) services, Simple Mail Transfer Protocol (SMTP) services, and Network News Transfer Protocol (NNTP) services to create a Web page on the internet. Let's discuss these services in the next section.

The ASP.NET Service

Active Server Pages using the Microsoft.Net framework is a method of creating dynamic elements, such as clicking and loading, on Web pages. ASP.NET allows a Web page to respond to a user's actions, such as loading the pages or clicking an object on the page. It also handles and authenticates the Web page forms.

The File Transfer Protocol (FTP) Publishing Service

Microsoft has created and released a new FTP service for Windows Server 2008. This service incorporates some new features, such as SSL based authentication that allows creating and using custom user accounts and data transfer, which protect the sensitive data on network. The FTP service offers Web administrators and host an integrated management and configuration experience for FTP and Web sites through IIS Manager. The FTP publishing service allows Web authors to publish content more easily and securely to IIS 7.0 Web servers using modern Internet publishing standards. Using FTP, we can easily upload and download files and distribute files on the internet with each other.

World Wide Web (WWW) Services

WWW services are installed by the IIS 7 by default. WWW services use the Hypertext Transfer Protocol (HTTP) to allow users to publish the content on the Web using Hypertext Markup Language (HTML) and Extensible Markup Language (XML). This published content can be viewed by using an Internet browser in the Internet Explorer (IE). IIS 7 has divided this service into two services: WWW service and a new service, Windows Process Activation Service (WAS). WAS manages the application pool configuration, which contains all Web applications on domain. These two services run on Local System using the Svchost.exe file and share the same information over the network. Using the WWW services, we can host the graphical HTTP sites.

Simple Mail Transfer Protocol (SMTP) Service

IIS 7 supports the Simple Mail Transfer Protocol (SMTP) to transport email through the Internet. The SMTP protocol is used to transfer an email from e-mail client to server and one mail server to another mail server. The SMTP protocol sends and receives e-mail between servers, and retrieves e-mail from the mail server to the user's computer using the Post Office Protocol version 3 (POP3) service. POP3 protocol makes the connection between the sender's server and the recipient and then transfers the messages.

Network News Transfer Protocol (NNTP) Service

The NNTP protocol is used to transfer Usenet news from one server to another server. Usenet news is a large collection of discussion groups, covering a wide range of topics. NNTP protocol manages the global network of collected Usenet newsgroups. Transmission Control Protocol/ Internet Protocol (TCP/ IP) connection allows the client and the server to transfer article without transmission delay.

After learning about the services supported by IIS 7, let's learn about the installation of IIS 7 in the next section.

Installation of IIS 7

The IIS 7 is the set of the internet-based services for servers that are created by the Microsoft for the Microsoft Windows. The IIS 7 supports various services, which provide the better platform for creating the Web applications on the Web server. You need to install the IIS 7 on your server to make the server a Web server to use these IIS services. You have to install IIS7 manually as Windows Server 2008 does not install it by default.

Let's perform the following steps to install IIS 7 in Windows Server 2008:

1. Click the **Start** button. The Start menu appears (Figure 1.6).
2. Click the **Server Manager** from the left pane of the Start menu, as shown in Figure 1.6:

15
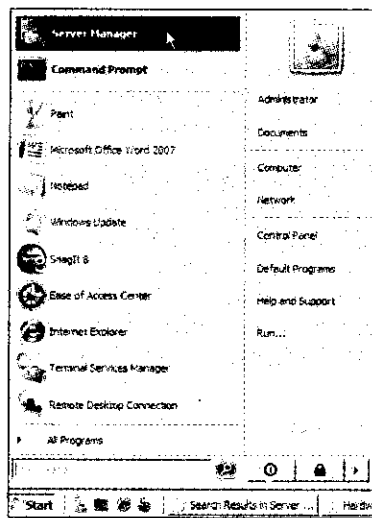
Figure 1.6: Launching Server Manager

The **Server Manager** window appears (Figure 1.7).

3. Click the **Roles** option under the **Server Manager (KOGENT_TEST_SER)** category. The **Roles Summary** displays the installed roles (Figure 1.7).

4. Click the **Add Roles** option from the right pane of the Server Manager window, as shown in Figure 1.7:
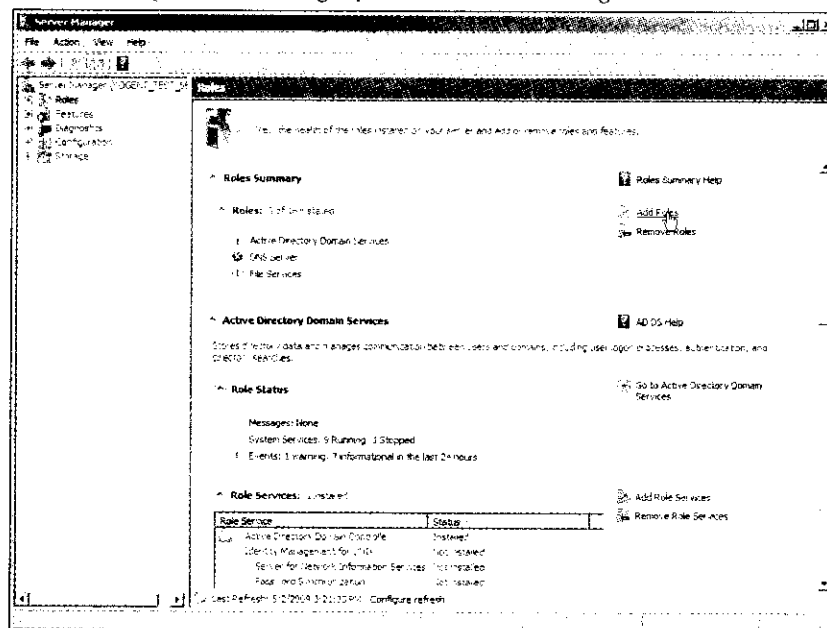
Figure 1.7: Selecting Add Roles from Server Manager Window

The **Add Roles Wizard** appears and displays the **Before You Begin** page (Figure 1.8).

5. Click the **Next** button after reading the page, as shown in Figure 1.8:
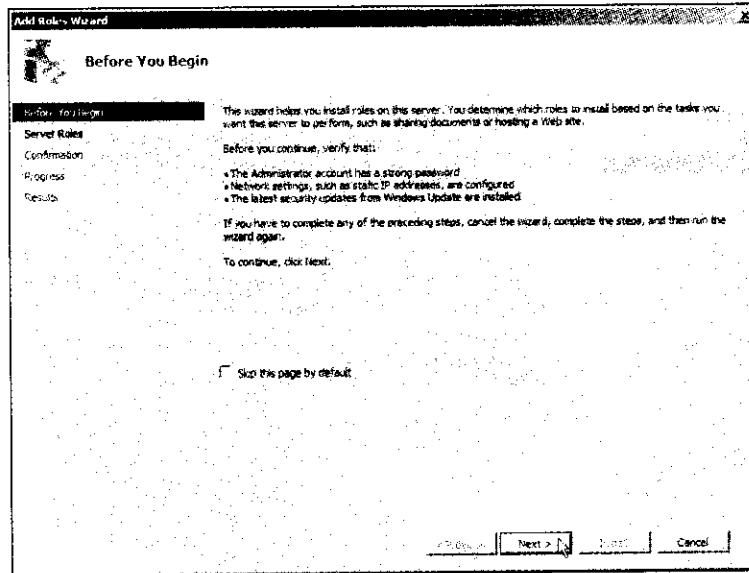
Figure 1.8: Add Roles Wizard

The **Select Server Roles** page appears (Figure 1.9). This page prompts you to select the one or more roles to install on this server.

6. Select the check box beside the **Web Server (IIS)** option (Figure 1.9).

7. Click the **Next** button, as shown in Figure 1.9:
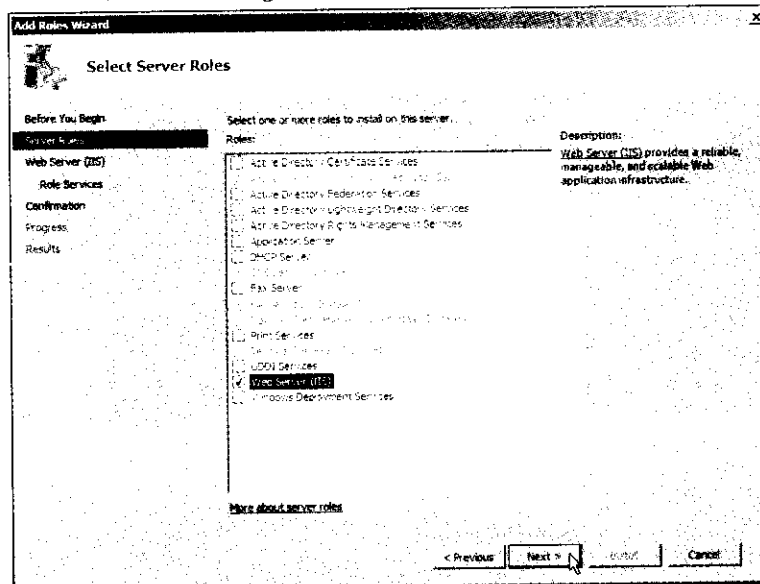
Figure 1.9: Selecting Web Server IIS

The **Web Server (IIS)** page appears (Figure 1.10).

