

Lesson 9:

Internet Services and Tools for Business

Objectives

By the end of this lesson, you will be able to:

- ✦ 1.5.9: Use common Web browser software features and various clients (e.g., FTP, e-mail) within a given context, identify when to use each, and identify basic commands (e.g., FTP put and get).
- ✦ 1.6.2: Distinguish between MIME, S/MIME and PGP/GPG.
- ✦ 1.7.1: Retrieve and place documents using FTP, SCP, SFTP and SSL/TLS-enabled FTP.
- ✦ 1.7.2: Compare FTP-based and HTTP-based retrieval.
- ✦ 1.7.3: Use remote-assistance clients and servers, including Microsoft Remote Services.
- ✦ 1.7.5: Define Peer-to-Peer (P2P) services, use them when appropriate for business, and describe how to use a typical BitTorrent client.
- ✦ 1.7.6: Identify privacy concerns related to network communications (e.g., e-mail, instant messaging, P2P).
- ✦ 1.7.9: Explain the various uses of mass e-mail and texting services.
- ✦ 1.7.10: Join and manage your participation in an e-mail listserv group.
- ✦ 1.9.5: Troubleshoot connectivity issues (e.g., no connection, poor rendering, slow connections) using TCP/IP utilities.
- ✦ 1.13.1: Identify the need to define MIME file types for special download procedures such as unusual documents or graphics formats, and solve the problem.
- ✦ 1.13.2: Manage files using common compression software and techniques (e.g., zip/WinZip, gzip, bzip2, RAR, compress).
- ✦ 1.18.1: Define essential elements of open-source and "copyleft" licenses (e.g., GNU General Public License [GPL]).
- ✦ 1.18.2: Explain the purpose of typical End User License Agreements (EULAs) and software patents.
- ✦ 1.18.3: Define essential open source terms (e.g., source code, fork, free distribution, derived works, dual-licensing, non-discrimination).

Pre-Assessment Questions

1. Some FTP sites allow guests who do not have user-specific accounts to access the site. What are these sites called?

2. What TCP/IP diagnostic tool should you use to determine whether a connection exists between your computer and the computer at an IP address to which you want to connect?

3. What service provides companies the ability to subscribe customers to receive promotions and advertising via e-mail?
 - a. Spam servers
 - b. List servers
 - c. Exchange servers
 - d. Mass mailings

Internet Resource Tools

Internet resources can be used for a variety of purposes beyond the World Wide Web and e-mail. Many companies use mass e-mail and texting services for marketing and emergency broadcasts, and File Transfer Protocol (FTP) to transmit larger files. Other tools, such as Virtual Network Computing (VNC) and Microsoft Terminal Services, are used by IT support desk personnel to access and fix computers in remote locations.

Peer-to-peer (P2P) networking maximizes the processing power of client computers, and TCP/IP diagnostic tools help you troubleshoot and solve problems. You can use these tools to complete tasks more efficiently.

You will learn about these business tools in this lesson. You will also learn about proprietary software, open-source development, and the patent and licensing practices that accompany software programs and tools.



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Lesson 9: Internet services and Tools

OBJECTIVE

1.7.9: Mass e-mail and texting services

Mass E-Mail and Texting Services

Two popular mass-marketing technologies used to push advertisements, promotions and emergency broadcasts to customers are mass e-mail and mass texting services. You are probably quite familiar with them, whether you know it or not.

- **Opt-in e-mail marketing** — Opt-in e-mail marketing is used every day by companies and individuals alike. Often when you register at a business's Web site, such as Target.com, for example, you are asked if you would like to receive e-mails regarding special promotions or other types of updates. If you select "Yes," you have opted in and are added to an e-mail list server (list servers are discussed in the following section). Whenever Target has a promotion or a weekly advertisement they want to distribute, the e-mail server sends the promotional e-mail to everyone on the list. There can be hundreds or thousands of recipients.
- **Opt-in mass texting services** — Opt-in texting services are similar, but are used most often on mobile devices. The service is technically a Short Message Service (SMS) used by phone carriers, not an Internet service, but it serves the same purpose as mass e-mail. If a user visits the Target Web site and sets up an account on his or her smartphone, Target will ask for the user's mobile phone number in order to receive the promotional text messages. The user's phone number is added to the texting service, and promotions can be sent directly to his or her phone.

Both e-mail and texting mass-marketing technologies have a multitude of uses beyond marketing. List servers are used by schools to send e-mail messages to parents with school updates and emergency messages. Mass e-mail services include the LISTSERV e-mail list software and LISTSERV Maestro e-mail marketing software (www.lsoft.com).

Mass texting services are also used by schools to send emergency messages. For example, after the shootings on the Virginia Tech campus in 2007, the university realized that e-mail messages regarding the emergency were not reaching the students. The students were using text messaging more than e-mail because they always had their mobile phones with them. In response, the university (and nearly every other university) began

using mass texting services for emergency situations. Mass texting services include AlertFirst ([http:// alertfirst.com](http://alertfirst.com)) and Club Texting (www.clubtexting.com).

OBJECTIVE

1.7.10: E-mail
listserve groups

list server

A server that collects and distributes information from an authorized group of participants, called a listserve group.

listserve group

Users who subscribe to an e-mailing list through a list server.

List Servers

A **list server** is a server that automates the collection and distribution of messages from an authorized group of participants, allowing collaboration among multiple users. A list server differs from a mail server, which handles incoming and outgoing e-mail for Internet users.

A group of users that subscribes to a mailing list is called a **listserve group**. Participants can send an e-mail to the list server to join a specific group, or be added upon registering for a service. Once subscribed, they are placed on a mailing list of users authorized to receive messages from the list server. When a traditional list server receives a message from a listserve group participant, it stores the message, then distributes it to the mailing list.

There are variations of list servers. As mentioned, traditional list servers allow participants to reply to messages that are broadcast to the entire listserve group. In business applications, it is usually a one-way transmission; users cannot respond to the advertisement or promotion. Mass text services usually work in the same one-way manner.

How traditional list servers work

A user who wants to join a listserve group simply sends an e-mail message to the list server. This request is often a blank e-mail message with a simple request in the Subject field. A request can be worded as follows:

subscribe ciw

Some list servers request that the same command also be placed in the body of the e-mail message. If the list server is configured to allow a particular user to join, the list server then sends a confirmation e-mail to the subscriber. Occasionally, users will attempt to subscribe other people to listserve groups. To prevent this practice, list servers often require the user to confirm the subscription before he or she is added to the mailing list.

List servers forward e-mail messages that are addressed to their mailing lists to the list's respective listserve group. List servers typically forward e-mails, announcements, newsletters or advertising to group members on a regular schedule or as events occur.

Three of the most popular list servers are:

- **LISTSERV** (www.lsoft.com), which is a product of L-Soft.
- **Majordomo** (www.greatcircle.com/majordomo), which is hosted by Great Circle Associates and is freeware.
- **Lyris** (www.lyris.com).

In the following lab, you will explore **LISTSERV**. Suppose you are the marketing director for a company. You want to distribute timely information to customers about your company's products. You purchase **LISTSERV** to create your own mailing list server so that you can distribute messages to all subscribers on your list (your customers) quickly and efficiently.

NOTE:

Listserve groups also allow users to unsubscribe from the groups. Sometimes this requires sending an e-mail message with the word Unsubscribe in the Subject field. It may also involve visiting a Web site and submitting your e-mail address in an Unsubscribe form.



Lab 9-1: Exploring LISTSERV

In this lab, you will access the LISTSERV Web page and explore various links to obtain information about LISTSERV.

1. Open your **browser** and go to **www.lsoft.com** to display the L-Soft home page (Figure 9-1).



Figure 9-1: L-Soft home page

2. Display the **Software** menu, then click the **LISTSERV** link to display the LISTSERV page. This product is the traditional LISTSERV software.
3. Click **See LISTSERV demo** to display a demonstration of how the LISTSERV product works. When complete, exit the demo.
4. Display the **Software** menu, then click the **LISTSERV Maestro** link. This software is the mass e-mail marketing product.
5. Click **See LISTSERV Maestro Demo** to display a demonstration of how the product works. When complete, exit the demo.
6. As a class, discuss the following scenarios and answer the questions.
 - Provide a business scenario in which traditional LISTSERV software would be beneficial. Could it be used for internal company communications or development work? Provide specific ideas.
 - Provide a business scenario in which the LISTSERV Maestro e-mail marketing product would be beneficial.
 - Why are list servers considered opt-in products? How does an opt-in service differ from spam? Could list servers be used to distribute spam?
7. Close your **browser**.

OBJECTIVE
1.7.1: FTP services

1.5.9: Browser software

File Transfer Protocol (FTP)

File Transfer Protocol (FTP) is a TCP/IP suite protocol that allows the transfer of files between two computers, or one server and one computer. FTP is a convenient way to transfer files and can be a good alternative to sending an e-mail attachment. For example, if you need to send a file to a remote co-worker and the file is too large to send via e-mail, you can upload the file to your company FTP server, and then your co-worker can download the file from the FTP server. Many corporate e-mail servers (and even firewalls) prevent the sending and receiving of executable files as e-mail attachments. However, you can upload and download such files using an FTP server.



If you download executable files via FTP or any other file transfer method, be sure that you scan the files with a virus scanner before using them. Users who download executable files from the Internet often find that these files are not what they purport to be.



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Lesson 9: Conducting an FTP session

FTP and authentication

An FTP server can require user-based authentication, meaning that in order for the FTP server to allow uploading and downloading, it requires the user to provide a user name and a password. All FTP clients provide a place for you to enter authentication information. Even Web browsers allow authentication. Web browsers allow you to authenticate via FTP (or HTTP) using the following syntax:

```
ftp://username:password@servername
```

So, if you wanted to log on as *ciwuser* with the password *ciwcertified* to a server named *ftp.ciwcertified.com*, you would issue the following command:

```
ftp://ciwuser:ciwcertified@ftp.ciwcertified.com
```

If you wanted to log on to a Web server on that same server that has enabled password protection, you would simply change the protocol in the preceding URL from *ftp://* to *http://*.

However, remember that standard FTP does not encrypt the authentication session. Malicious users will often attempt to obtain authentication information during FTP-based authentication sessions, so reconsider using sensitive information for FTP authentication.

