

Module 9: Examining Web Services

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Instructor Notes

Presentation:
45 Minutes**Labs:**
30 Minutes

This module provides students with information about the Internet and how to securely access it from a Microsoft® Windows® 2000 network. The module begins with an introduction to the Internet, Internet services, intranets, and domain naming.

The module then describes common client technologies, such as newsreaders and Web browsers, and discusses Internet protocols and Uniform Resource Locators (URLs). At the end of this section, students will perform a lab to access an FTP site by using Microsoft Internet Explorer.

The module continues with a description of the methods for securely connecting to the Internet from a Windows 2000 network. The module concludes with a discussion of Web server concepts and the Microsoft Internet Information Services (IIS) software that is a part of the Windows 2000 operating system.

A lab in which students identify Web concepts follows the last section of the module.

At the end of this module, students will be able to:

- Describe the Internet, an intranet, the domain namespace, and a URL.
- Describe the different client technologies available for accessing information on the Internet.
- Describe the methods for securely connecting to the Internet from a Windows 2000 network by using network address translators (NATs), proxy servers, and firewalls.
- Explain how Web server technologies, such as IIS, can be used to host services on the Internet.

Materials and Preparation

This section provides you with the required materials and preparation tasks that are needed to teach this module.

Required Materials

To teach this module, you need the following materials:

- Microsoft PowerPoint® file 2151A_09.ppt
- Module 9, “Examining Web Services”

Preparation Tasks

To prepare for this module, you should:

- Read all of the materials for this module.
- Complete the labs.
- Review the Delivery Tips and Key Points for each section and topic.
- Study the review questions and prepare alternative answers for discussion.
- Anticipate the questions that students may ask and prepare answers to them.

Module Strategy

Use the following strategy to present this module:

- Identifying Internet Concepts

Introduce the structure of the Internet and mention that TCP/IP is used for communication over the Internet. Briefly describe the commonly used Internet services. Explain the concept of intranets and how they can be extended to form an extranet. Describe the need for domain names by using a suitable example.

- Using Client Technologies

Discuss common end-user tools, such as newsreaders and Web browsers, which are used to access information on the Internet. Explain the significance of Internet protocols for connecting to the Internet and introduce the concept of a Uniform Resource Locator (URL).

- Connecting to the Internet

Describe the methods for securely connecting to the Internet from a Windows 2000 network by using NATs, proxy servers, and firewalls. Emphasize that the Microsoft Proxy Server software can function as both a proxy server and a firewall. Mention to the students that Proxy Server is not a part of Windows 2000 but can be obtained separately.

- Identifying Web Server Concepts

Discuss Web server concepts and describe the features of IIS. Mention to the students that IIS is included with the Windows 2000 operating system.

Customization Information

This section identifies the lab setup requirements for a module and the configuration changes that occur on student computers during the labs. This information is provided to assist you in replicating or customizing Microsoft Official Curriculum (MOC) courseware.

This module includes only computer-based interactive lab exercises, and as a result, there are no lab setup requirements or configuration changes that affect replication or customization.

Important The labs in this module are also dependent on the classroom configuration that is specified in the Customization Information section at the end of the Classroom Setup Guide for course 2151A, *Microsoft Windows 2000 Network and Operating System Essentials*.

Lab Results

There are no configuration changes on student computers that affect replication or customization.

Overview

Slide Objective

To provide an overview of the module topics and objectives.

Lead-in

In this module, you will learn about Internet concepts, end-user tools to access Internet information, and methods for securely connecting to the Internet and providing Web server content.

- Identifying Internet Concepts
- Using Client Technologies
- Connecting to the Internet
- Identifying Web Server Concepts

Transmission Control Protocol/Internet Protocol (TCP/IP) enables communication between computers running Microsoft® Windows® 2000 and other operating systems, and in different network environments, including large internetworks. The largest of these internetworks is the Internet, which provides several services, called Web services. Web services use TCP/IP across large internetworks around the world. By accessing these Web services from a Windows 2000 network, you can search for information, share ideas and opinions, or communicate with other users who are connected to the Internet.