8. Click the **Next** button after reading the **Web Server (IIS)** introduction, as shown in Figure 1.10:
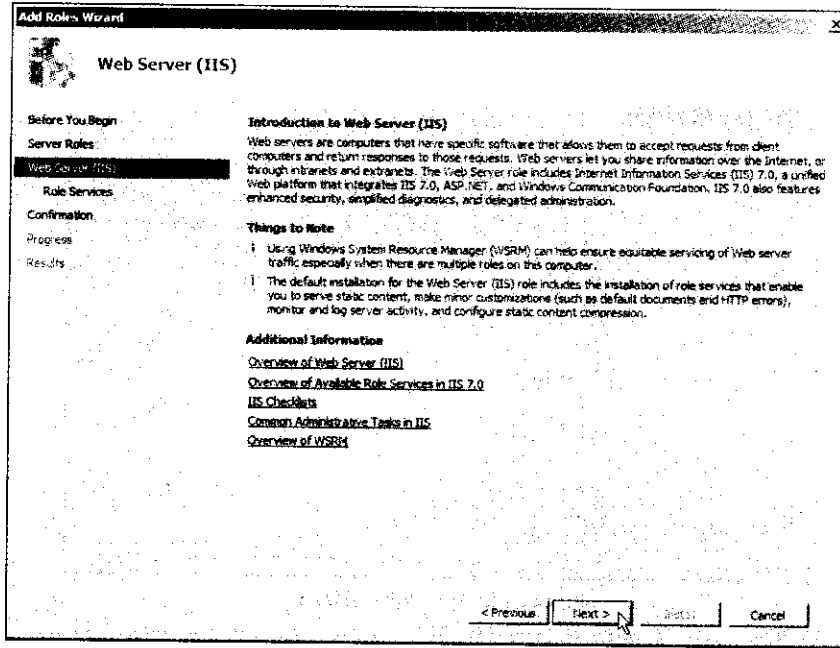
Figure 1.10: Web Server IIS Overview Dialog Box

The **Select Role Services** page appears, as shown in Figure 1.11:
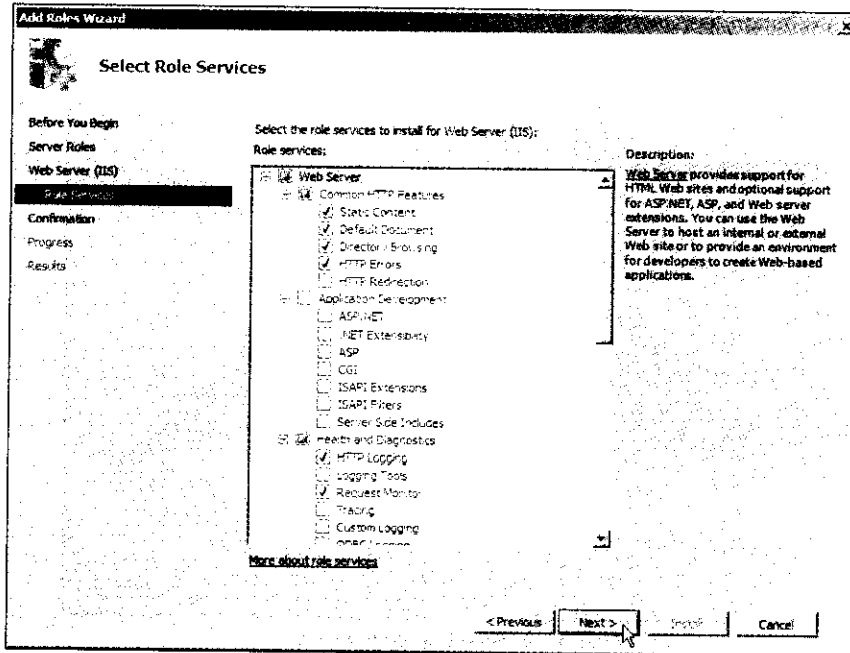
Figure 1.11: Selecting Role Services

9. Select the check box under the **Application Development** in the Select Role pages to install the additional features of the Web server (IIS). In our case, we have selected the **ASP.NET** role services check box, as shown in Figure 1.11.

As you select the preceding mentioned check box, the Add Roles Wizard message box appears and acknowledges you the role services, which are required to install the ASP.NET services.

10. Click the **Add Required Role Services** button, as shown in Figure 1.12:
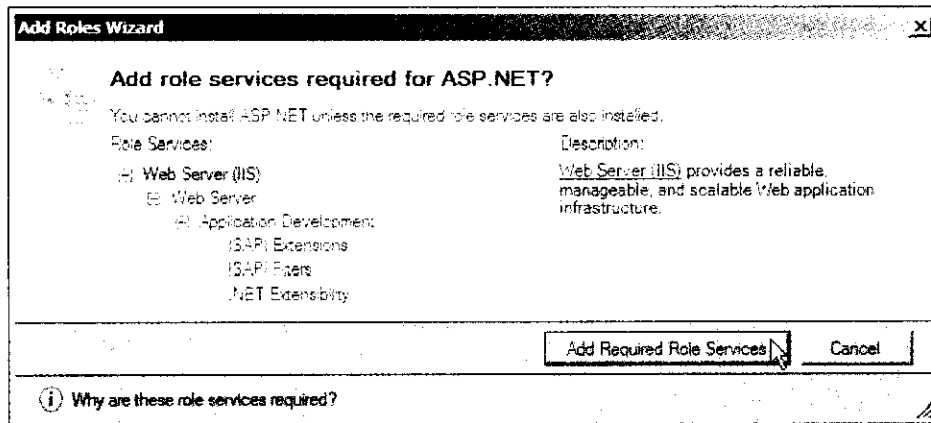
Figure 1.12: Adding Role Services

The ASP.NET feature is now added to the Web server role services (Figure 1.13).

11. Click the **Next** button, as shown in Figure 1.13:
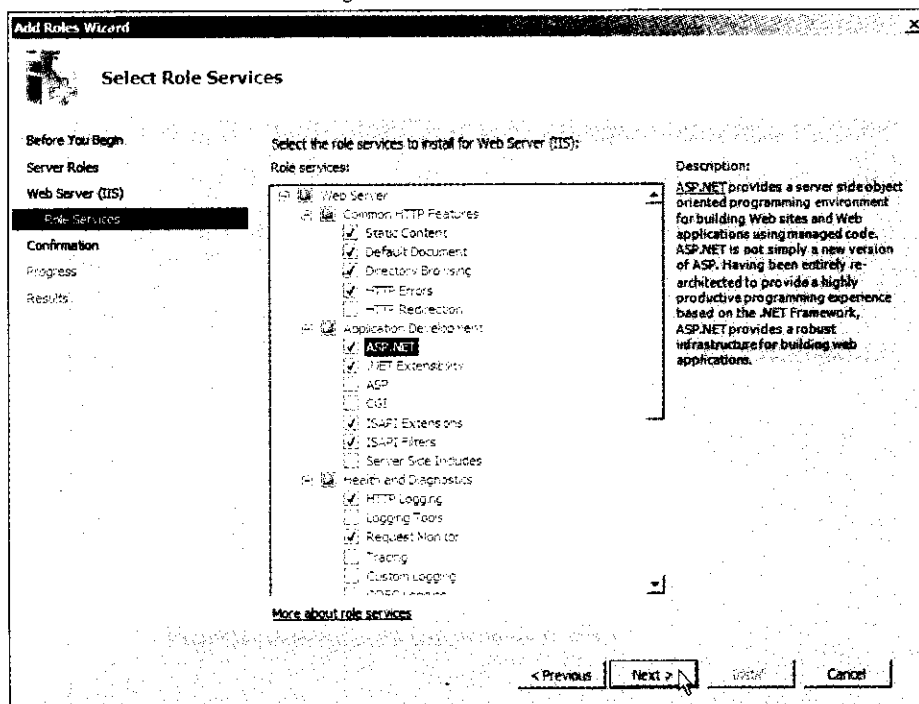
Figure 1.13: Description of Selected Role Service

The **Confirm Installation Selections** page appears. This page provides the summary of the features to install (Figure 1.14).

12. Click the **Install** button, as shown in Figure 1.14:

19
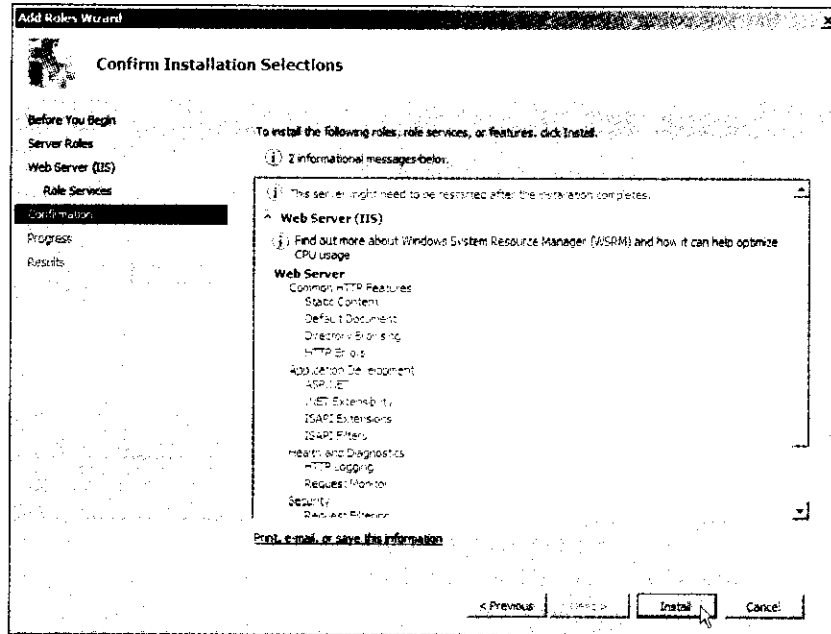
Figure 1.14: Installing Selected Role Service