As a result, some FTP site administrators allow guests to transfer files without requiring the system administrator to create a specific account for the user on the remote site. These sites are called anonymous FTP sites and are available to the public. Many major universities have reliable anonymous FTP servers on the Internet. However, these sites usually do not allow uploading of files. They only allow files to be downloaded, and only if downloading such files does not violate national and international laws.



FTP does not encrypt data transfer. If you are transferring sensitive data, consider a secure alternative to FTP, such as SSH (for example, S/FTP) or SSL/TLS-encrypted FTP (FTPS).

For logging on to public FTP sites, a user name of *anonymous*, *ftp* or *guest* is often used to gain immediate access to the FTP server. In most cases, the password is your e-mail address. The FTP client usually sends the user name and password automatically. Most private FTP sites require users to provide a specific user name and password that have been assigned by an FTP server administrator.



FTP clients cannot change their own passwords. If a password must be changed, the user must contact the FTP administrator, who can change it.

Navigating an FTP server

Navigating an FTP server is similar to navigating the directory structure of a hard drive. You start at the top of the hierarchy by selecting a directory name that is close to the general topic in which you are interested. You then continue to select directory names that are more specific to the subject you are seeking, until you find the file you want. This navigation process may take you many levels into an FTP server's hard drive. Most FTP servers are structured similarly. When you become familiar with FTP servers, navigating their contents becomes easy.

FTP server contents

binary file

A file containing data or instructions written in zeros and ones (computer language).

FTP servers contain documents of various sizes and types. Two common types of resources available on Internet FTP servers include large text files and **binary files**. The large text files are usually application source files. Programmers use these files to customize and compile programs. Binary files are executable files, small software applications, images that require an association to open, or compressed files that require decompression. End users will probably download only binary files.

FTP servers often contain popular shareware and open-source freeware. Shareware is inexpensive; you download it, and if you like it you send the vendor a payment. Freeware is free; it may be a beta version (in the process of being tested) or distributed by an unknown source, but there is no charge for it. Major software companies, such as Microsoft and Mozilla, often distribute free program samples to help you get started, and more complete versions are available for a fee. Plug-ins (software to extend browser capabilities) and helper applications (which your browser opens to play or view multimedia files) are usually free, as well.

NOTE:

To save time, you will upload and download very small files in the FTP labs in this lesson.

Large text documents, binary files and/or shareware can take a long time to download and read, depending on your connection speed. To accelerate this process, several compression utilities are available to reduce file size for the purpose of transmission. The files are then placed on FTP servers in a compressed format. Thus, after you download the compressed files, you must decompress them. Decompression restores the files to their original, readable states. Table 9-1 lists the file types commonly found on FTP servers.

Table 9-1: Popular file types found on FTP servers

File Name Extension	File Type
.txt	A basic text file; can be read by any word processor or text editor.
.zip	A WinZip or PKZIP compressed file; a popular form of compressed file for the personal computer (PC).
.exe	An executable file; typically, a self-extracting compressed file, sometimes found as an executable software program.
.asc	An ASCII text file. ASCII is a universally accepted standard text format for all computers.

Table 9-1: Popular file types found on FTP servers (cont'd)

File Name Extension	File Type
.tar	A UNIX tape archive (tar) file; a form of compression used by UNIX operating systems.
.sea	An OS X Stuffit self-extracting compressed file.
.sit	An OS X Stuffit compressed file.
.rar	A platform-neutral compression standard, used by applications such as RAR (for UNIX) and WinRAR (for Windows).

You will manage downloaded files, decompress files and specify MIME types in labs later in this lesson.

Installing an FTP client

Most modern operating systems and Web browsers feature built-in FTP clients. You can also install an FTP client that suits your preferences. FireFTP is a Firefox add-on that is a free user-friendly FTP client.

In the following lab, you will install the FireFTP add-on. Suppose your company's publishing department needs to upload files to a printing company's FTP site. The department manager has requested that a particular user-friendly FTP client be installed on all systems.



Lab 9-2: Installing the FireFTP Firefox add-on as your FTP client

In this lab, you will install the FireFTP add-on.

Note: You will use the FireFTP add-on in labs later in this lesson.

1. Start **Firefox**, go to <https://addons.mozilla.org/en-US/firefox/>, type **FireFTP** in the Search For Add-Ons text box, then press **ENTER**.
2. In the FireFTP section, click the **Add To Firefox** button, then click **Install Now**. When prompted to do so, click the **Restart Now** button to complete the installation.
3. When Firefox restarts, return to your browser's **home page** and close any additional tabs.
4. Minimize the **Firefox** window.

Downloading files using FTP

To download files, the FTP client program uses the *get* command. For instance, after a user logs on to an FTP server, he or she enters the command *get filename.ext*, depending on the name and extension of the file to be downloaded. However, with most user-friendly FTP client programs, the *get* command is initiated when the user clicks on the file he or she wants to download. The client automatically uses the *get* command (invisible to the user) to download the file. The user must then identify the location to which the file should be downloaded. In the following labs, you will use various implementations of FTP.

Using command-line FTP

On Windows systems, you can use the MS-DOS prompt to access a command-line FTP client to upload files. You need to use the *open* command to access an FTP server, and you must use the *get* command to copy a file to your computer. You should also be familiar with DOS commands for navigation and file management.

Files are downloaded into the directory from which you enter the FTP commands. When you access the MS-DOS prompt, the DOS window opens in the Windows directory. To download files into a specific folder other than the Windows directory, create or navigate to the directory, then start the FTP session.

OBJECTIVE

1.7.1: FTP services

1.7.2: FTP-based vs. HTTP-based retrieval

1.5.9: Browser software

In the following lab, you will download files using command-line FTP. Suppose your company's human resources director, who rarely needs to download files, has been instructed to download archived personnel records from the corporate headquarters FTP site. Using command-line FTP, you can quickly download the files for him without having to install any additional software on his system.



Lab 9-3: Downloading files using command-line FTP

In this lab, you will create a directory on your hard drive to receive FTP downloads. You will then use FTP from the command line to download a file from the FTP server into the directory you create.

NOTE:

At Step 2, note that the `cd\` (change directory) command navigates to the specified directory name. In this case, the backslash (\) indicates the root directory of the hard drive.

At Step 3, note that the `md` (make directory) command creates a directory.

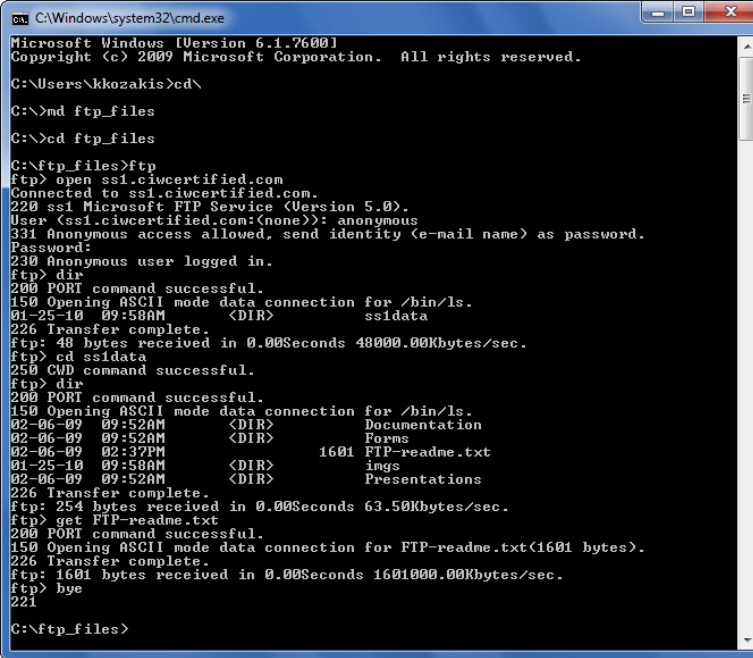
NOTE:

At Step 7, you must log on manually as an anonymous user when using command-line FTP.

1. First, you will access the command prompt and create a directory on the root directory of your hard drive for your FTP files. Click **Start**, type **cmd** in the Search Programs And Files text box, and then press **ENTER** to open a command prompt window.
2. Type **cd**, and then press **ENTER** to move to the root directory of the hard drive.
3. Type **md ftp_files**, and then press **ENTER** to make a directory called *ftp_files*.
4. Type **cd ftp_files**, and then press **ENTER** to access the new directory.
5. Next, you will begin the FTP session, display the server's contents and download a file. Type **ftp**, then press **ENTER**.
6. Type **open ssl.ciwcertified.com**, then press **ENTER**.
7. Type **anonymous**, and then press **ENTER**.
8. At the Password prompt, press **ENTER**.
9. Type **dir**, and then press **ENTER** to see a listing of directories on the server. Notice that one directory appears, *ssl1data*.

*Note: If you receive a Windows security alert informing you that Windows Firewall has blocked some features of this program, click the **Unblock** button.*
10. Type **cd ssl1data** and then press **ENTER**. Type **dir** and then press **ENTER** to display four directories and a file, *FTP-readme.txt*.
11. Type **get FTP-readme.txt** and then press **ENTER** to copy the file *FTP-readme.txt* from the FTP server to the current directory (*ftp_files*) on your hard drive.

12. Next, you will close the FTP session and close the command prompt window. Type **bye** and then press **ENTER** to close the FTP session. Your screen should resemble Figure 9-2.



```

C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\kkozakis>cd\
C:\>md ftp_files
C:\>cd ftp_files
C:\ftp_files>ftp
ftp> open ss1.ciwcertified.com
Connected to ss1.ciwcertified.com.
220 ss1 Microsoft FTP Service (Version 5.0).
User (ss1.ciwcertified.com:(none)): anonymous
331 Anonymous access allowed, send identity (e-mail name) as password.
Password:
230 Anonymous user logged in.
ftp> dir
200 PORT command successful.
150 Opening ASCII mode data connection for /bin/ls.
01-25-10 09:58AM <DIR>          ssldata
226 Transfer complete.
ftp> 48 bytes received in 0.00Seconds 48000.00Kbytes/sec.
ftp> cd ssldata
250 CWD command successful.
ftp> dir
200 PORT command successful.
150 Opening ASCII mode data connection for /bin/ls.
02-06-09 09:52AM <DIR>          Documentation
02-06-09 09:52AM <DIR>          Forms
02-06-09 02:37PM <DIR>          1601 FTP-readme.txt
01-25-10 09:50AM <DIR>          ings
02-06-09 09:52AM <DIR>          Presentations
226 Transfer complete.
ftp> 254 bytes received in 0.00Seconds 63.50Kbytes/sec.
ftp> get FTP-readme.txt
200 PORT command successful.
150 Opening ASCII mode data connection for FTP-readme.txt(1601 bytes).
226 Transfer complete.
ftp> 1601 bytes received in 0.00Seconds 1601000.00Kbytes/sec.
ftp> bye
221
C:\ftp_files>

```

Figure 9-2: Using command-line FTP

13. Type **exit** and press **ENTER** to close the command prompt window.

What is your opinion of command-line FTP? Was it easy or difficult to use? Would you like to use it for all of your FTP activities?