If you want to connect a Windows 2000 network to the Internet, you must first familiarize yourself with some of the basic concepts and terminologies related to Web services. You must also know which client technologies and end-user tools you can use to access the Web services. To access the Internet from a Windows 2000 network, you must also be familiar with the methods of connecting and securing access to the Internet. Finally, to host your own Web services, you must be aware of the server technologies available for providing information on the Internet.

At the end of this module, you will be able to:

- Describe the Internet, an intranet, the domain namespace, and a Uniform Resource Locator (URL).
- Describe the different client technologies available for accessing information on the Internet.
- Describe the methods for securely connecting to the Internet from a Windows 2000 network by using network address translators (NATs), proxy servers, and firewalls.
- Explain how Web server technologies, such as Microsoft Internet Information Services (IIS), can be used to host services on the Internet.

◆ Identifying Internet Concepts

Slide Objective

To introduce concepts, such as the Internet, intranet, domain namespace, and URL.

Lead-in

You must be able to understand such concepts as the Internet, intranets, domain namespaces, and URLs to access information on the Internet.

- The Internet
- Internet Services
- Intranets
- Domain Naming

To understand the terminology and concepts involved with Web services, you should first become familiar with the structure of the Internet and the technologies deployed on it.

The technologies developed to host Internet services can also be deployed internally in an organization. You can do this by creating an intranet to maximize the advantages of Internet services within an organizational network.

You must also know how computers find, or address, other computers connected to the Internet to send information to them. Addressing of computers on the Internet is accomplished by using a user-friendly naming system called domain naming.

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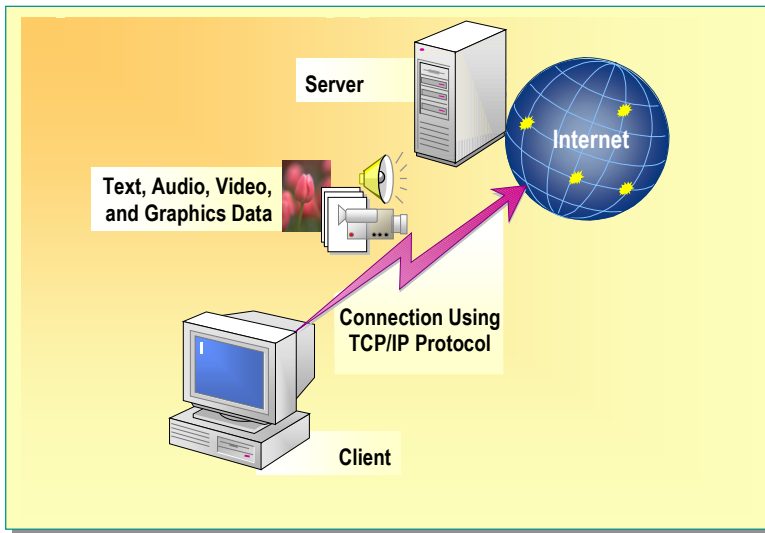
The Internet

Slide Objective

To illustrate the structure of the Internet, the protocol stack used for Internet communications, and private and public addresses.

Lead-in

The Internet is a global collection of networks that connects computer users around the world.



Delivery Tip

Do not spend much time discussing the Internet. Instead, emphasize to the students TCP's function as the underlying protocol stack, and the need for private IP addresses.

Many major companies, universities, and government agencies, as well as millions of individuals, place information on the Internet in order to share it with the public.

Structure of the Internet

Using the Internet, people all over the world can exchange information—text, word-processor documents, pictures, video, audio, and computer programs—over computers. Although specific organizations may develop tools or programs for the Internet, no individual or single organization controls or governs the Internet. However, private companies do own the Internet *backbone* (the physical media through which the Internet traffic flows).

Computers on the Internet use a client/server architecture. This means that a remote server provides files and services to the user's local client computer. The speed at which the client can access the services provided by the server depends upon the technology available. With continuous technological advancements, the access speeds and mechanisms are improving to allow large amounts of information to be quickly downloaded, or retrieved, from the server.