As you click the Install button, it shows you the **Installation Progress** of the Web server (IIS), as shown in Figure 1.15:
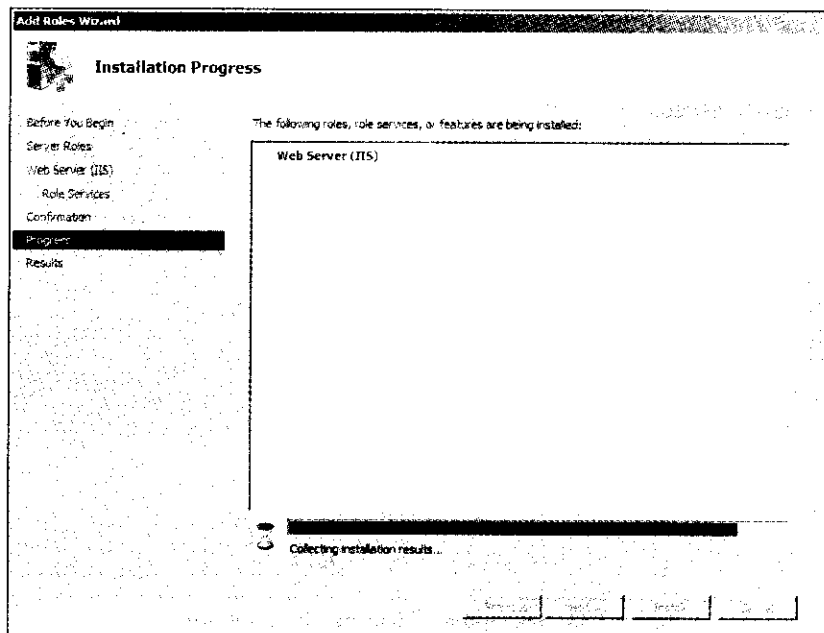
Figure 1.15: Installation Progress of Role Service

When the Web server (IIS) installation is completed, the **Installation Results** page appears (Figure 1.16). This page shows the installation summary of Web server (IIS).

13. Click the **Close** button, as shown in Figure 1.16:
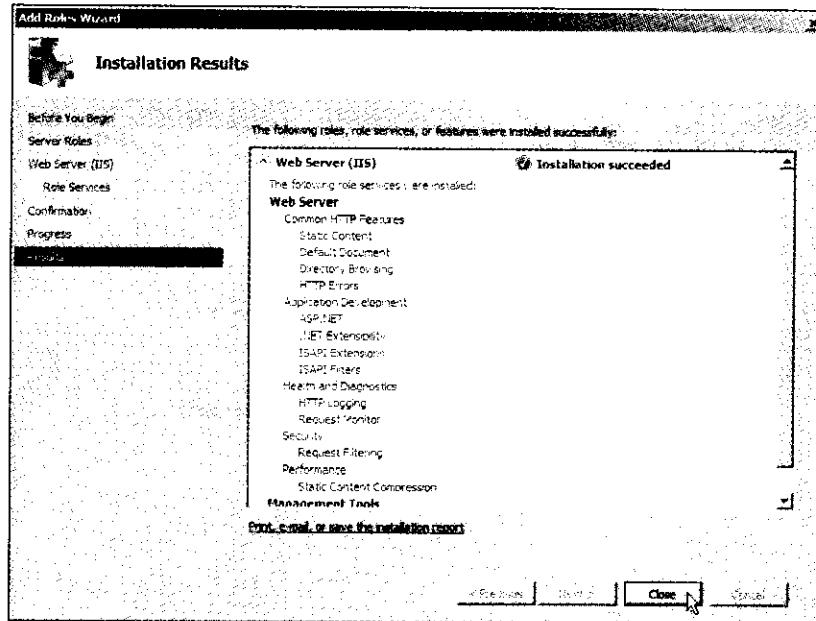
Figure 1.16: Summary Dialog Box of Wizard

Once you installed Web server in your computer. You can verify whether or not it is installed. Perform the following steps to verify the installation of Web server (IIS 7):

1. Double-click the **Internet Explorer** icon that appears on the desktop, as shown in the Figure 1.17:
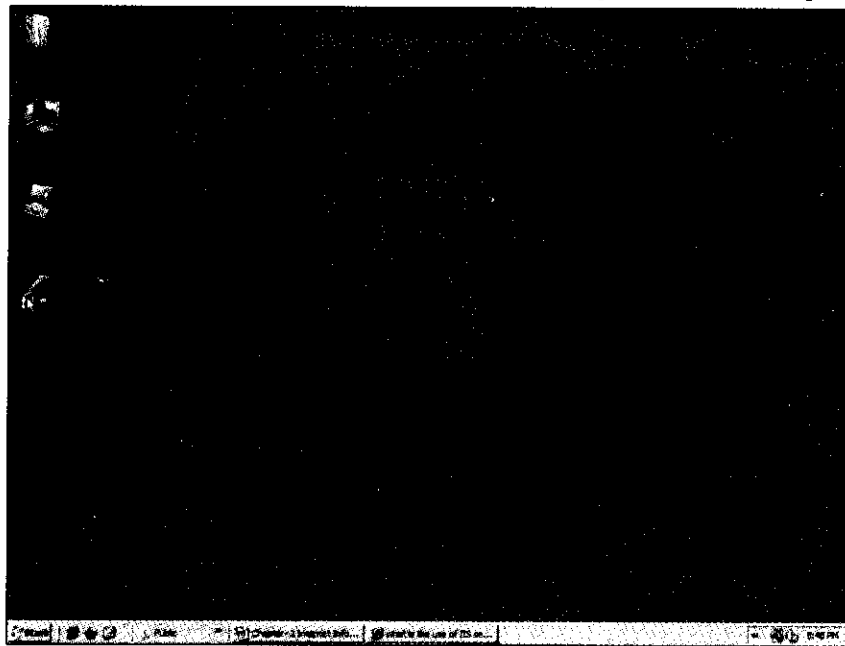
Figure 1.17: Desktop Window

The Internet Explorer window appears (Figure 1.18).

2. Type the **http://localhost/** in the address bar of the **Internet Explorer** window, as shown in Figure 1.18:
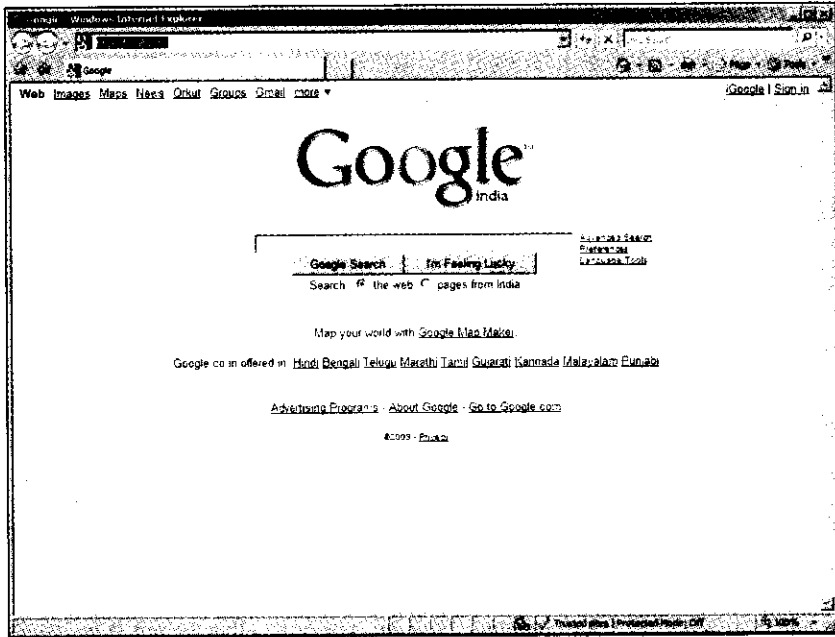
Figure 1.18: Typing URL of Localhost

3. The default Web Server (IIS) "Welcome" page appears, as shown in Figure 1.19:

Figure 1.19: Welcome Screen of Web Server IIS

This confirms you that your Web server is now installed and ready to use.

After learning about installation of Web server (IIS), let's learn about the configuration of Web server (IIS) in the next section.

Administer Web Server Remotely

The Remote Administration service in Web server (IIS 7) provides end users and administrators the ability to securely manage Web server (IIS 7) in Windows Vista and Windows Server 2008.

A Web server administrator can perform almost all administrative tasks related to IIS 7. Site owners and developers that have been assigned administrative privileges, such as permission and security, can use IIS 7 Manager for Remote Administration to allow changes (IP address and Port no.) to the remote Web server. For using the remote administration services, you need to install the Web server (IIS 7) management services.

Let's learn the installation and the Configuration of Web server (IIS 7) management services.

Installation of Web Server (IIS 7) Management Services

The Management services in the Web server (IIS 7) allow you to turn on the remote services. It also assigns the Web server administration to the user (non-administrator) to use the administrative privileges on the Web server (IIS 7). With the help of the Web server (IIS 7) management services, you can easily manage the Web server (IIS 7) in Windows Vista or Windows Server 2008.

Let's perform the following steps to install the Web server (IIS 7) Management Services:

1. Click the **Start** button. The Start menu appears (Figure 1.20).
2. Click the **Server Manager** option from the right pane of the Start menu, as shown in Figure 1.20:
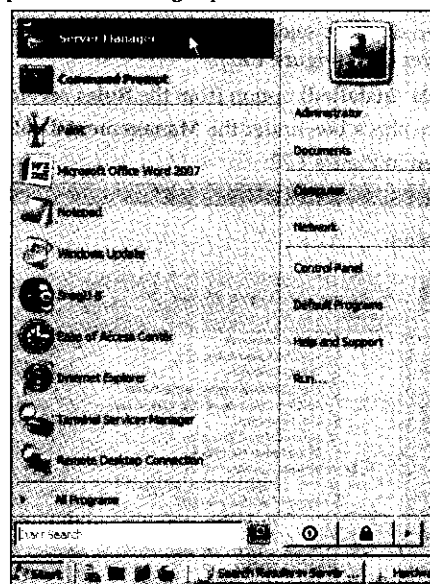
Figure 1.20: Selecting Server Manager from the Start Menu

The **Server Manager** window appears (Figure 1.21).