OBJECTIVE
1.7.2: FTP-based vs.
HTTP-based retrieval

Using a Web browser's built-in FTP client

Although FTP sites do not usually look like Web pages, accessing them and copying content from them is very similar to saving Web site content with your browser. Generally, you right-click the file you want to copy, select the Copy command, and then specify a destination location on your hard drive.

OBJECTIVE
1.7.1: FTP services

In the following lab, you will use the Mozilla Firefox built-in FTP client. Suppose the accounting manager at your company needs to download a file from the company FTP site. However, he does not have time to learn to use an FTP client. You can demonstrate to him how to use his Web browser to download the file without having to learn any FTP commands.

NOTE:
See **Optional Lab 9-1: Downloading files using the Internet Explorer FTP client.**



Lab 9-4: Downloading files using the Firefox FTP client

In this lab, you will use the Mozilla Firefox FTP client to download files.

1. Restore the **Firefox** window.
2. In the Location Bar, type **ftp://ss1.ciwcertified.com** and press **ENTER** to display the contents of the ss1 FTP site. Click the **ss1data** link. You should see four folders and a file, **FTP-readme.txt**, as shown in Figure 9-3.

NOTE:
At Step 2, note that when you use a Web browser's FTP client, an anonymous logon takes place automatically.

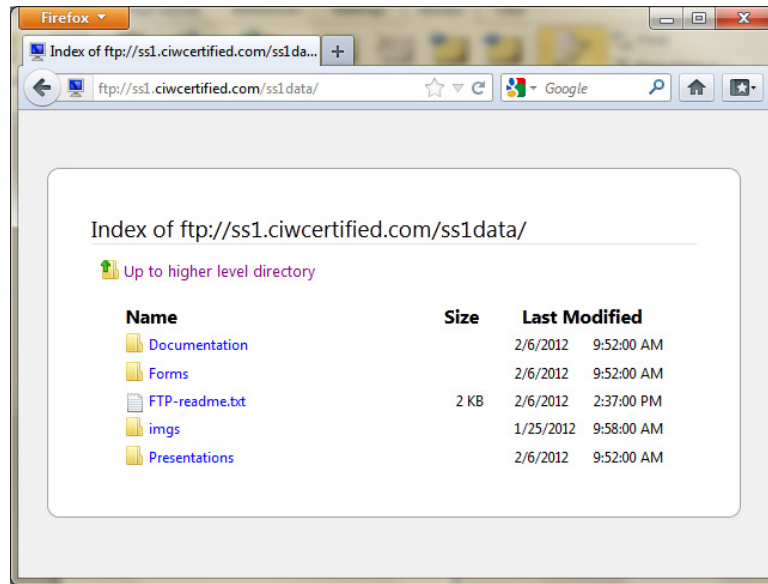


Figure 9-3: Using Mozilla Firefox FTP client

3. Click the **Documentation** link, then click **Command Prompt FTP.txt** to display the contents of the file in your browser window.
4. Click your browser's **Go Back One Page** button.
5. Right-click **Command Prompt FTP.txt** and then click **Save Link As** to display the Enter Name Of File To Save To dialog box.
6. Navigate to the **C:\ftp_files** folder, and then click the **Save** button to copy the selected file to your hard drive.
7. Close the **Downloads** window.
8. Click the **Up To Higher Level Directory** link to return to the index level of the ss1data folder on the ss1 FTP site.
9. Minimize the **Firefox** window.

How does Web browser FTP compare with command-line FTP? Was it easier to see what was available? Did you prefer it to command-line FTP?

OBJECTIVE

1.7.1: FTP services

1.7.2: FTP-based vs. HTTP-based retrieval

In the following lab, you will use Firefox's FireFTP add-on as your FTP client. Suppose your company's marketing department has asked you to recommend a user-friendly FTP client that its team members can use to download files from a customer's FTP site. You can demonstrate the free FireFTP add-on to the department personnel so that they can evaluate it.

**Lab 9-5: Downloading files using FireFTP**

In this lab, you will use Firefox's FireFTP add-on to download files from the ss1 FTP server.

1. Restore the **Firefox** window.

2. Select **Firefox | Web Developer | FireFTP** to open the FireFTP window, as shown in Figure 9-4. Notice that the window is divided into several panes. You use the left pane to select a directory on your local system. You use the right pane (currently empty) to navigate the FTP server.

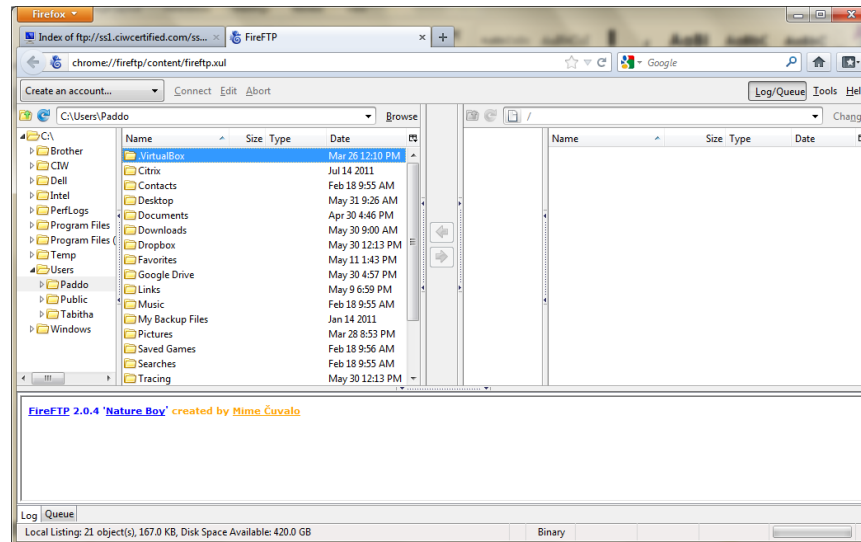


Figure 9-4: FireFTP window

3. You must create an account before you can connect to an FTP server. Click the **Create An Account** button to display the Account Manager dialog box.
4. In the Host text box, type **ss1.ciwcertified.com**, select the **Anonymous** check box, then click **OK** to save the account information.
5. Click the **Connect** button to access the FTP site and display its contents in the right pane. Notice that you are automatically logged on as an anonymous user. Click **ss1data** to display the contents of the ss1data folder. Your screen should resemble Figure 9-5.

NOTE:

At Step 4, note that the FTP protocol is assumed. Also, by selecting Anonymous, you are specifying to allow anonymous logins.

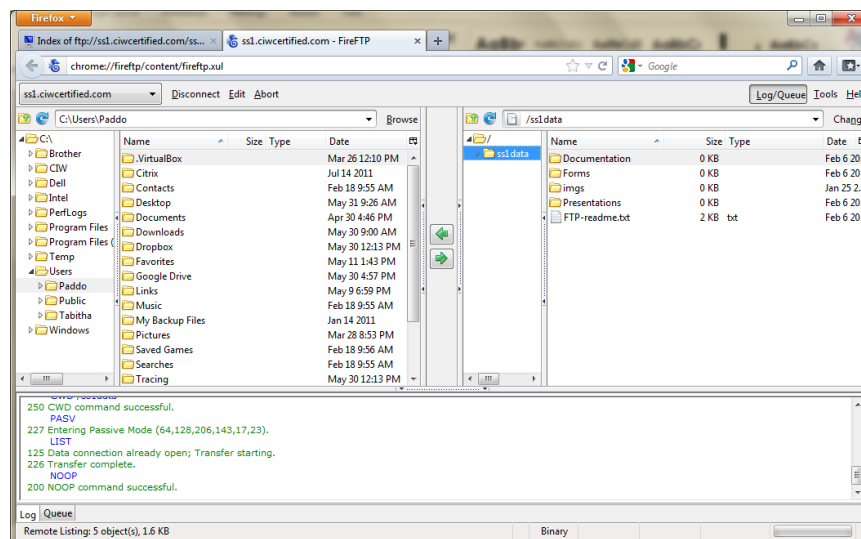


Figure 9-5: Using FireFTP to access FTP server

NOTE:

Authentication (whether as an anonymous user or as a user with a user name and password) does not guarantee specific permissions or access. The administrator controls what you can see, and whether you can copy, write or delete files.

6. In the left pane, navigate to the **C:\ftp_files** folder to specify the location to which downloaded files will be copied.
7. In the right pane, double-click the **Presentations** folder to access the folder contents, and then right-click **Colossus.txt** to display the shortcut menu.
8. Notice that you have several options, including downloading the file. Some of the other options may or may not be available depending on the permissions you have to the FTP folder. Offering read-only permissions to anonymous users is standard; however, the system administrator decides which permissions to allow.
9. In the shortcut menu, click **Download** to download the file to the C:\ftp_files folder on your hard drive.
10. Right-click **An Interesting File.wow**, and then click **Download** to download the file to the C:\ftp_files folder. Notice that this file has a unique file name extension. You will learn more about this file name extension later in this lesson.
11. Click the **Disconnect** button to disconnect from the FTP server.
12. Minimize the **Firefox** window.

What is your opinion of this FTP client? Did you find the interface intuitive and easy to use? How does it compare to using a Web browser's FTP client?

Uploading files using FTP

Uploading to an FTP site requires an FTP client program, which can be embedded within other applications, such as a Web browser or Web publishing program. It also requires permission, which is usually provided by the FTP server administrator. If an FTP server allowed anonymous users to upload files, the server would be unmanageable and would quickly be depleted of hard drive space.

To upload files, an FTP client uses the *put* command. For instance, after a user logs on to an FTP server, he or she enters the command *put filename.ext*, depending on the name and extension of the file to be uploaded. Similar to downloading FTP files, most user-friendly FTP client programs initiate the *put* command when the user clicks the Upload button or chooses Upload from a menu and then identifies the file to upload. The client automatically uses the *put* command (invisible to the user) to upload the file.



