Internet Basics

OBJECTIVES:

In this lesson, you will learn to:

- ✔ **Identify the features of the Internet**
- ✔ **Identify the terminology used in connection with the Internet**
- ✔ **Discuss cross-browser compatibility**
- ✔ **Distinguish between client- and server-side scripting languages**

Getting Started

Ever since the advent of computers, researchers have indulged in a continuous quest to bring the world closer through computers. This effort gave rise to the Internet. It is through the Internet that today millions of people communicate and share information, regardless of their location. This chapter will focus on the basics of the Internet and also shed light upon how the Internet works.

Introducing the Internet

The Internet can be defined as a network of globally connected computers that is decentralized by design. This definition can be broken down into three parts. Let's understand each part of the definition in isolation.

Is a network.   A network is a collection of computers. The Internet can also be referred to as a network because it is a collection of millions of computers.

Globally connected computers.   This means that you can be connected to the Internet, regardless of your location. The Internet has brought people in the world closer by connecting computers located in the remotest of locations.

Decentralized design.   The Internet has a decentralized design. That is, there is no centralized body that controls the way in which the Internet functions. The Internet does provide online services that are centrally administered, but as a whole, it would not be incorrect to say that the Internet has a decentralized design. Each computer connected to the Internet is called a *host*. The operator/user of a particular host can choose from the millions of available Internet services and can also make services available through the Internet.

Internet Terminology

To understand how the Internet works, it is a good idea to first be familiar with the terms that are commonly used in connection with the Internet. These terms are discussed in the following subsections.

Client

A client is any computer on the network that requests services from another computer on the network. To be able to request services and access the resources present on some other computer on the network, the client should have adequate access permissions.

Server

A server is a computer that receives requests from client computers, processes these requests, and sends the output to the respective client computers that had placed the requests. The range of services that a server can offer a client is based on the permissions possessed by the client. The server computer defines these permissions.

Client-Server Network

Client-server network is one of the most basic common architectures that is used for computer connectivity. In this type of network, several client computers are connected to the server and also to each other. Client computers request services from the server computer, and the server accepts or rejects these requests. The server computer is also responsible for storing relevant information that is frequently used by the client
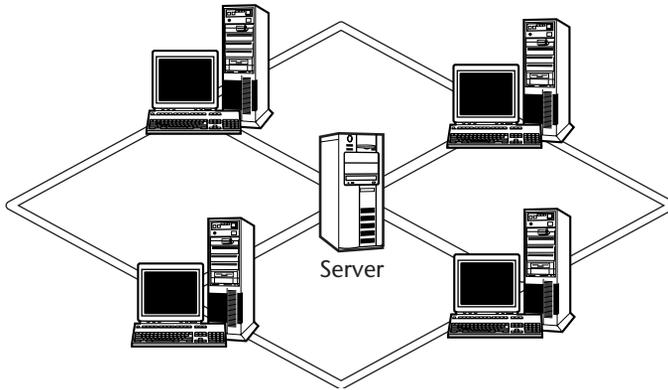
Figure 1.1   Client-Server Network.

most suited for a setup that has a large number of clients. Figure 1.1 illustrates how client computers are connected to the server.

In the Internet scenario, each user, typically a client, connects to a Web site that is hosted on a server. The user then requests services from this server, and depending on the permissions possessed by the user, the server processes these requests.

Web Server

A Web server is a computer that is dedicated to provide Web services to clients on the Internet. Web services are often provided through Web sites that are hosted on a Web server that is accessed by a client. However, before the clients can access the site, it is preferable to register the domain name at a Domain Name Service.

Browser

To access the content of a Web site, users must have a browser that can help them locate a Web site on the Internet and then view the content of a Web page. Users can also use the browser to download and upload files on the Internet. A few popular browsers that are used worldwide are Internet Explorer, Netscape Navigator, and Opera. To access a Web site, a user needs to specify an address that helps the browser track a particular Web site.

URL

A unique resource locator (URL) is a link that is used to access a Web site on the Internet. A URL is unique to each site, and is typically based on the nature of the site. Without specifying a valid URL, users cannot access a particular site. For example, to access the official Web site for PHP, the user will need to specify the URL www.php.net.

ISP

Internet service providers (ISPs) are companies that help users connect to the Internet for a monthly fee. In return, they provide a username, a password, and telephone number. The username and the password are used to authenticate the user on the Internet. The telephone number is used to establish connection with the dial-up server of the ISP. However, to access the Internet a user (client computer) requires a modem.

> **TIP** In addition to providing Internet services to individual users, ISPs also provide Internet services to large companies in return for an annual fee. When such a company subscribes to an ISP, the company provides Internet access to all the computers on the corporate network.

Modem

To access the Internet, a user requires a hardware device called a modem. The word *modem* originated from the words *modulator* and *demodulator*. A modem transmits data over telephone lines as analog signals and then converts them digital signals that can be interpreted by a computer.