3. Click the **Roles** option under the **Server Manager** category. The **Roles** page appears (Figure 1.21).

   From the right pane of the **Roles** page, scroll down the scroll bar till the Web server (IIS) role services appears (Figure 1.21).

4. Click the **Add Role Services** hyperlink under the **Web Server (IIS)** section, as shown in Figure 1.21:

23
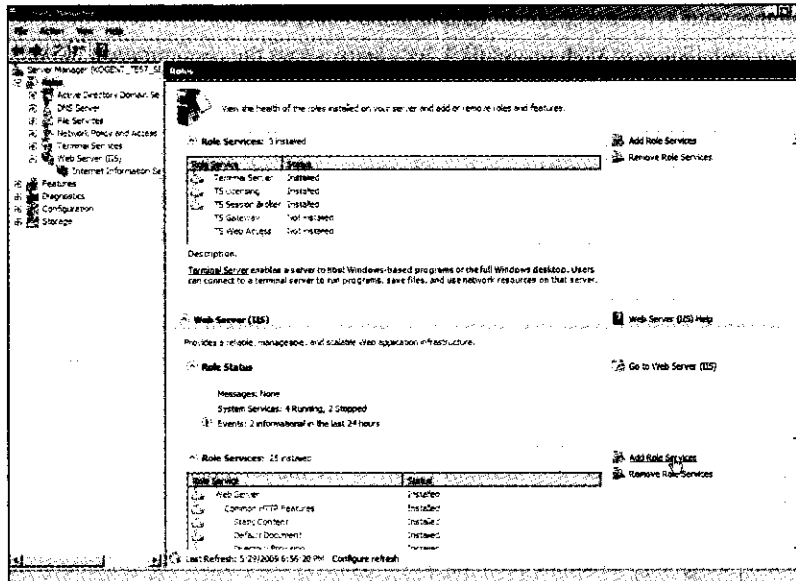
Figure 1.21: Server Manager Window

The **Add Roles Services** wizard appears (Figure 1.22).

By default, the **Role Services** option displays selected in the left pane of the **Select Role Services** page to install Management services for **Web Server (IIS)** (Figure 1.22).

5. Expand the **Management Tools (Installed)** option from the **Roles services** list box (Figure 1.22).
6. Select the **Management Service** check box under the **Management Tools (Installed)** category (Figure 1.22).
7. Click the **Next** button, as shown in Figure 1.22:
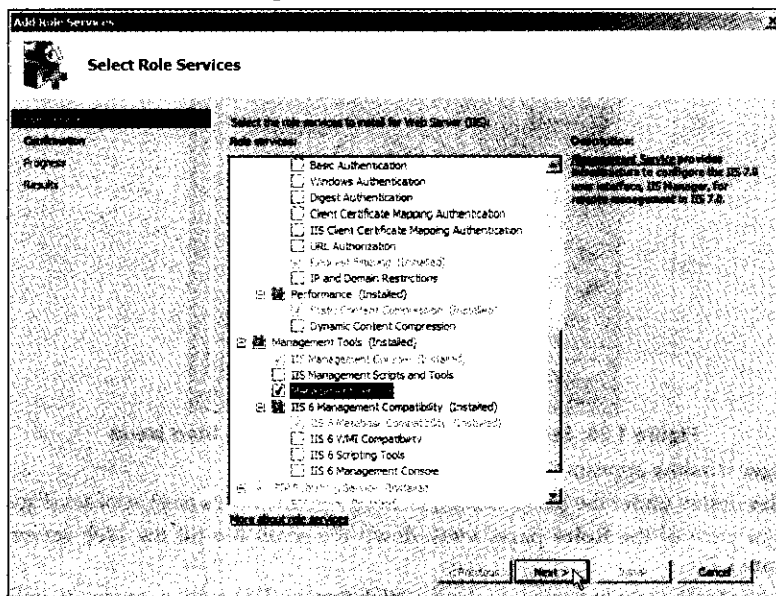
Figure 1.22: Selecting Management Services

The **Confirm Installation Selections** page appears (Figure 1.23).

8. Click the **Install** button to install the **Management Services**, as shown in Figure 1.23:
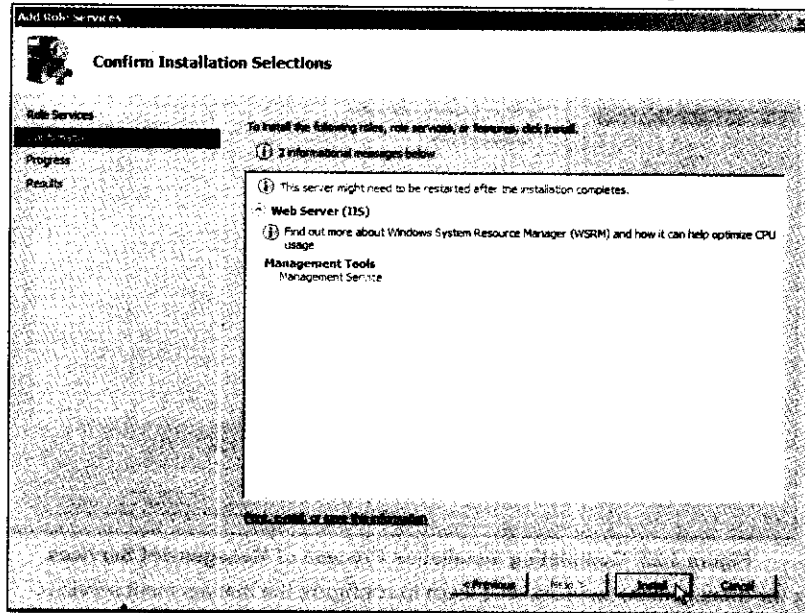
Figure 1.23: Installing Management Services

The **Installation Progress** page appears, as shown in Figure 1.24:
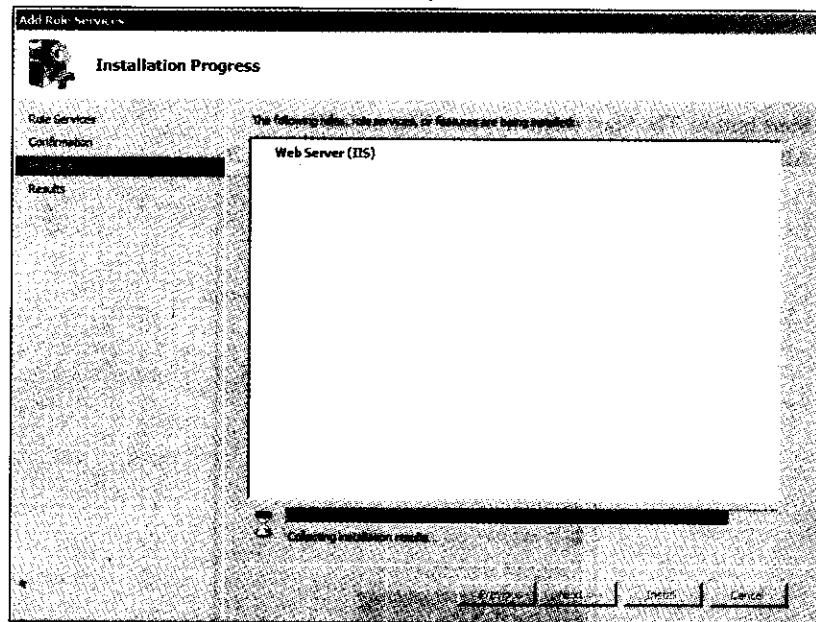
Figure 1.24: Installation Progress of Management Services

The **Installation Results** page appears (Figure 1.25).

9. Click the **Close** button to close the Add Roles Services wizard, as shown in Figure 1.25:
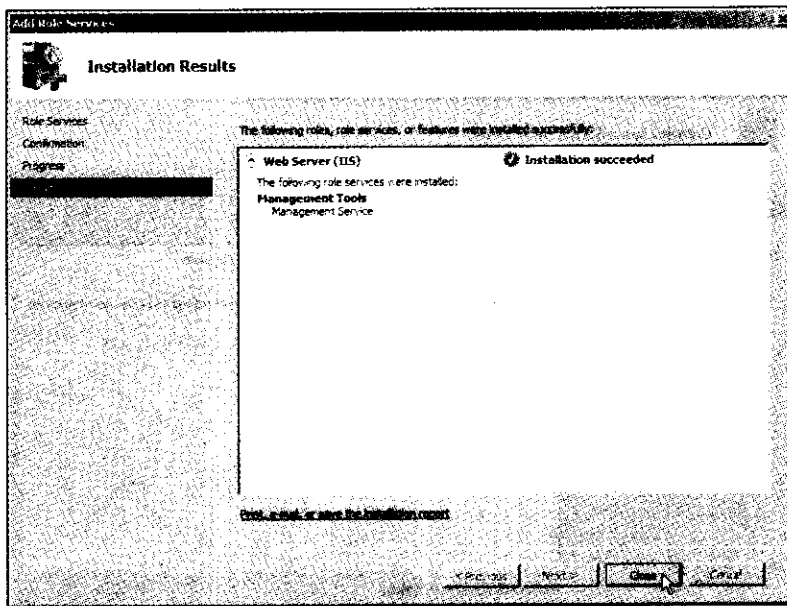
Figure 1.25: Completing Installation Process of Management Services

After installing the management services, let's learn to configure the management services.

Configuration of the Web Server (IIS 7) Management Services

Once the Management Services are installed, they become the part of the Web server (IIS 7). If you want to modify the existing settings of the management services, you need to configure these services with the help of Web server (IIS 7).