CIW Online Resources – Online Exercise

Visit CIW Online at <http://education.Certification-Partners.com/CIW> to complete an interactive exercise that will reinforce what you have learned about this topic.

Exercise 9-1: Command-line FTP

OBJECTIVE

1.7.1: FTP services

In the following lab, you will use FireFTP to upload files to an FTP server set up on your instructor's computer. Suppose that your company's publishing department has asked you to demonstrate how to use FireFTP to upload files to a printing company's FTP site.



Lab 9-6: Uploading files to an FTP site using FireFTP

In this lab, you will use FireFTP to log on to an FTP site on your instructor's computer using a password, and upload files to that site. In this lab, you have full permissions to the FTP folder. However, in most cases, permissions to an FTP folder are tightly controlled.

Note: If you are not performing this lab in a classroom environment, you will not be able to complete all the steps in this lab unless you have a friend or family member who can play the part of the "instructor" with whom you can perform the lab steps concurrently. If you do not have a friend or family member with whom you can perform the lab steps concurrently, follow the instructions that appear in italic text prefaced by the words "Self-study."

Self-study: In order to complete this lab, you will need access to an FTP site and you must have the write permissions necessary to upload files to that site. If you do not have access to an FTP site to which you can upload files, you may still want to review the steps in this lab to see how to perform this task. Otherwise, skip this lab and proceed to the next section.

Self-study: The following steps are written for FireFTP and assume that you have completed the previous lab and are continuing from that point. If you use a different FTP client, the steps to upload a file to an FTP site may differ from those listed here.

1. Restore the **Firefox** window.
2. You must create an account using the name of your instructor's computer. Your instructor will provide this information.

Self-study: You must create an account using the name of the computer on which the FTP site is hosted. You can acquire this information from the host computer's administrator.

Click the **ss1.ciwcertified.com** drop-down arrow, then click **Create An Account** to display the Account Manager dialog box.

3. In the Host text box, type the name of your instructor's computer.

Self-study: In the Host text box, type the name of the FTP site's host computer.

Press **TAB** and type **ciwuser** to specify the login name. Press **TAB** and type **ciwcertified** to specify the password, then click **OK** to save the account information.

4. Click the **Connect** button to access the FTP site on your instructor's computer.

*Self-study: Click the **Connect** button to access the FTP site.*

5. In the left pane, navigate to your **C:\ftp_files** folder, right-click **FTP-readme.txt**, then click **Upload** to transfer the file to your instructor's computer.

*Note: Because your classmates will be uploading the same file to the same FTP location, a Confirm Overwrite dialog box will appear prompting you to overwrite the existing file. Click the **Overwrite** button to overwrite the file.*

*Self-study: In the left pane, navigate to your **C:\ftp_files** folder, right-click **FTP-readme.txt**, then click **Upload** to transfer the file to the FTP site.*

6. Click the **Disconnect** button to disconnect from the server, and then close **Firefox**.

Self-study: You can perform Steps 7 through 12 only if you have a friend or family member who is playing the part of the "instructor" with whom you are performing the lab steps concurrently. Otherwise, you will be unable to complete Steps 7 through 12. Proceed to the next section.

7. Turn your attention to your instructor's monitor. What do you think happens when FTP site administrators allow anonymous users to upload files or delete files? It is up to the site administrator to assign permissions to users. An anonymous user may have permissions to read, write, append and copy files and folders, as well as delete files and folders.
8. Your instructor will now demonstrate how to restrict permissions on an anonymous account. As a class, choose permissions for anonymous users. Your instructor will assign the chosen permissions.
9. After your instructor has changed the permissions for anonymous users, restart **Firefox**. Select **Firefox | Web Developer | FireFTP**, select your instructor's account from the drop-down list, then click the **Edit** button. This step displays the Account Manager dialog box.
10. Ensure that the name of your instructor's computer appears in the Host text box. Delete the entries in the Login and Password fields, select the **Anonymous** check box, then click **OK** to log on as an anonymous user.
11. Click the **Connect** button to access the FTP site on your instructor's computer, then attempt to upload files. Do you have the same access as you did when you logged on with a user name and password?
12. Disconnect from the server, then close **Firefox**.

OBJECTIVE
1.7.1: FTP services

Secure Copy (SCP), SSH FTP (S/FTP) and SSL/TLS-enabled FTP (FTPS)

As you have learned, FTP is used for transferring files from one computer to another. However, because security is a growing concern for all aspects of computing, including FTP, many companies and public entities are implementing secure forms of file transfer.

Secure Copy (SCP)

A program used with Secure Shell (SSH) to transfer files between systems.

SSH File Transfer Protocol (S/FTP)

A file transfer protocol that allows the encryption of transmissions using the Secure Shell (SSH) protocol.

SSL/TLS-enabled FTP (FTPS)

FTP that runs on an SSL/TLS-secured connection.

Secure Copy (SCP) is a program used to securely transfer files between systems. SCP is used primarily on UNIX/Linux systems (command-line interface), although versions are available for Windows (graphical user interface). SCP uses an SSH-secured connection, and it is quickly becoming a replacement for FTP. All SCP transmissions use 128-bit encryption, and SCP allows quick transfer of large files. SCP adds file transfer capability to SSH, and each file transfer constitutes a discrete session.

SSH File Transfer Protocol (S/FTP) is a secure version of FTP, performing file transfer operations over a connection secured by SSH. S/FTP is very similar to SCP, although it allows longer sessions. That is, you can perform several file transfers in one session.

SSL/TLS-enabled FTP (FTPS) is FTP that runs on an SSL/TLS-secured connection. FTPS differs from SCP and S/FTP in that it relies on SSL/TLS for encryption, whereas SCP and S/FTP rely on SSH for encryption.

SCP, S/FTP and FTPS all offer secure methods of transferring files, and all three are encrypted by default. That is, all user name and password information transfers are encrypted as they are sent across the Internet.

Figure 9-6 shows WinSCP (a Windows-based SCP program). Notice the similarities to a regular FTP client. However, remember that SCP is most often used as a command-line client.

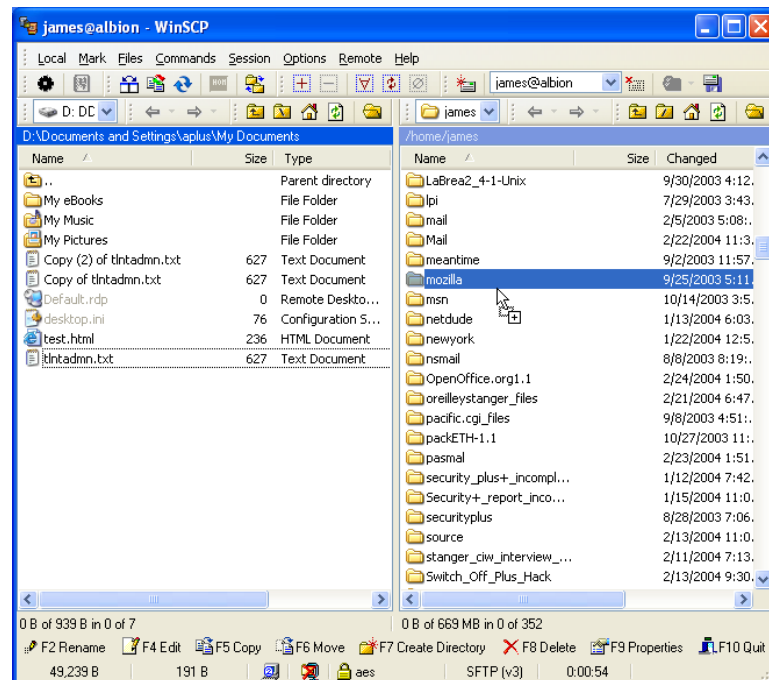


Figure 9-6: WinSCP client

Managing Downloaded Files

As you already know, waiting for large files to download or upload can be tedious. Most files that you download arrive in a compressed format and are decompressed (usually automatically) after they are copied to your system. You may also download files that your system does not know how to open. The following sections will examine compression utilities, and you will learn to define MIME types for unknown files.

OBJECTIVE

1.13.1: MIME file types

NOTE:

If you are unable to download this file from the FTP server, you can copy it from the C:\CIW\Internet\Lab Files\Lesson09 folder to your ftp_files folder.

Defining MIME types

Occasionally, you may encounter files that your system does not know how to open. For example, in an earlier lab in this lesson, you downloaded a file named *An Interesting File.wow*. This file is a plaintext file, but the file name extension has been changed from *.txt* to *.wow*. The *.wow* file name extension is not one that will be recognized by your system, and when you attempt to open this file in the following lab, Windows will display the dialog box shown in Figure 9-7.

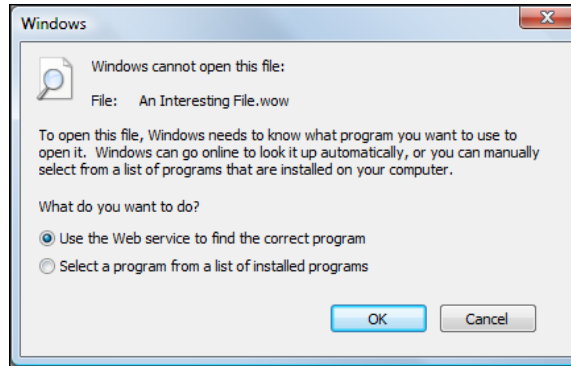


Figure 9-7: File with undefined MIME type

NOTE:

Visit the IANA Web site (www.iana.org). Navigate the site to examine the defined MIME types.

Windows does not know how to open the file because it does not recognize the file name extension or the file's MIME type. As you learned in a previous lesson, MIME types are used to identify a document type and the application required to open it.

**Tech Tip**

MIME types are standardized and are created by the Internet Assigned Numbers Authority (IANA). Visit www.iana.org/assignments/media-types/ to view a list of the defined types.

You can specify to use a Web service to find the appropriate program or select a program that already exists on your system to open the file. Once you select a program with which to open the file, you can specify to open the current file only, or to always use the selected program to open this type of file.

In the following lab, you will define a MIME type for a file. Suppose a co-worker has asked for your help because she downloaded a file from the corporate FTP site that she cannot open. You can add a MIME type definition to her system and enable her to open files of this type in the future without problems.