Web Page

Any page that is hosted on the Internet is a Web page. A Web page is viewed by using a browser. The basic framework of Web pages can be designed using a language called *HyperText Markup Language (HTML)*.

Web Development

Web development is the process of creating Web pages for a Web site that will be hosted on the Internet. You can use a combination of HTML and other scripting languages to develop interactive Web pages.

> **NOTE** Scripting languages are discussed later in the chapter under the heading *Scripting Languages*.

Site Hosting

To enable people to access your site, you need to host it. You can either host the site on your own Web server or you can buy space from a Web site–hosting company. In either case, you need a registered domain name. Besides providing space, site-hosting companies also register your domain name. If you don't have adequate funds to host your own site, buying space from a known Web-hosting company would be an intelligent choice.

TIP It is advisable to register your domain name with well-known search engines such as Google, Lycos, and Exite. This makes your site more popular and easily accessible to users.

Access Methods

Access methods refer to the means of accessing sites on the Internet. There are two access methods that you can use to access the Internet. Let's discuss them.

Dial-up Connection

A dial-up connection is the access method that uses telephone lines to connect to the Internet. It is the most common way that individuals who use home computers connect to the Internet. To connect to the Internet by using dial up, the user needs to specify a username, a password, and a telephone number. After the connection is established, the user can start browsing sites on the Internet. Figure 1.2 illustrates a dial-up connection.

Leased Lines

Another popular method of accessing sites on the Internet is through leased lines. These lines maintain a dedicated connection with the Internet. Unlike dial-up connections, a user need not connect to the Internet using a modem. Leased lines are faster than dial-up connections because they can handle higher data transmission speed. Figure 1.3 depicts a corporate network connected to the Internet by using a leased line.

Bandwidth

Bandwidth refers to the rate of data transfer over the Internet. The higher the bandwidth, the higher the connection speed. Bandwidth is measured in *kilobits per second (Kbps)* or *megabits per second (Mbps)*. A modem supports bandwidth up to 56 Kbps, whereas leased lines such as a digital subscriber line (DSL) support up to 8 Mbps.

TIP Another upcoming technology that may replace slow network connectivity is the cable modem. By using cable modems, even household PC users can get rid of the hassle of dialing up every time they connect to the Internet. Cable modems are known to support bandwidths up to 52 Mbps.
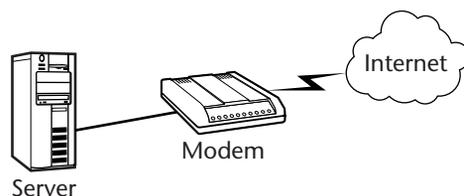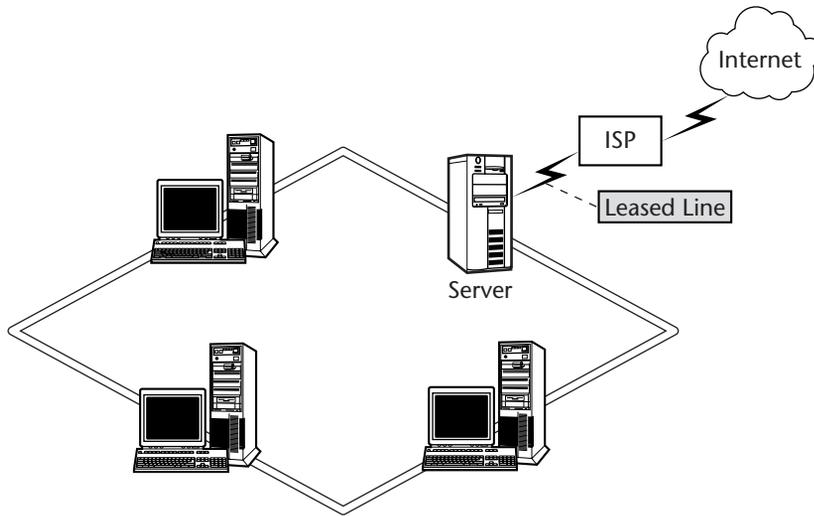
Figure 1.2   Dial-up connection.

Figure 1.3   Connecting to the Internet by using a leased line.

Cross-Browser Compatibility

As discussed earlier, several browsers are available for accessing the Internet. The choice of browser entirely depends on the preference of the user. Although this increases the availability of options for the users, it also gives way to problems. When Web pages are developed, if they are tested using a single browser, the developer will be unaware of how the Web page will appear when viewed using a different browser. In some cases, a Web page that is displayed perfectly on Internet Explorer might not be displayed properly on Netscape Navigator. This leads to browser incompatibility, which might occur because of the following:

> **Browser version.**   Sometimes, you might test your Web site by using the latest version of a browser. However, if your users aren't using the same version, they might not be able to view the contents of a Web page properly. You may have visited sites that display a warning indicating that the Web site is best viewed with IE 5 or higher. This suggests that the Web site might not appear as intended if the user is using an earlier version of Internet Explorer than version 5.