Let's perform the following steps to configure the Web server (IIS 7) Management Services:

1. Click the **Start** button. The **Start** menu appears (Figure 1.26).
2. Click the **All Programs** from the Start menu, as shown in Figure 1.26:
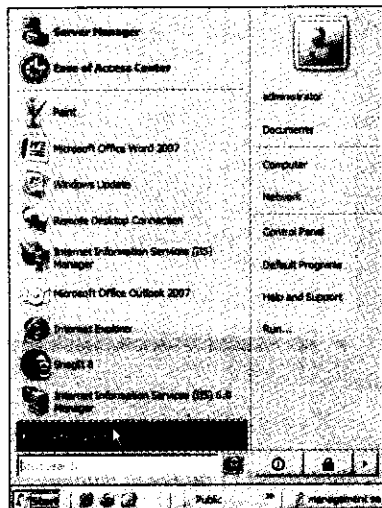
Figure 1.26: Start Menu

The list of installed programs appears (Figure 1.27).

3. Click the **Administrative Tools** folder from the list of the programs, as shown in Figure 1.27:
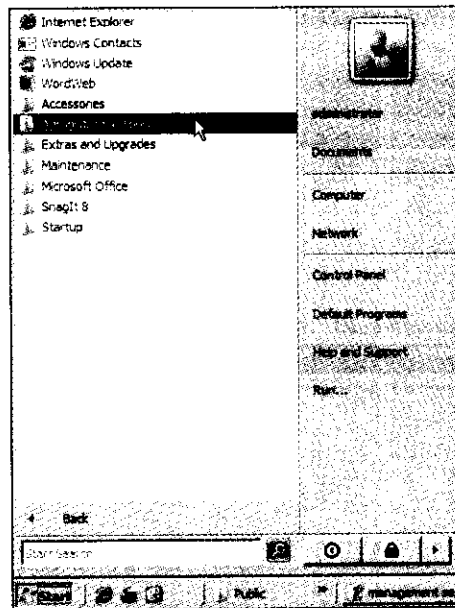
Figure 1.27: Selecting Administrative Tools

The program installed in the Administrative Tools appears (Figure 1.28).

4. Select the **Internet Information Services (IIS) Manager** form the Administrative Tools, as shown in Figure 1.28:
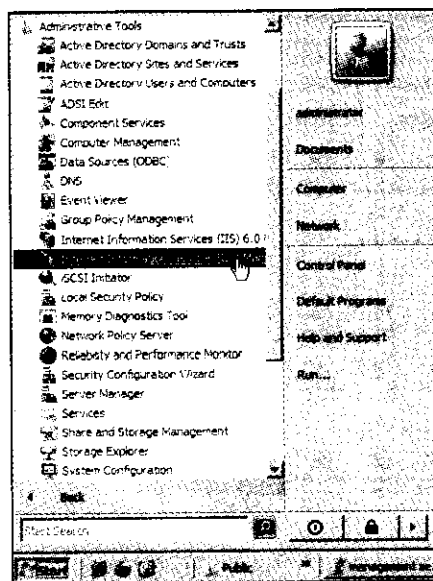
Figure 1.28: Selecting Internet Information Service (IIS) Manager

The Internet Information Services (IIS) Manager window appears (Figure 1.29).

27

5. Click **Connect to localhost** under the **Connection Tasks list box** from the right pane of the **Start Page**, as shown in Figure 1.29:
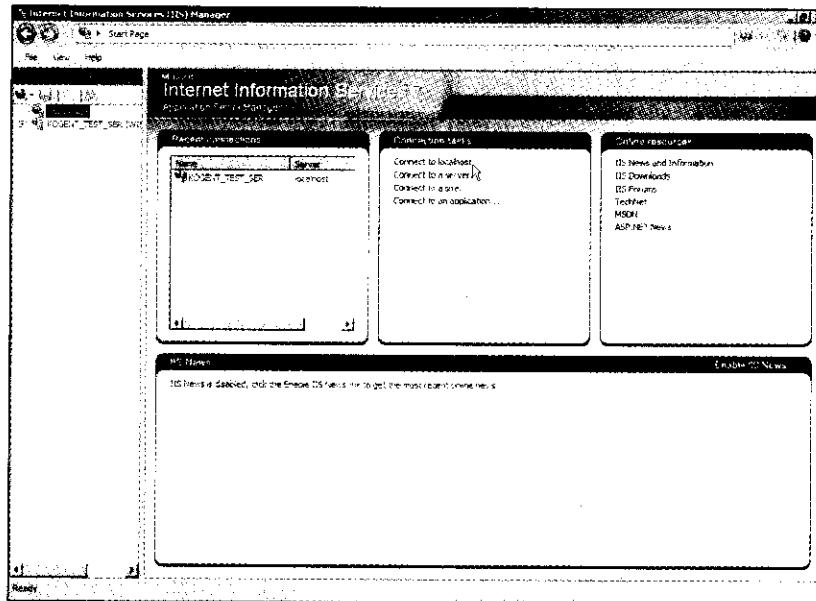
Figure 1.29: Internet Information Service Manager Window

In our case, the **KOGENT_TEST_SER Home** page appears (Figure 1.30).

6. Double-click the **Management Services** icon from the centre Workspace pane under the Management Section, as shown in Figure 1.30:
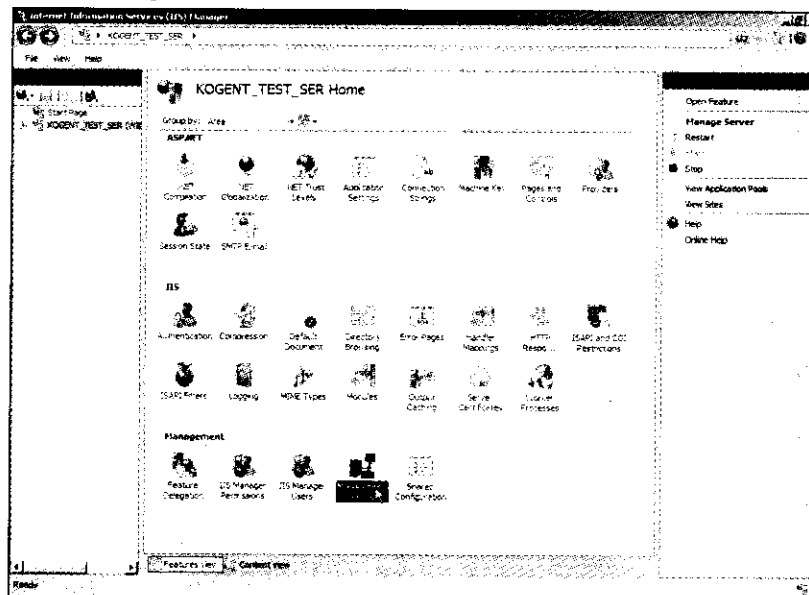
Figure 1.30: Selecting Management Services

The **Management Service** page appears (Figure 1.31).

7. Select the check box beside the **Enable Remote Connections** under the Management Service page (Figure 1.31).

8. Click the **Start** link to start the Management Services from the Action pane, as shown in Figure 1.31:
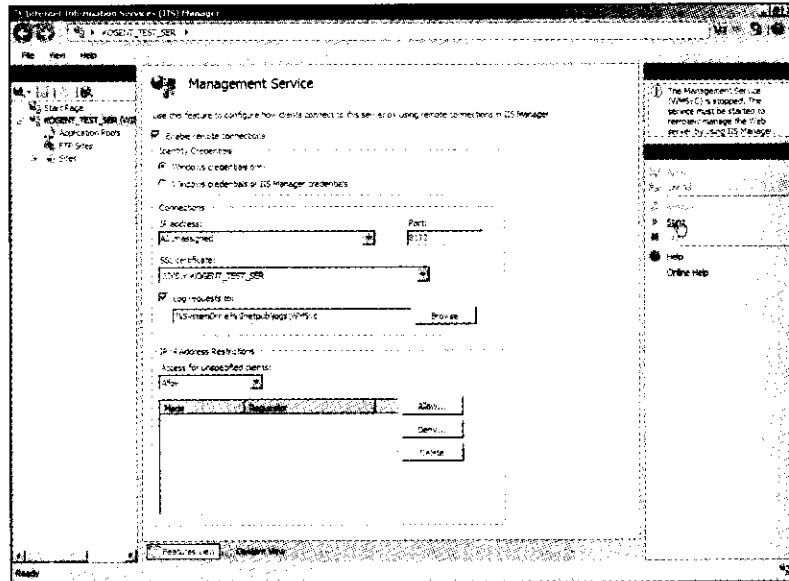
Figure 1.31: Management Services Window

A message box appears asking whether you want to save the services settings or not (Figure 1.32).

9. Click the **Yes** button to save the services settings, as shown in Figure 1.32:
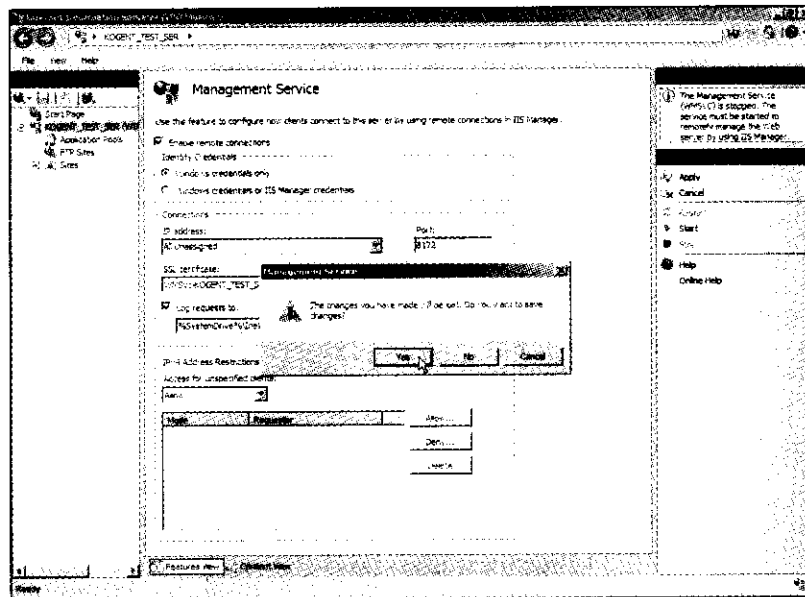
Figure 1.32: Starting Management Service

After learning about installing IIS manager and configuring IIS manager to administer Web server remotely, let's learn to create Web sites in the next section.