Lab 9-7: Defining MIME types

OBJECTIVE
1.13.1: MIME file types

In this lab, you will examine a MIME type definition and then define a MIME type for a file that you downloaded in a previous lab.

1. Select **Start | Control Panel | Programs | Default Programs**. Click the **Associate A File Type Or Protocol With A Program** link to open the Set Associations window, which displays the file types currently defined in your system.
2. Scroll down the list box and click **.txt**. Notice that text documents are opened with Notepad by default, as shown in Figure 9-8. Close the **Set Associations** window.

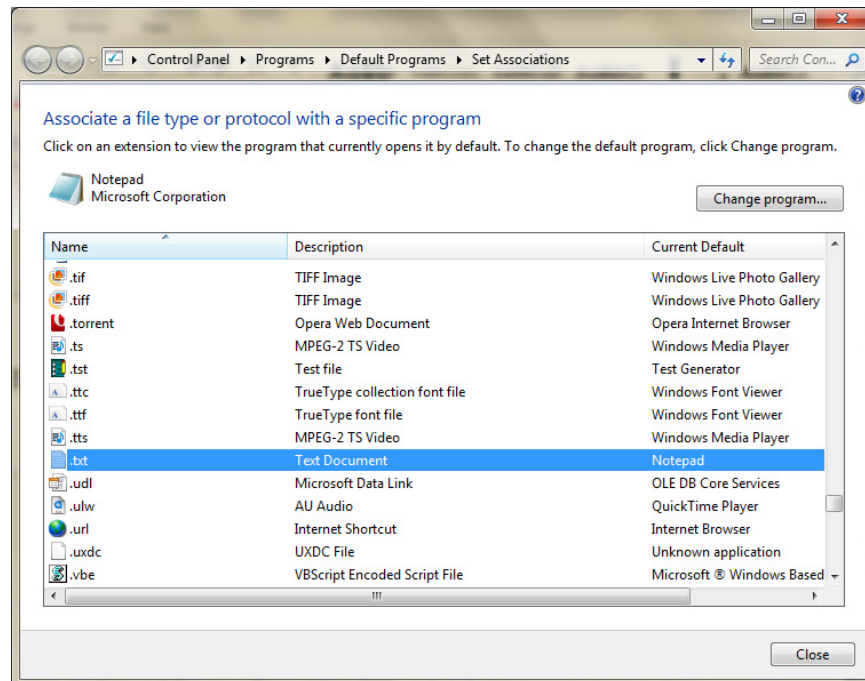


Figure 9-8: Set Associations window

3. Open **Windows Explorer**, navigate to the **C:\ftp_files** folder, and then double-click **An Interesting File.wow**. This step displays a message box informing you that Windows does not know how to open the file.
4. Click the **Select A Program From A List Of Installed Programs** radio button, then click **OK**. The Open With dialog box will display, and from there you can select the program you want to use to open the file.
5. Click **Notepad**, then click **OK**. This step specifies that all programs with the file name extension **.wow** will now be opened into Notepad by default. Notice that *An Interesting File.wow* now displays with a Notepad icon.
6. Double-click **An Interesting File.wow**. This step opens the file in Notepad because you have modified your system's MIME settings.
7. Close the **Notepad** window.

8. Select **Start | Control Panel | Programs | Default Programs**. Click the **Associate A File Type Or Protocol With A Program** link to open the Set Associations window.
9. Scroll down the list box and click **.wow**. Notice that documents of this type are now set to be opened with Notepad by default. Close the **Set Associations** window.

NOTE:

Remember that you can find MIME types listed at www.iana.org/assignments/media-types/. Notice that MIME types are now called media types by IANA.

OBJECTIVE

1.6.2: MIME, S/MIME and PGP/GPG

OBJECTIVE

1.13.2: Compression utilities

The MIME type definitions set in Windows are used by all applications running on the system.

In most cases, installing the latest version of a browser, or installing any available upgrades, will eliminate the need to define a MIME type for files that you download from Web sites.

You learned in a previous lesson that S/MIME provides a secure method of sending e-mail. Whereas MIME controls how messages and attachments are organized and distinguished from one another, S/MIME controls how encryption information and digital certificates can be included as part of an e-mail message.

Compression utilities

To reduce transfer time, most files you download from the Internet arrive in a compressed (or "zipped") format, and the compressed files must be decompressed on your system. Windows Vista contains a built-in utility that decompresses zipped files.

Most compression utilities (such as WinZip, BitZipper, PKZIP, bzip2, gzip and RAR/WinRAR) allow you to create archives. An archive is a file that contains several files that have been compressed and bundled together. Archive files simplify the process of distributing all the files that are necessary for a particular application. When compressed files are extracted from an archive file, you have two files: the compressed file and the folder with the extracted files.

Generally, you should compress files that you want to send as e-mail attachments to reduce transfer time and to conserve space on your recipient's hard drive. On your own system, you can compress files that you use infrequently in order to save space.

Table 9-2 describes several popular compression applications.

Table 9-2: Compression applications and common file name extensions

Application	File Name Extension (MIME)	Comments
Zip/unzip	.zip	Includes the PKZIP and WinZip applications, as well as all variants. You can obtain free command-line versions of zip at http://sourceforge.net/projects/gnuwin32 .
Bzip2/bunzip2	.bz2	You can obtain free command-line versions of bzip2/bunzip2 at http://sourceforge.net/projects/gnuwin32 .
Bzip/bunzip	.bz	You can obtain free command-line versions of bzip/bunzip at http://sourceforge.net/projects/gnuwin32 .
Gzip/gunzip	.gz	Often, archives of files and directories are created using the tar application, then compressed using gzip. If this is the case, the file will often have a .tgz or .tar.gz file name extension.

Table 9-2: Compression applications and common file name extensions (cont'd)

Application	File Name Extension (MIME)	Comments
Compress/ uncompress	.Z	Often, archives of files and directories are created using the tar application, then compressed using uncompress. If this is the case, the file will often have a .tar.Z or .tZ file name extension.
RAR/WinRAR	.rar	You can obtain versions of RAR/WinRAR at www.rarlab.com .

Compressing files, especially word processor files, can save a considerable amount of hard disk space. However, some formats (such as PNG, GIF and JPG) are already compressed. Compressing these files does not significantly reduce file size.

Bzip2 is a free compression utility that you can use to compress files and create archives. In the following lab, you will compress a file and then compare its size with the size of the decompressed file. Suppose your project manager has given you the task of compressing thousands of image files that are currently stored on the corporate server. You can improve system performance and enable bandwidth to be used more efficiently by downloading these files, compressing them, and replacing the uncompressed versions on the server with the compressed files.



Lab 9-8: Compressing and decompressing files using bzip2 and bunzip2

In this lab, you will use the bzip2 and bunzip2 applications to compress and decompress files.

1. First, you will copy the necessary files to your hard drive. Copy the contents of the **C:\CIW\Internet\Lab Files\Lesson09\bzip2** directory to your Desktop.
2. Copy the file **image.tif** from the **C:\CIW\Internet\Lab Files\Lesson09** directory to your Desktop, and then close any open windows.
3. On the Desktop, double-click **image.tif** to open it. Notice that you can view the image.
4. Close the **Windows Photo Viewer** window.
5. Right-click **image.tif**, then click **Properties**.
6. How large is this file? Write its uncompressed size in the space provided:

7. Close the **Properties** dialog box.
8. Next, you will compress the file image.tif. Click **Start**, type **cmd** in the Search Programs And Files text box, and then press **ENTER** to open a command prompt.
9. Type **cd desktop**, then press **ENTER** to navigate to the Desktop directory.
10. Type **bzip2 image.tif** and then press **ENTER**. This step compresses the file.

11. If necessary, drag the command prompt window out of the way so that you can view the Desktop.
12. Notice that the image file name has changed to *image.tif.bz2*. The file name has changed because it has been compressed using the *bzip2* application.
13. On the Desktop, right-click **image.tif.bz2**, then click **Properties**. Notice that the file size has changed significantly. Write the new file size in the space provided:

14. Close the **Properties** dialog box.
15. On the Desktop, double-click **image.tif.bz2**. Notice that Windows does not know how to open this file. You cannot view the image because the file has been compressed.
16. Close the message box.
17. Finally, you will decompress the file. At the command prompt, type **bunzip2 image.tif.bz2** and then press **ENTER**. This step decompresses the file.
18. Close the command prompt window, then double-click **image.tif**. Notice that you can view the image again.
19. Check the file size of the image. Notice that it has returned to its original size.
20. Close all open windows.

Sharing large files

It is common practice to send files to people via e-mail. However, some services do not accept attachments over a certain size (usually several megabytes). Large files may also take a long time to download when they reach the intended recipient, slowing down his or her e-mail and Internet interaction. To solve this problem, there are several services you can use to upload, share, download and manage large files over the Internet without the need to use FTP or P2P software.

Following is a list of common services you can use to send large files via e-mail:

- File Dropper (www.filedropper.com/)
- YouSendIt (www.yousendit.com/)
- Pando (<http://pando.com/>)
- ShareFile (www.sharefile.com)

Virtual Network Computing (VNC)

Virtual Network Computing (VNC) is a program that allows you to control a computer at a remote location as if you were sitting in front of it. VNC is similar to applications such as pcAnywhere by Symantec (www.symantec.com) and NetOp Remote Control by NetOp (www.netop.com).

OBJECTIVE
1.7.3: Remote assistance

Virtual Network Computing (VNC)
A program that allows you to control a computer at a remote location.

VNC consists of two components:

- **The server** — The server listens on a specific port (for example, TCP 5800 on Windows systems) and allows clients to connect. The server also allows authenticated users to log on and see the same display they would see if they were sitting in front of the (server) computer.
- **The viewer** —VNC provides a viewer that allows users to see the remote system's logon environment.

The server and the viewer do not need to be running the same operating system.

Uses for VNC

VNC can be used in a variety of ways. In an office, a system administrator can use VNC to diagnose and solve problems on an employee's computer, or access and administer servers without going to the server room. Newer versions of VNC promise a proprietary file transfer program that allows VNC the functionality of programs such as pcAnywhere and NetOp Remote Control.

Help desk personnel might also use VNC to troubleshoot computer problems for remote employees, or to install software on remote systems.

In the following lab, you will use VNC. Suppose you work in the IT department at your company, and the security manager has tasked you with updating the virus definition files on all corporate systems. You can use VNC to update the systems without leaving your desk.