TCP/IP

TCP/IP is the standard protocol stack used for communication over the Internet. The TCP/IP protocol stack consists of the lower-level protocols TCP and IP and such higher-level protocols as Hypertext Transfer Protocol (HTTP), File Transfer Protocol (FTP), and Simple Mail Transfer Protocol (SMTP). TCP and IP provide the low-level functionality needed for many applications, whereas HTTP, FTP and SMTP give you access to higher-level services, such as transferring files between computers, sending e-mail, or identifying who is logged on at another computer. Therefore, because of its broad range of functions, you must install and configure TCP/IP on all computers accessing the Internet.

Public and Private Addresses

In addition to understanding how TCP/IP functions, you must also know how computers are assigned IP addresses for accessing the Internet. The Internet Assigned Numbers Authority (IANA) allocates IP addresses. The addresses allocated by IANA can receive traffic from Internet locations and are known as public addresses. For a typical small business or home office, public addresses are allocated by an *Internet service provider (ISP)*, which is a company that maintains a range of public addresses and offers access to the Internet.

For multiple computers in a small office or home office to communicate on the Internet, each computer must have its own public address. The demand for public addresses is greater than can be met by the limited supply of available public addresses. To overcome this shortfall in the supply of public addresses, IANA provides an address reuse system that reserves groups of IP addresses, called private addresses, for private networks connected to the Internet. Private addresses cannot directly receive traffic from Internet locations.

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Internet Services

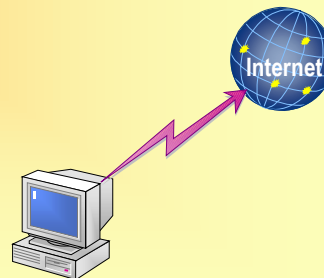
Slide Objective

To introduce the commonly used Internet services.

Lead-in

All Internet applications function by taking advantage of one or more of the basic Internet services.

- **Electronic Mail (e-mail)**
- **World Wide Web (WWW)**
- **Chat**
- **Internet News**
- **File Transfer Protocol (FTP)**
- **Telnet**

**Delivery Tip**

Make sure that all students are familiar with the basic Internet services. The actual client applications will be mentioned later in this module.

Some of the most popular Internet services include electronic mail (e-mail), the World Wide Web (WWW), Chat, Internet News, File Transfer Protocol (FTP), and Telnet.

- **Electronic mail (e-mail)**

E-mail is the most popular service on the Internet. You can use it to send messages to any user connected to the Internet.

- **World Wide Web (WWW)**

The World Wide Web, or the Web, is a term used to describe the interlinked collection of hypertext documents and multimedia content available on the Internet. Hypertext documents are files that have been formatted for use on the Internet. You use a Web browser, such as Microsoft Internet Explorer, to search for, locate, view, and download information from the Internet.

- **Chat**

Chat programs allow you to participate in a real-time conversation with two or more people on the Internet.

- **Internet News**

Internet News is a service that hosts electronic discussion groups through which participants can share information and opinions. A news client, such as Microsoft Outlook® Express, can then be used to access these groups.

- **File Transfer Protocol (FTP)**

FTP is a service that includes a server for transferring files from the server to a client computer. Users can download files from the FTP server by using an FTP client utility.

- **Telnet**

Telnet offers a way to remotely log on to a computer and work on that computer. By logging on to this computer remotely, users can access services or resources that they may not have on their own workstation.