29

Creating Web Sites

Once the Web server (IIS 7) and its management services are installed, they can be used to open, manage, and handle one or more Web sites. Each site can appear as a separate location on internet Web surfers. When you install the IIS 7, a default Web site is already set up. You can publish your content in the default Web site. Although, mostly organizations use a new site to customize the size of the site as per the needs of the organization.

Let's perform the following steps to create a Web site:

1. Click the **Start** button. The **Start** menu appears (Figure 1.33).
2. Click the **All Programs** from the Start menu, as shown in Figure 1.33:
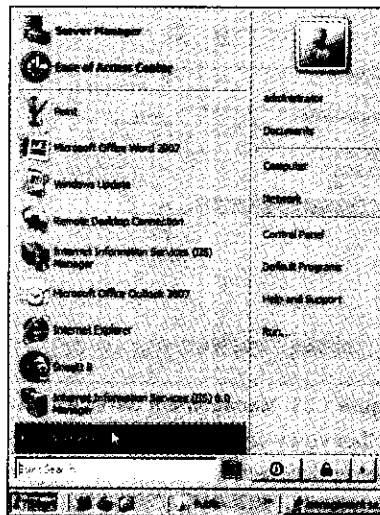
Figure 1.33: Start Menu

The list of installed programs appears (Figure 1.34).

3. Click the **Administrative Tools** folder from the list of the programs, as shown in Figure 1.34:
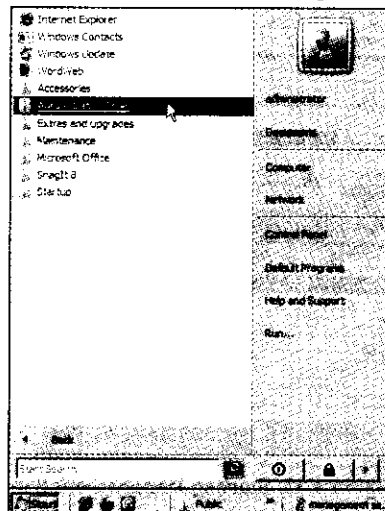
Figure 1.34: Selecting Administrative Tools

The program installed in the Administrative Tools appears (Figure 1.35).

4.   Select the **Internet Information Services (IIS) Manager** from the Administrative Tools, as shown in Figure 1.35:
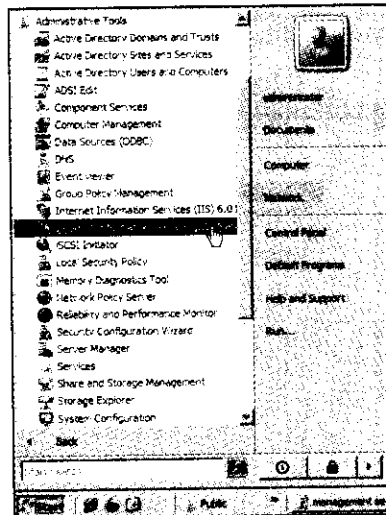

Figure 1.35: Internet Information Services (IIS) Manager

The Internet Information Services (IIS) Manager window appears (Figure 1.36).

5.   In our case, expand the KOGENT_TEST_SER from the Connections pane in the Internet Information Services (IIS) Manager window (Figure 1.36).

6.   Click the Sites option from the KOGENT_TEST_SER, as shown in Figure 1.36:
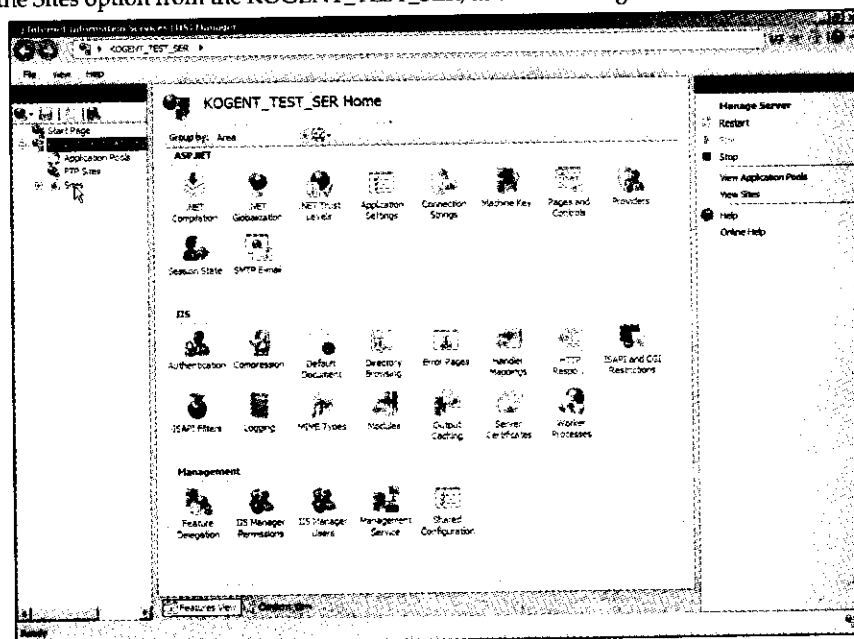
Figure 1.36: Internet Information Services Manager Widnow

The Sites page appears. By default, the Default Web Site appears (Figure 1.37).

31

7. Right-click in the empty area of the Sites pane. The context menu appears (Figure 1.37).

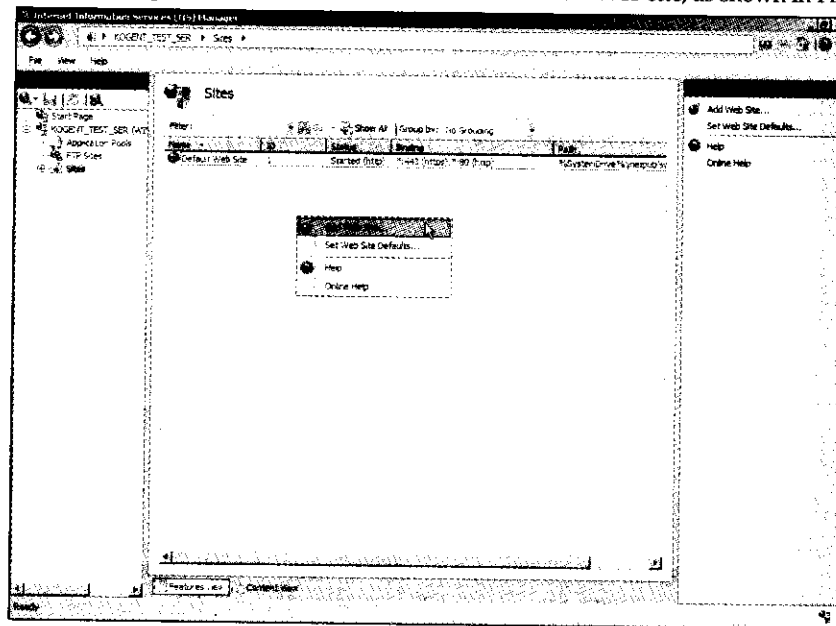8. Click Add Web Site option from the context menu to create a new Web site, as shown in Figure 1.37:

Figure 1.37: Adding Web Site

The Add Web Site dialog box appears (Figure 1.38).

9. Enter the site name under the Site name text box. In our case, we have typed www.heavenmates.com, as shown in Figure 1.38:
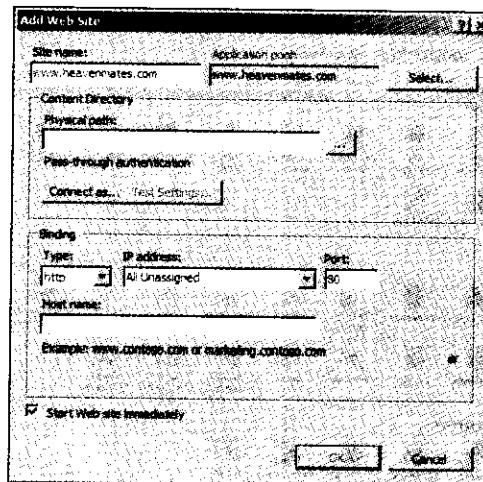

Figure 1.38: Specifying Web Site Name

10. Type the location for the Web site below Physical path to open it into your default browser. In our case, we have typed the %SystemDrive%\inetpub\wwwroot location (Figure 1.39).