> **HTML tags.**   Certain HTML tags are specific to particular browsers and don't appear properly when viewed using other browsers.

> **Fonts.**   Certain fonts are specific to particular browsers and don't appear properly when viewed using other browsers.

To avoid incompatibility issues, you should:

- Test your Web site on different browsers during the development and after the development phase.

- Ensure that the important information present on your site is best viewed without version or browser dependencies.

- Avoid using HTML tags that are not supported by certain browsers.
- Avoid using fonts that are not supported by certain browsers.

Protocols

Protocols are a set of rules that are followed on a network to facilitate communication between two different computers on a network or different networks. *HyperText Transfer Protocol (HTTP)* is used for communication on the Internet. When you specify a site address, it starts with http, this indicates that HTTP protocol is used to connect to the Internet.

Scripting Languages

With the evolution of the Internet and increasing competition, the need to develop more interactive Web pages arose. Users were no longer interested in viewing the same old noninteractive Web pages that were created using HTML. But it was challenging and required a lot of time and expertise to make Web pages more interactive using languages such as C++.

Developers started looking for an alternative that would help them develop more interactive Web pages in a shorter time and with ease. This led to the introduction of scripting languages, programming languages that can be embedded within HTML tags to make Web pages more attractive and interactive. Over the past couple of years, several scripting languages have been introduced.

Using scripting languages, you can achieve the following functionality:

- You can dynamically modify the content of a Web page at the time when the page is downloaded.
- Scripts can accompany forms and can be used to process input or information provided by a user for checking the validity of the information.
- Scripts can be triggered by events. That is, you can use scripts to respond and react to events such as form submission, mouse action, and selection.
- Scripts can be used to check authenticity. For example, a script can check whether the username and password specified by a user during logon are valid or not.
- Scripts can be used to create graphical user interface elements. Linking the script to form controls called buttons can do this.

There are two types of scripting languages, *client-side* and *server-side*.

Client-Side Scripting

Client-side scripting languages execute on a client computer. This means that a script executes when a page is downloaded on a client computer or when a link is activated. Client-side scripting was introduced so that the server did not have to handle the entire processing load. There are several advantages of using client-side scripting languages.

Reduces the load on a server.   Client-side scripting languages result in a script being executed on the client machine, thereby reducing the load on the server. Imagine a situation where thousands of users are connected to the server and are trying to log on simultaneously. A server-side script that checks whether the username entered by a user contains any special characters will have to be verified by the server every time a user enters a username or password, overloading the server. Such a situation can be avoided by using client-side scripting so that usernames and passwords are verified on the user's machine.

Reduces network traffic.   When a script is executed on the client side, the network traffic is also reduced to a large extent.

There are certain limitations to using client-side scripting:

- The scope of client-side scripting is limited. You cannot use client-side scripting languages to perform complex tasks such as interacting with a database server or accessing local files and directories.

- The client-side scripting code that you use is visible to users.

A few examples of client-side scripting languages are:

JavaScript.   JavaScript is a popular scripting language that was developed by Netscape. JavaScript was developed using Java as the base language. It can be embedded within HTML and is an open source language that doesn't require a license.

VBScript.   VBScript stands for Visual Basic Scripting Edition. This is another popular scripting language and was developed by Microsoft. VBScript is based on the Visual Basic programming language.

Jscript.   JScript is Microsoft's version of JavaScript. It is very similar to JavaScript.

Server-Side Scripting

Server-side scripting is just the opposite of client-side scripting. All the scripts are executed on the server side. It is used to perform more complex tasks that require a lot of processing power. The advantages of server-side scripting are:

- When you use server-side scripting, all processing takes place before a Web page is sent to the browser. As a result, the code remains hidden from users.

- Server-side scripting is browser independent. That is, the browser used does not have any impact on the processing of code because all the processing takes place on the server.

A few disadvantages of using server-side scripting are:

- To use server-side scripting you might require a high-configuration server.

- Running complex tasks on the server side might require a lot of processing speed and also possibly slow down the Web site.

TIP You should design your Web site in such a way that you take the best possible advantage of both client- and server-side scripting languages. This will help you protect your code and ensure that you derive the maximum performance from the server.

A few examples of server-side scripting languages are:

PHP.   HyperText Pre Processor (PHP) is an open source server-side scripting language. PHP scripts can be embedded within HTML to create dynamic Web pages.

Perl.   Perl stands for Practical Extraction and Report Language. Larry Wall developed Perl for writing CGI scripts.

JSP.   Java Server Pages (JSP) was developed by Sun Microsystems. JSP is a powerful server-side scripting language.

Python.   Python is an interpreted object-oriented programming language. It was developed by Guido Van Rossum. Although Python is not a dedicated scripting language, it can be used for server-side scripting.

Summary

In this chapter, you learned about Internet basics. Next, you were introduced to the terminology that is used in connection with the Internet. Finally, you learned about client- and server-side scripting languages.