NOTE:

Work with a partner for Labs 9-9 and 9-10. One system will be the server, and the other system will be the viewer for using the remote-control services.



Lab 9-9: Using the TightVNC remote administration application

In this lab, you will install and use TightVNC. TightVNC is a version of VNC that is available free of charge under the GNU General Public License (GPL), which you will learn about later in this lesson. A lab partner is required for this lab. One partner's system will function as the server (the computer that will be controlled), and the other will function as the client (the computer from which commands will be issued). Decide the role each of you will take.

1. **Both server and client computer:** Copy the file **tightvnc-1.3.9-setup.exe** from the **C:\CIW\Internet\Lab Files\Lesson09** folder to your Desktop, and install it using the default configuration.
2. **Server computer:** Select **Start | All Programs | TightVNC | Launch TightVNC Server**. This step displays the TightVNC Server Current User Properties dialog box, shown in Figure 9-9. You use this dialog box to specify settings for the server side of the VNC connection.

Note: You may need to right-click the **TightVNC Server** icon on the status bar and click **Properties** in order to open the TightVNC Server Current User Properties dialog box.

Note: If you see a Windows Security Alert dialog box informing you that Windows Firewall has blocked some features of this program, click the **Allow** button so you can accept incoming network connections.

NOTE:

Step 2 should be performed on the server computer only.

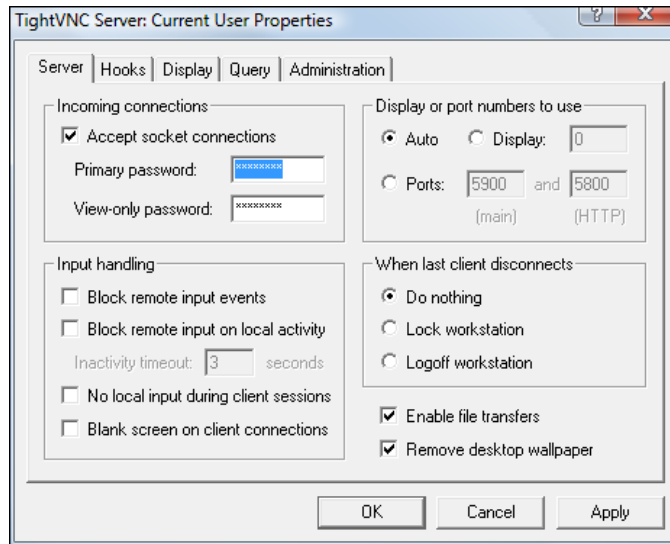


Figure 9-9: TightVNC Server Current User Properties dialog box

3. **Server computer:** Type **password** in the Primary Password text box, press **TAB**, then type **password** in the View-Only Password text box. TightVNC will not accept incoming connections without a password due to security risk. You must specify a password in order to proceed.
4. **Server computer:** Click **OK** to close the TightVNC Server Current User Properties dialog box. Notice that a TightVNC Server icon displays in the status bar.
5. **Server computer:** Double-click **image.tif** on the Desktop to display the image file in the Windows Photo Viewer.
6. **Client computer:** Select **Start | All Programs | TightVNC | TightVNC Viewer** to display the New TightVNC Connection dialog box (Figure 9-10).

NOTE:

At Step 5, you display this file for demonstration purposes only.

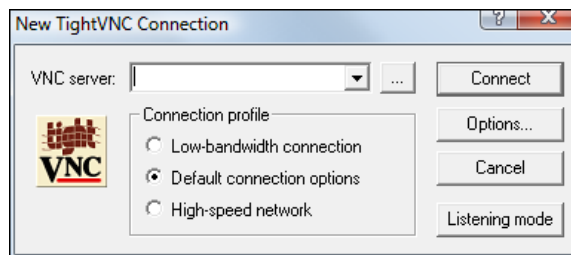


Figure 9-10: New TightVNC Connection dialog box

7. **Client computer:** In the VNC Server text box, enter the IP address of the server computer, then click the **Connect** button to display the Standard VNC Authentication dialog box.

Note: You can display the IP address of the server computer by positioning the mouse pointer over the VNC icon in the status bar.

8. **Client computer:** Type **password** in the Password text box, then click **OK** to start the VNC session. The screen on the client computer will display the Desktop of the server computer, as shown in Figure 9-11. Notice that the name of the server displays in the window title bar.

NOTE:

At Step 7, the user on the server computer can also open a command prompt, type ipconfig and press enter to find the IP address.



Figure 9-11: VNC display on client computer

9. **Client computer:** Scroll down to display two taskbars. The upper taskbar controls the server computer, whereas the lower taskbar controls the client computer.
10. **Client computer:** Click the **Close** button in the Windows Photo Viewer to close the image file on the server computer. You can control the server computer from the client computer. You can even restart the server computer.
11. **Server computer:** Double-click **image.tif** on the Desktop to redisplay the image. Notice that while using VNC, the server computer can still function normally.
12. **Server computer:** Right-click the **VNC** icon in the status bar, then click **Kill All Clients** to close the connection. This step displays a Connection Closed message on the client computer. Notice that the VNC viewer window closes on the client computer.
13. **Client computer:** Click **OK** to close the message box.
14. **Server computer:** Right-click the **VNC** icon in the status bar, then click **Close TightVNC Server**. This step makes it impossible for any clients to connect.
15. **Server computer:** Close the **Windows Photo Viewer**.

In this lab, you used VNC to gain remote access to another computer. When using VNC, both the viewer (client) and the server have control over the server computer.

Remote Desktop Connection

Remote Desktop Connection is part of Microsoft Terminal Services, which is a suite of tools that enables computers to function as dedicated clients to a server running Windows. In Windows 7, you can use Remote Desktop Connection for the remote administration capability of Terminal Services. It is similar to VNC.

In the following lab, you will use Remote Desktop Connection. Suppose that the IT manager has instructed you to defragment the hard drives of several corporate systems. You can use Remote Desktop Connection to gain control of those computers and defragment them while sitting at your desk.



Lab 9-10: Using Remote Desktop Connection

In this lab, you will use Remote Desktop Connection to control a remote computer. A lab partner is required for this lab. One partner's system will function as the server (the computer that will be controlled), and the other will function as the client (the computer from which commands will be issued). Decide the role each of you will take.

1. **Server computer:** You may need to modify the system properties of the server computer to enable Remote Desktop Connection. Click **Start | Control Panel | System and Security | System**. Click the **Remote Settings** link, then select **Allow Remote Assistance Connections to this Computer** and click **OK** to enable Remote Desktop Connection. **Close** the Control Panel.
2. **Client computer:** Select **Start | All Programs | Accessories | Remote Desktop Connection** to display the Remote Desktop Connection dialog box, shown in Figure 9-12.

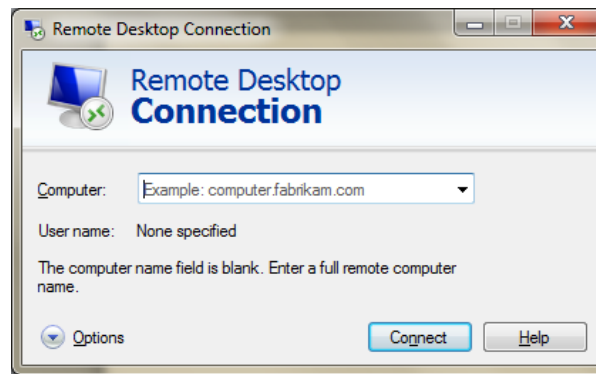


Figure 9-12: Remote Desktop Connection dialog box

3. **Client computer:** In the Computer text box, enter the IP address of the server computer, and then click the **Connect** button to display the Log On screen of the server computer.
4. **Client computer:** Log on to the server computer with the user name and password your instructor provides.
5. **Client computer:** You should be able to see the Desktop of the server computer, and its IP address should display in the Remote Desktop tab across the top of your screen. Notice that the tab contains Minimize, Maximize/Restore and Close buttons. You can click the Minimize button in the tab to see the display from your own (client) system.
6. **Client computer:** Notice that a Log On screen displays on your lab partner's monitor. When you establish a remote desktop connection and log on to the server computer, all control of that computer is passed to you.
7. **Client computer:** On the (server) Desktop, double-click **image.tif** to open the Windows Photo Viewer.

8. **Client computer:** Click the **Minimize** button in the Remote Desktop tab. This step minimizes the display of the server computer and displays your own Desktop.
9. **Client computer:** Click the **Remote Desktop** button in the taskbar to redisplay your partner's Desktop.
10. **Client computer:** Click the **Close** button in the Remote Desktop tab to disconnect the Remote Desktop Connection session.
11. **Client computer:** Click **OK** to end the session.
12. **Client computer:** Direct your lab partner to log back on.
13. **Client computer:** Direct your lab partner to close the **Windows Photo Viewer**.
14. **If time permits:** Students can switch computers and perform the lab again so that both students can complete the lab as the client computer.

You have now used VNC and Remote Desktop Connection (a part of Microsoft Terminal Services) to control a remote computer. How do these programs compare with each other? Which was easier to use? Which gives you more control?

OBJECTIVE
1.7.5: Peer-to-Peer (P2P) services

peer-to-peer network

A network in which each computer has both server and client capabilities.

P2P

A peer-to-peer network on the Internet.

Peer-to-Peer Networks

By now you should be familiar with the client/server architecture used in networks. The client/server model is also used on the Internet. The client sends a request to the server, which processes that request and delivers the information. In a **peer-to-peer network**, however, each computer has both client and server capabilities. That is, each computer has the same capabilities as any other member of the network, and each one can open a communication session with any other member of the network.

On the Internet, a peer-to-peer (referred to as **P2P**) network allows a group of users to connect with each other and directly share files among their hard drives. P2P is advantageous because it is very inexpensive and allows all the users to share their bandwidth. That is, you can share the load of distributing files among all the members of the network.

Sharing MP3 files: Napster (now part of Rhapsody)

You have probably heard of Napster, a service that allowed free file sharing. Napster is a P2P application, developed in 1999 by then-19-year-old Shawn Fanning, that enabled millions of users to share music in MP3 format across the Internet. Users installed the Napster application on their computers, which enabled the computers to act as miniature servers that allowed users to obtain files from other Napster users. As users logged on to the Napster Web site, they would indicate which MP3 files were available on their own systems. The central servers at Napster created and maintained a vast directory of song files and the IP addresses at which they were available.