11. Enter the Host name under the Host name text box. In our case, we have typed the www.cantabil.com (Figure 1.39).
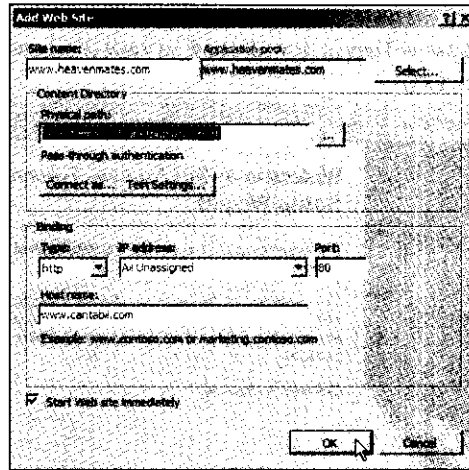
12. Click the OK button, as shown in Figure 1.39:

Figure 1.39: Specifying Path of the Web Site

The Web site you have created is now added to the Sites page, as shown in Figure 1.40:
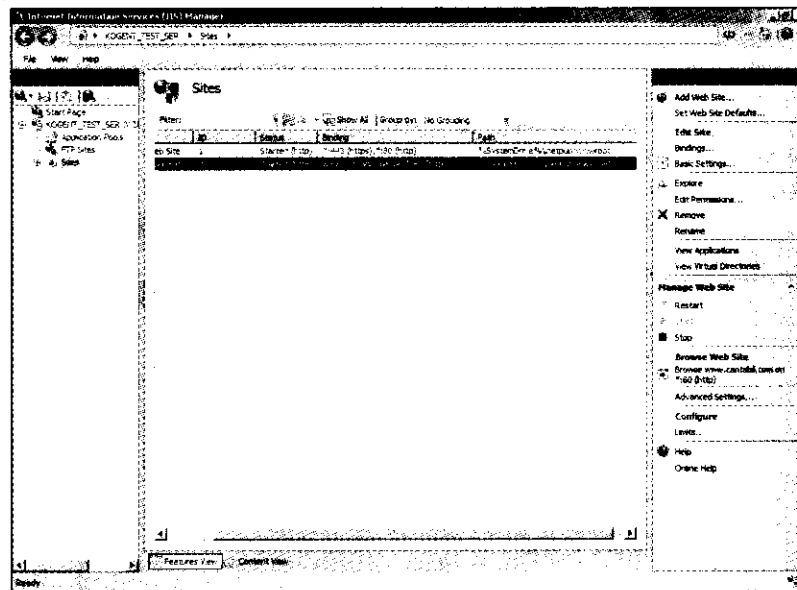

Figure 1.40: Web Site Appearing in Sites Pane

You can perform various actions on the created site with the help of options listed in the Action pane, such as Add new site, edit site, remove site, and rename site. Similarly, with the help of Manage Web Site pane, you can manage your created Web site with the help of options, such as restarting, stopping, browsing, and configuring the Web site.

With this, we come to an end of this section. Let's learn to install Apache Tomcat Web server.

Apache Tomcat

Apache Tomcat server is used to deploy and run Java based applications. The working and functionality of Apache Tomcat server is more or less similar to IIS and it is available free of cost. You can download a copy of

33

Apache Tomcat server from http://tomcat.apache.org/download-60.cgi. Once you download a copy of Apache Tomcat, perform the following steps to install on your machine

1. Double-click the exe file of Apache Tomcat downloaded on your computer. A welcome screen appears.
2. Click the Next button (Figure 1.41).

Figure 1.41: Starting Apache Tomcat Installation

The License Agreement dialog box appears (Figure 1.42).

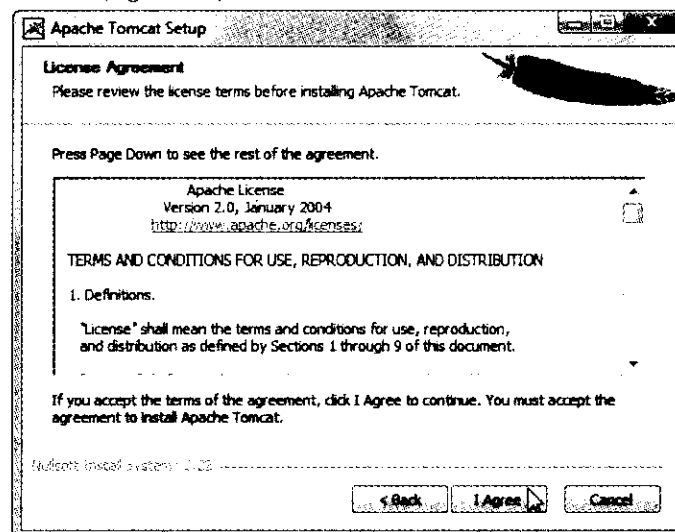3. Click the I Agree button (Figure 1.42).

Figure 1.42: Accepting Licensing Terms

The Choose Component dialog box appears. Keep default settings selected (recommended), as shown in Figure 1.43:
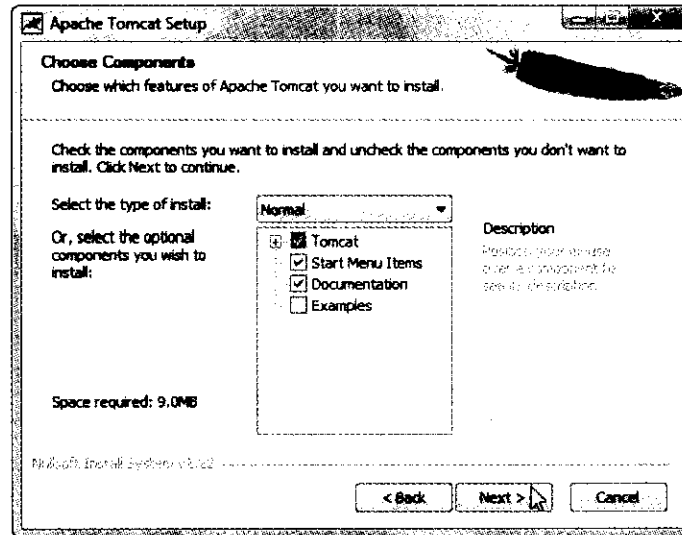
Figure 1.43: Selecting Components for Installation

4. Click the Next button (Figure 1.43).

The Choose Install Location dialog box appears with default path to install Apache Tomcat server on your computer. If you want to alter the default path to install the server on your computer then click the Browse button and specify the other path.

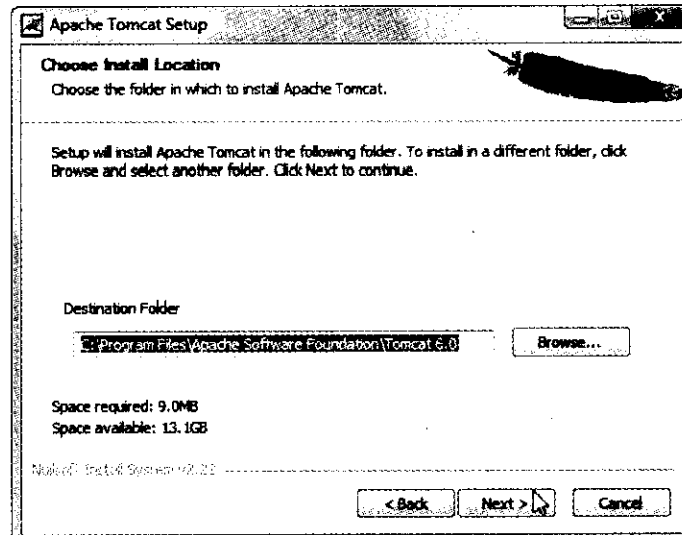5. Click the Next button (Figure 1.44).

Figure 1.44: Specifying Path to Install Server

The Configuration dialog box appears

6. Type port number in the HTTP/1.1 Connector Port to establish communication between application and the Web server. The default port number appears in the Configuration dialog box is 8080 (Figure 1.45).

7. Type a name in the User Name text box (Figure 1.45).

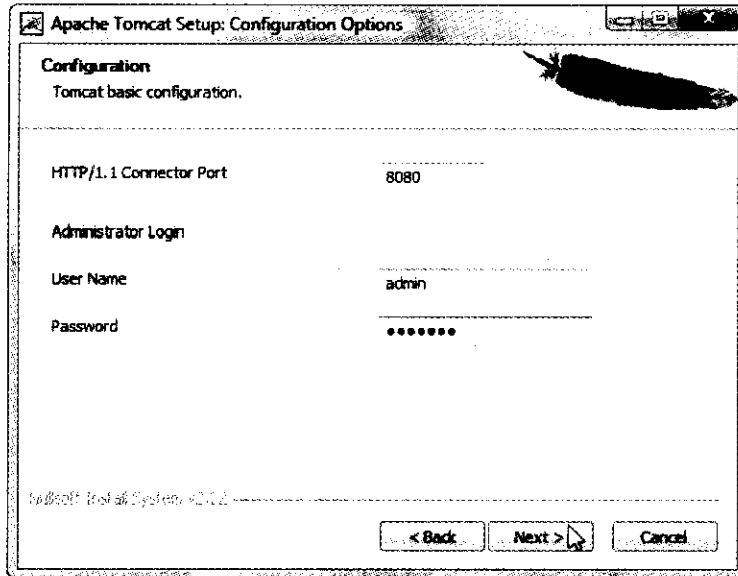8. Type a password in the Password text box (Figure 1.45).

35 .

Figure 1.45: Specifying Port Number, User Name, and Password

An Installing dialog box appears with progress bar, as shown in Figure 1.46:
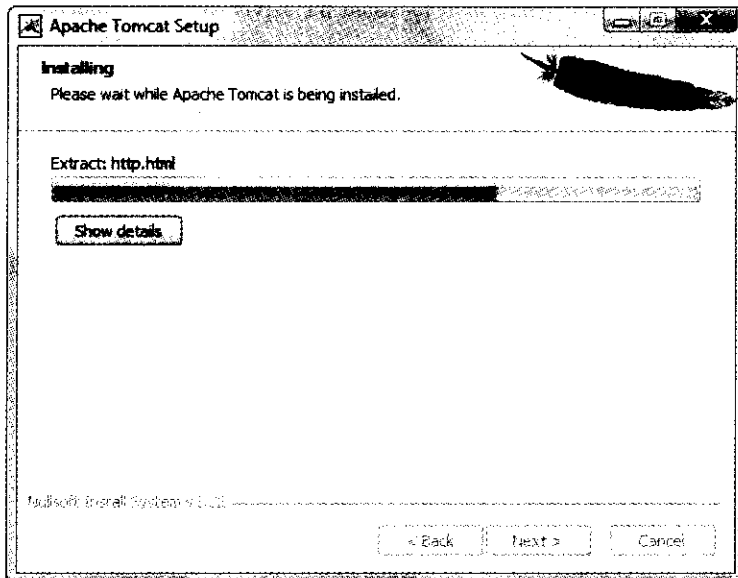

Figure 1.46: Installation Progress of Server

In few moments installation completes and dialog box shown in Figure 1.47 appears on the screen.