Napster created a public controversy over the legality of file sharing because shared MP3 files contained copyrighted music, for which permission to use, borrow or share was never sought. Owners of the songs were not paid for access to them. A court order handed down in March 2001 forced Napster to halt sharing of more than 100,000 copyrighted songs. Napster now charges a nominal per-song fee to download MP3 files and is part of the Rhapsody digital music site (www.rhapsody.com).

Gnutella

Another Web-based application for sharing MP3 files is Gnutella. The major difference between Gnutella and Napster is that instead of maintaining a central database, users on the Gnutella network find songs using a distributed query. Using Gnutella, you type the name of a song you want to find (query), and you enter the IP address of at least one other computer on the Gnutella network. Your query is sent to that computer, that computer searches its hard drive for the file, then sends the query to another computer on the network, and so on. The query is thereby distributed among thousands of users on the network. The Napster peer-to-peer network used a server to direct requests, whereas a Gnutella network is server-free.

Peer-to-peer networks in business

P2P power is not limited to sharing music files. Corporations are beginning to consider P2P as a way for employees to share files directly, eliminating the cost and maintenance associated with a centralized server. P2P allows companies to utilize the otherwise dormant processing power of each employee's computer. P2P also allows businesses to exchange information with each other directly, without having to maintain servers to provide FTP access.

OBJECTIVE
1.7.6: Network communications privacy

IBM, Intel and Hewlett-Packard are currently exploring ways to standardize and commercialize peer-to-peer technology. In order to protect privacy and sensitive materials, companies will be able to control access to information, and will be able to password-protect files.

Many large corporations (such as Intel, Amerada Hess and Boeing) have been using peer-to-peer technology to maximize processing power and even eliminate the need for mainframes. Many universities and research organizations have been using peer-to-peer networks for years.

OBJECTIVE
1.7.5: Peer-to-Peer (P2P) services

BitTorrent

BitTorrent is a P2P application used for downloading huge files (more than a gigabyte) because it dramatically reduces the demands on networking hardware and bandwidth. Many IT professionals use BitTorrent to download software updates and service packs. One of the interesting features of BitTorrent is that it has a built-in mechanism to ensure that people who participate share their bandwidth and the files they download. That is, it prevents people from merely taking advantage of the system. You can read about BitTorrent at www.bittorrent.com/.

OBJECTIVE
1.9.5: Troubleshooting connectivity issues

Troubleshooting Using TCP/IP Tools

Now that you have used various Internet services, you should be familiar with a few basic tools for troubleshooting problems with your Internet clients. All Internet communications are handled through TCP/IP, and certain diagnostic tools use IP addresses to discover information within a TCP/IP network. You can use the following TCP/IP tools and commands to assist with basic troubleshooting:

- ipconfig
- ping
- tracert



CIW Online Resources – Movie Clips

Visit CIW Online at <http://education.Certification-Partners.com/CIW> to watch a movie clip about this topic.

Lesson 9: Troubleshooting network connections

The *ipconfig* command

The Windows *ipconfig* utility (Internet protocol configuration) is used to display your system's IP configuration. To use the command, type *ipconfig* at the command prompt and then press **ENTER** to display your system's IP address. You can use the *ipconfig* command when you are using remote control services and need to enter the IP address of the system you want to control. On UNIX/Linux systems, the utility command is *ifconfig*.

The *ping* command

The ping utility (Packet Internet Groper) tests connectivity between source and destination systems. To use the command, type *ping ip_address* (where *ip_address* is the IP address of the destination computer) at the command prompt and then press **ENTER**. If a reply is received, then a connection exists between your computer and the computer at the IP address you specified. You can use the *ping* command to ensure connectivity between two systems.

The *tracert* command

The Windows *tracert* utility can determine the path between a source and a destination system. That is, it will display all the IP addresses between your system and the destination system, and it will locate failures along the path that may interrupt service. The *tracert* command also displays information about the travel time for each stage of the path from the source to the destination. To use the command, type *tracert ip_address* at the command prompt and then press **ENTER**. You can also use the *tracert* command with a host name. On UNIX/Linux systems, the utility command is *traceroute*.



CIW Online Resources – Online Exercise

Visit CIW Online at <http://education.Certification-Partners.com/CIW> to complete an interactive exercise that will reinforce what you have learned about this topic.

Exercise 9-2: TCP/IP commands

In the following lab, you will use TCP/IP diagnostic tools to test connectivity. Suppose that your co-worker is unable to connect to the CIW Web site. You can use these diagnostic tools to test her computer's connectivity.



Lab 9-11: Using TCP/IP diagnostic tools

In this lab, you will use the *ipconfig*, *ping* and *tracert* utilities to test for basic connectivity.

1. Click **Start**, type **cmd** in the Search Programs And Files text box, then press **ENTER** to open a command window.

2. At the command prompt, type **ipconfig**, and then press **ENTER**. Write your IP address in the space provided:

3. Exchange IP addresses with a classmate and write your classmate's IP address in the space provided:

4. At the command prompt, type **ping ip_address** (where *ip_address* is the IP address of your classmate's computer) and then press **ENTER**. Were you able to successfully ping your classmate's computer?
5. At the command prompt, type **tracert 72.44.192.233** and then press **ENTER**. How many hops were required to reach the *www.CIWcertified.com* site? Your display should resemble Figure 9-13.

```

C:\Windows\system32\cmd.exe
C:\Users\kkozakis>tracert 72.44.192.233
Tracing route to 72.44.192.233 over a maximum of 30 hops
  0  *         *         *         Request timed out.
  1  *         *         *         Request timed out.
  2  *         *         *         Request timed out.
  3  *         *         *         Request timed out.
  4  *         *         *         Request timed out.
  5  72 ms    81 ms    44 ms    72.44.192.233
Trace complete.
C:\Users\kkozakis>_

```

Figure 9-13: Using TCP/IP diagnostic tools

6. Close the **command** window.

OBJECTIVE

1.18.3: Open source terminology

open source

A peer-based development process describing organizations and products that provide free source code to the development community at large with the goal of developing better products; includes Apache Web server and Linux.

Open-Source Development

Open source is a development methodology that makes an application's source code available to anyone. In software development, open source lends itself to peer development and collaboration because software source code is developed concurrently by many people. This approach is the direct opposite of the structured, controlled models of development such as the waterfall model.

Because the open-source process is collaborative and transparent, proponents contend that it delivers qualitative, reliable, flexible and less costly software than software developed using more traditional methods. Open source also encourages wide adoption of software because it is not associated with a specific vendor.

Popular examples of open-source software include:

- Mozilla Firefox (*www.mozilla.com*)
- Linux (*www.linux.org*)

- Apache HTTP Server (<http://httpd.apache.org/>)
- The Internet address system, Internet Protocol (IP).

Table 9-3 lists terms associated with open-source software development.

Table 9-3: Open-source software development terms

Term	Description
Source code	The collection of statements and instructions written in a human-readable programming language.
Project fork	The point at which a developer copies source code as it exists, then begins independently developing the code further to produce a distinct piece of software.
Free distribution	The ability of users to run, copy, distribute, modify and improve the software with no restrictions.
Derived (or derivative) works	Any software that is based upon one or more existing pieces of software.
Dual licensing	The practice of distributing software under two different licensing agreements. Users can then determine the set of terms and conditions under which they will use the software.
Non-discrimination	The ability of users to use the software however they see fit (e.g., the software cannot be restricted from use in a certain environment or for a certain purpose).
Copyleft	The practice of removing restrictions from the distribution and use of software, and requiring all modified versions of the software to be free as well. A play on the word copyright, which restricts the use of intellectual property.



CIW Online Resources – Online Exercise

Visit CIW Online at <http://education.Certification-Partners.com/CIW> to complete an interactive exercise that will reinforce what you have learned about this topic.

Exercise 9-3: Open-source software development terms

OBJECTIVE

1.18.1: Open-source and "copyleft" licenses

open-source license

A "copyleft" license that removes restrictions on the use and distribution of the licensed product.

NOTE:

GNU stands for "GNU's Not UNIX", because its design is similar to UNIX but it contains no UNIX code and, unlike UNIX, it is free.

Open-source licenses

When talking about software development, an **open-source license** is a copyright license that enables users to modify and redistribute the software's source code without restriction. Open-source licenses are called copyleft licenses. Software that is distributed with an open-source license is in the public domain.

GNU General Public License (GPL)

There are many open-source licenses, but perhaps the most popular and widely used is the GNU General Public License (GPL). There are three versions of the GNU GPL:

- **GNU GPL Version 1 (GPLv1)** — Released in January 1989, GPLv1 stated that human-readable source code must be distributed along with an application's binary code under the same licensing terms. GPLv1 also stated that software distributed under it could be combined with other software only if the terms of the other software's license were not more restrictive than GPLv1.

- **GNU GPL Version 2 (GPLv2)** — Released in June 1991, GPLv2 stated that a user could not distribute GPL-protected software if he or she placed any restrictions on it that would prevent another user from freely using or distributing it.
- **GNU GPL Version 3 (GPLv3)** — Released in June 2007, GPLv3 made far-reaching changes and clarifications relating to the definition of source code, software patents, free software license compatibility and hardware restrictions on software modification. GPLv3 also changed how license violations are handled, allowed authors to grant additional permissions or add conditions to their software, and removed geographic restrictions on software distribution.

The GNU GPL allows you to obtain the code and make all the changes to it that you want. But the code must remain in the public domain. By so doing, others can review your code and improve it. The GNU GPL does allow users to charge for code. However, developers of GPL code make money by providing support services for the software, rather than by selling the software. You can find more information about the GNU GPL at the GNU Operating System site at www.gnu.org/licenses/gpl.html.

Other open-source licenses

Other open-source licenses include:

- **BSD License** — a permissive free software license, which is a license that is similar to a copyleft license but may place restrictions or requirements on derivative works.
- **Apache License** — a free software license that allows the use of source code for open-source as well as proprietary development.
- **Mozilla Public License (MPL)** — a free software license for Mozilla software. Any source code that is copied or modified under the MPL must remain under the MPL.
- **Common Public License (CPL)** — a free software license published by IBM. CPL is similar to the GNU GPL but has a patent clause that prevents developers from contributing code that infringes on their patents.

Benefits and drawbacks of open-source software

Some of the benefits of using open-source software are:

- The software is free.
- Developers have ready access to the source code.
- Code is reviewed and improved by the community of open-source developers.