9. Clear the Show Readme checkbox and click the Finish button (Figure 1.47).
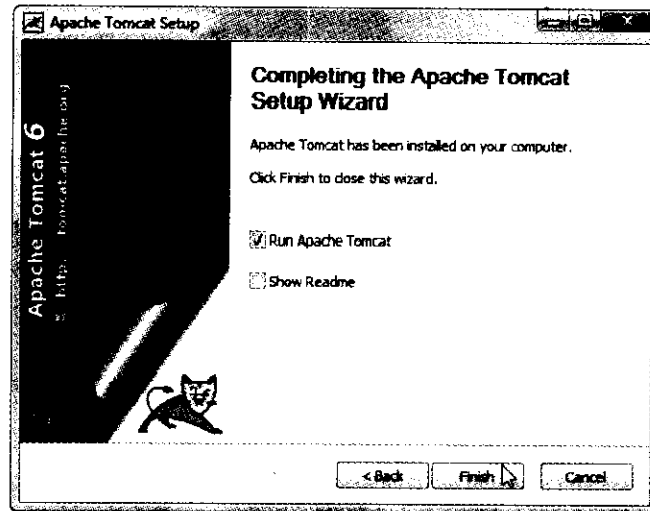
Figure 1.47: Finishing Installation Wizard

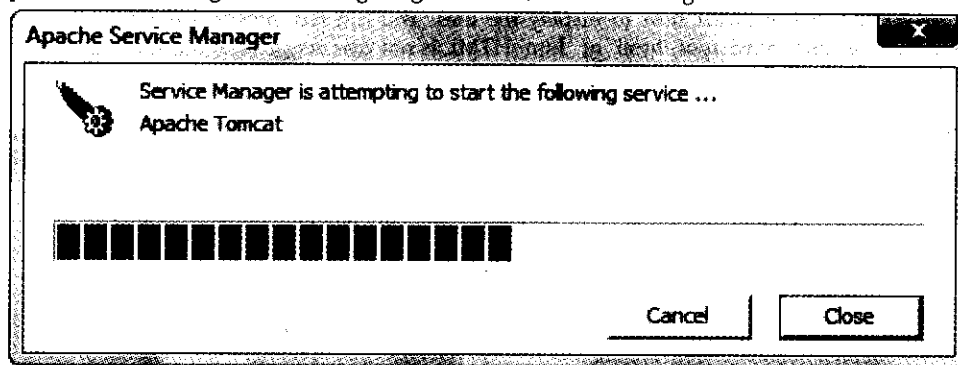The Apache Session Manager starts configuring the server, as shown in Figure 1.48:

Figure 1.48: Session Manager Configuring Server

Once the server is configured automatically on your computer, click Start→Apache Tomcat 6.0→Tomcat Manager from the Start menu.

Summary

In this chapter you come to know about the history of the Web and architecture of OSI reference model. The chapter also discusses the Web system architecture including 3-tier Web system architecture. The role of TCP/IP and HTTP protocols is covered in the chapter. Towards the end of the chapter you came to know about various Web technologies available in the market, such as HTML, XML, PHP, Java, ASP.NET, and AJAX and installation procedure of IIS and Apache Tomcat Web servers.

Quick Revise

Q1.   What is OSI model? Briefly explain all layers of OSI model.

Ans: The International Standards Organization (ISO) developed what they called the Open Systems Interconnection (OSI) Reference Model. This Model proposed that all network protocols should consist of seven distinct layers. The seven layers of OSI model are:

1. Physical	Handles voltages, electrical pulses, connectors, and switches so that data can be transmitted over network media.
2. Data link	Controls grouping data into blocks (message packets) and transferring blocks from one point in the network to another.
3. Network	Controls the routing of data and messages through the channels of a network.
4. Transport	Controls data transfer for the complete transmission path, from sending point to receiving point.
5. Session	Establishes and terminates communications links between computers.
6. Presentation	Formats data for transfer between different systems.
7. Application	Provides network services to users and user applications, including file transfer.

Q2.   Explain the hierarchy of HTML document.

Ans: The Hypertext Markup Language is a computer language used to create Web pages. Each page created in HTML contains the data to be included in the Web page and the HTML tags. The Web Browser understands these tags and displays the corresponding Web page. We browse the World Wide Web using a Web Browser. All text, graphics and design elements of a Web page are "tagged" with codes that instruct the Web browser how to display the files. You can recognize these files easily because they contain the file extension of 'html' or 'htm'.HTML is not case sensitive and can be easily updated after the file is created. To format a simple text file into HTML, the user creates tags that start and finish with angle brackets. To end the formatting or change to another format, type the first angle bracket, a backslash, then repeats the command and closes the bracket. For example, <H1>Understanding HTML </H1> is the code used to create the heading. The hierarchy of HTML document is shown in Figure 1.49.
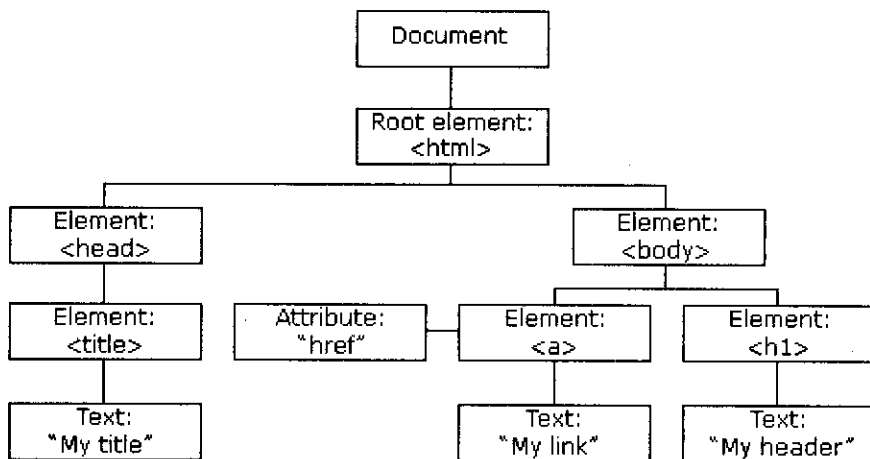

Figure 1.49: HTML Document Hierarchy

Q3.   What is Web Service?

Ans: Web services (sometimes called application services) are services (usually including some combination of programming and data, but possibly including human resources as well) that are made available from a business's Web server for Web users or other Web-connected programs. Providers of Web services are generally known as application service providers. Web services range from such major services as

storage management and customer relationship management (CRM) down to much more limited services such as the furnishing of a stock quote and the checking of bids for an auction item.

Q4. **What is difference between Web site and Web Service?**

Ans: A Web site is a site intended for use by humans. It must have a user friendly interface, must be able to interact with a human being. A Web service is a service intended for use by another program, via Web. One program interacts to another via its Web service port. Google search maybe use in both forms. You can use directly or you can write a small program to call the search Web service, obtain the result and display it embedded in your application.

Q5. **What is 3-Tier Web System Architecture?**

Ans: Three-tiered application is a client-server architecture in which the user interface, functional process logic, computer data storage and data access are developed and maintained as independent modules on separate platforms. Three tiers present in the 3-Tier Web Architecture are Presentation Tier, Application Tier and Data Tier.

Q6. **Explain URL and DNS**

Ans: **URL:** The URL specifies the Internet address of a stored file on a host computer connected through the Internet. Every file on the internet has a unique URL, no matter what is its access procedure. Web browsers use the URL to retrieve the file from the host computer and the specific directory in which it resides. This file is downloaded to the user's client computer and displayed on the monitor connected to the machine.

DNS: The DNS is a worldwide system of servers that stores location pointers to Web sites. The numeric address, called the IP (Internet Protocol) address, is actually the "real" URL. Since numeric strings are difficult for humans to use, alphneumeric addresses are employed by end users. Once the translation is made by the DNS, the browser can contact the Web server and ask for a specific file located on its site.

Q7. **What is Web browser? Give few examples of Web browser.**

Ans: A browser is a software, which allows users to access and navigate the World Wide Web. There are two types of browsers known as Graphical and Text. Internet Explorer, Mozilla Firefox, and Opera are few examples of Web browser.

Q8. **What is cookie?**

Ans: A cookie is a piece of text that a Web server can store on a user's hard disk. Cookies allow a Websites to store information on a user's machine and later it can be retrieved. The pieces of information that a cookie store are structured as name-value pairs.

Q9. **Define terms XML, JAVA, and AJAX.**

Ans: **XML:** eXtensible Markup Language (XML) is a text-based markup language that enables you to store data in a structured format by using meaningful tags. The term "eXtensible" implies that you can extend your ability to describe a document by defining meaningful tags for your application. XML is a cross-platform, hardware and software independent markup language. XML allows computers to store data in a format that can be interpreted by any other computer system and therefore, XML can be used to transfer structured data between heterogeneous systems.

Java: Java is programming language developed by the Sun Microsystems. The syntax used in Java is more or less similar to the syntax used in C and C++. Java applications are first compiled to bytecode, which can be executed on any Java virtual machine (JVM). Thus JVM is prerequisite to use Java and Java based technologies. Two important components of Java are Java Servlets and Java Server Pages (JSPs). They can be combined together to design efficient content publishing systems that support separation of presentation and business logic of Web applications

39

AJAX: AJAX, `Asynchronous JavaScript and XML`, is a new technique. Its primary components are `JavaScript` and `XML`. AJAX is a technique, which describes how other technologies, JavaScript, `DOM` (`Document Object Model`), and XML can be used together to create interactive Web applications.

Q10. **What is Apache Tomcat?**

Ans: Apache Tomcat server is used to deploy and run Java based applications. The working and functionality of Apache Tomcat server is more or less similar to IIS and it is available free of cost.