Some of the drawbacks of using open-source software are:

- Software development relies on the willingness of developers to contribute code without getting paid.
- The market for proprietary software may be compromised, which could adversely affect the entire software development industry.
- The software may not be user-friendly because developers may not be as likely to create patches to fix bugs.

OBJECTIVE

1.18.2: Proprietary development models

proprietary software

Software that is the legal property of an entity.

end-user license agreement (EULA)

A legal contract between the author of software and the end user that defines how the software can be used.

Proprietary Software and EULAs

Proprietary software is software that is owned by an author or entity. The use of proprietary software is governed and protected by **end-user license agreements (EULAs)**. A EULA is a legal contract between the software's author and the end user who uses the software. A EULA describes how the application can and cannot be used by the end user, and details any restrictions imposed by the author. A typical EULA protects both parties from liability if the software is used in a manner not intended by the author.

The terms of a EULA can be liberal or conservative. Most EULAs from major corporations that believe in proprietary coding, such as Microsoft, Adobe and Symantec, have strict EULAs.

A typical EULA usually copyrights the code so that it belongs to the author. A EULA specifies exactly how you may use the software. For example, you cannot make changes to the code or redistribute the code. Otherwise, you are violating the author's copyright. The author of the software reserves the right to make you stop using the software at any time.

Following are examples of EULAs:

- **Generic** — www.developer-resource.com/sample-eula.htm
- **Adobe** — www.adobe.com/products/eulas/
- **Microsoft** — www.microsoft.com/About/Legal/EN/US/IntellectualProperty/UseTerms/Default.aspx (This link enables you to read any of Microsoft's EULAs, by product.)
- **Wikipedia article discussing software licensing models** — <http://en.wikipedia.org/wiki/EULA>

Some of the benefits of using proprietary software are:

- The availability of vendor-supplied services and support.
- The availability of regular updates and patches from vendors.
- The generally prevalent adoption rates of proprietary software in organizations.

Some of the drawbacks of using proprietary software include the following:

- Vendor-supplied services and support may be limited to certain hours/days.
- Updates and patches may not be available in a timely manner.
- The cost can be prohibitive, especially as compared to open-source software, which is free.

OBJECTIVE

1.18.2: Proprietary development models

patent

A set of exclusive rights granted to an inventor for a fixed period of time upon disclosure of the invention.

Software Patents

A software **patent** is a set of exclusive rights granted to an individual or company that claims to have invented a unique procedure or feature, and then seeks to protect that invention. Once the uniqueness of the invention is proven to a particular patent office, the idea can only be used under license from the patent holder. Generally, if an individual or company wants to use a patented technology, that party will have to pay a royalty to the patent holder.

If a company is successful in receiving a patent, and that company is purchased by another, then those patents are usually part of the purchase. Many times, a larger company will purchase a smaller, more innovative company for its patents.

Software patent examples

Many software patents exist. Following is a list of some of those that remain significant:

- **Image compression** — The compression scheme used by Graphics Interchange Format (GIF) images has been patented in the United States, leading to the creation of alternative image formats such as Portable Network Graphics (PNG) format. You can read the series of GIF patents at the following URL:
http://worldwide.espacenet.com/publicationDetails/biblio?CC=US&NR=4558302&KC=&FT=E&locale=en_EP.
- **Audio** — Many elements of the MP3 format are patented in the United States. For more information, visit:
http://worldwide.espacenet.com/publicationDetails/biblio?CC=US&NR=5579430&KC=&FT=E&locale=en_EP.
- **User interface patent** — In the European Union and the United States, a successful patent was issued about the concept of the progress bar. For more information, visit:
<http://worldwide.espacenet.com/publicationDetails/biblio?CC=EP&NR=0394160&KC=&FT=E>.
- **Browser plug-in** — EOLAS software was able to patent certain elements of the browser plug-in. For more information, visit:
<http://worldwide.espacenet.com/publicationDetails/biblio?CC=US&NR=5838906&KC=&FT=E>.
- **Search engine advertising and marketing** — Yahoo! was able to sue Google and other search engines for infringing on certain elements of Pay-Per-Click (PPC) marketing. This patent was originally awarded to a company named Goto.com. Yahoo! then purchased Goto.com and was able to apply the patent in a lawsuit. For more information, visit: <http://worldwide.espacenet.com/publicationDetails/biblio?CC=US&NR=6269361&KC=&FT=E>.

Patent jurisdiction

Patents do not apply worldwide. An individual, company or organization must apply to a specific patent office belonging to a particular country or group of countries. For example, the European Patent Office (www.epo.org) would grant patents for its particular area of jurisdiction. Regardless of location or sphere of authority, a patent office will review the patent application, then grant or deny a patent as it sees fit. It is important to note that a patent that applies in the European Union, for example, may have no authority in other parts of the world.

Thus, if a company residing in the United Kingdom wants to apply for a patent, that company may apply for a patent at the European Patent Office and other patent bodies as well, such as the Japan Patent Office (www.jpo.go.jp) or the United States Patent And Trademark office (www.uspto.gov).

Patent controversy

Software patents are quite controversial. Those who argue in their favor contend the following points:

- A tremendous amount of money and time goes into innovating new concepts.
- It is easy for anyone to copy these new concepts once they have been developed.
- Innovators should be allowed to protect their investments.
- Protecting innovators' investments helps ensure that innovation continues.

Those who argue against software patents contend that software patents:

- **Squelch creativity** — It is argued that large companies use patents as a form of artificial protectionism. Companies hide behind software patents to remain secure, rather than continue innovating. As a result, everyone from end users to programmers and even companies are denied the fruits of innovation.
- **Increase cost** — Because software patents require royalty payments, applications that include patented features will cost more.
- **Are difficult to enforce and apply** — If certain common elements are patented, then chaos can ensue in relation to enforcement, thereby hampering innovation and development.



CIW Online Resources – Course Mastery

Visit CIW Online at <http://education.Certification-Partners.com/CIW> to take the Course Mastery review of this lesson or lesson segment.

IBA Lesson 9

Case Study

These Are Sensitive Files

The contracts manager at a company needs to make a large legal document available to an overseas customer. However, she has some challenges: The document contains sensitive information; it is too large to send via e-mail; and the manager is expecting an amended document in return.

The contracts manager must make the document available in electronic format to only herself and the customer.

- First, the contracts manager sets up an FTP account that requires user names and passwords. She gives these user names and passwords to the customer and instructs him not to divulge the account information to anyone. She reveals authentication information to the customer only across a secure channel (or in person).
- Next, the contracts manager sets up a folder on the company FTP site into which she can upload the sensitive document. She ensures that only users with specific permissions can access the folder.
- The contracts manager now gives the customer permissions to upload and download files to and from this folder.

* * *

As a class, consider this scenario and answer the following questions:

- The information in this document is extremely sensitive. Suppose someone might try to gain access by "sniffing" the FTP passwords during authentication. How could the contracts manager further secure this file? Could she use S/FTP to secure the file? Could she use FTPS?
- Consider some of the other Internet services discussed in this lesson. Which ones would be inappropriate for transmitting this file? Why?

Lesson Summary



Application project

Now that you have used several methods for downloading files from FTP servers, which did you find to be the easiest? How does downloading files through an FTP client compare with retrieving files from a Web server using HTTP? Is FTP faster? Is it more difficult to use? Do you think that FTP is the best way to get information from your computer onto the Internet? What other options are available?



Skills review

In this lesson, you learned about list servers and used FTP to transfer files to and from your computer. You managed downloaded content by defining MIME types and using compression utilities. You used VNC and Remote Desktop Connection to control a remote computer, and you discussed the functions of peer-to-peer networks. You also used TCP/IP tools to troubleshoot basic connection problems. You discussed proprietary and open-source software development models, and the development implications of end-user license agreements (EULAs) and software patents.

Now that you have completed this lesson, you should be able to:

- ✓ 1.5.9: Use common Web browser software features and various clients (e.g., FTP, e-mail) within a given context, identify when to use each, and identify basic commands (e.g., FTP put and get).
- ✓ 1.6.2: Distinguish between MIME, S/MIME and PGP/GPG.
- ✓ 1.7.1: Retrieve and place documents using FTP, SCP, SFTP and SSL/TLS-enabled FTP.
- ✓ 1.7.2: Compare FTP-based and HTTP-based retrieval.
- ✓ 1.7.3: Use remote-assistance clients and servers, including Microsoft Remote Services.
- ✓ 1.7.5: Define Peer-to-Peer (P2P) services, use them when appropriate for business, and describe how to use a typical BitTorrent client.
- ✓ 1.7.6: Identify privacy concerns related to network communications (e.g., e-mail, instant messaging, P2P).
- ✓ 1.9.5: Troubleshoot connectivity issues (e.g., no connection, poor rendering, slow connections) using TCP/IP utilities.
- ✓ 1.7.9: Explain the various uses of mass e-mail and texting services.
- ✓ 1.7.10: Join and manage your participation in an e-mail listserv group.
- ✓ 1.13.1: Identify the need to define MIME file types for special download procedures such as unusual documents or graphics formats, and solve the problem.
- ✓ 1.13.2: Manage files using common compression software and techniques (e.g., zip/WinZip, gzip, bzip2, RAR, compress).
- ✓ 1.18.1: Define essential elements of open-source and "copyleft" licenses (e.g., GNU General Public License [GPL]).

- ✓ 1.18.2: Explain the purpose of typical End User License Agreements (EULAs) and software patents.
 - ✓ 1.18.3: Define essential open source terms (e.g., source code, fork, free distribution, derived works, dual-licensing, non-discrimination).
-



CIW Practice Exams

Visit CIW Online at <http://education.Certification-Partners.com/CIW> to take the Practice Exams assessment covering the objectives in this lesson.

IBA Objective 1.05 Review

IBA Objective 1.07 Review

IBA Objective 1.09 Review

IBA Objective 1.13 Review

IBA Objective 1.18 Review

Note that some objectives may be only partially covered in this lesson.

Lesson 9 Review

1. How are FTP servers structured, and how do you navigate them?

2. Describe the purpose of a list server.

3. Which types of files are not significantly reduced in file size by compression utilities?

4. How can using peer-to-peer networks save company resources?

5. What is the advantage of open-source software development over the traditional, structured, controlled models of development?

6. What governs and protects the use of proprietary software, and why is it important?