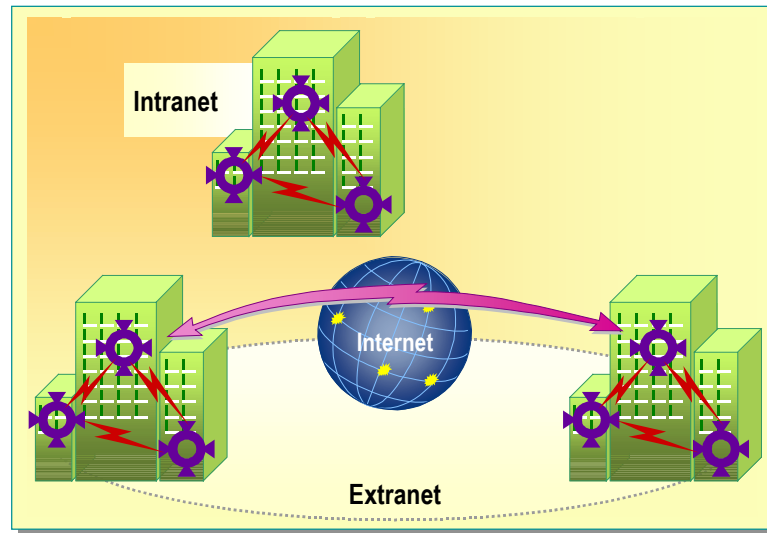
Intranets

Slide Objective

To illustrate an intranet and compare it with an extranet.

Lead-in

You can create an intranet site by installing Internet server software on any server on a LAN.



You can deploy the technologies developed for the Internet on a local area network (LAN) to disseminate information, such as updates to a catalog or information from a database within the LAN. To do this, you must install Internet server software on one of the servers on the LAN.

What Is an Intranet?

An *intranet* is a network, internal to an organization, which uses Internet technology to improve internal communications, publish information, or develop applications. To use the free or relatively inexpensive Internet applications on an intranet, each of the computers on the intranet must support TCP/IP. An intranet may be private, in which case it is not connected to the Internet, or public, in which case it is connected to the Internet.

Extending Intranets to an Extranet

You may want to grant access to your intranet to authorized users from your customers, vendors, suppliers, or other partners. For example, a company may want to share business information with its vendors and customers by granting limited access to its intranet. You can use the Internet to extend intranet access to authorized users. Such an intranet that is partially accessible to only authorized users through the Internet, or through other means, is called an extranet. Setting up an extranet through the Internet is easier and more economical than setting up a dedicated communication link between two companies. However, an extranet is less secure than a private intranet because it allows possible access by unauthorized users.

Domain Naming

Slide Objective

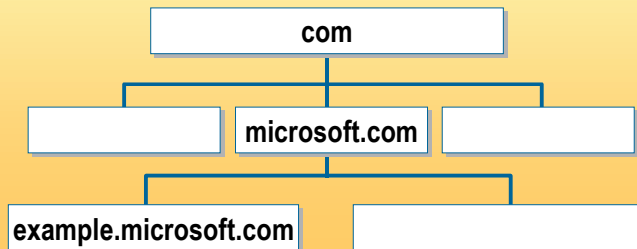
To introduce the concept of domain naming.

Lead-in

A domain name specifies an easy-to-remember name for Internet addresses.

■ Domain Name (example.microsoft.com)

- Top-level domain (com)
- Second-level domain (microsoft.com)
- Subdomain (example.microsoft.com)

**Delivery Tip**

This page is not intended to show students the DNS query process but to introduce the concept of DNS and specifically the format used by DNS. Remind the students that the IP address is what is actually used to locate a specific computer on the Internet.

With millions of computers on the Internet, there is an obvious need for an addressing system that provides an easy-to-remember method for locating computers. A domain name, which uses user-friendly names instead of long numbers, meets this need.

Domain Names

The address that is used at the computer level to uniquely identify a specific computer on the Internet is called the Internet Protocol (IP) address. An IP address consists of four sets of numbers, separated by periods, for example: 131.107.1.7 or 131.107.1.240.

Although a computer application has no difficulty with this numerical addressing system, people find it easier to remember user-friendly domain names, such as example.microsoft.com. However, before a computer can connect to the Internet, its domain name must be mapped, or resolved, to a unique IP address. A classification system called the Domain Name System (DNS) maps domain names to IP addresses. When you use a domain name to connect to a computer on the Internet, a DNS server resolves the name to an IP address. The server uses the mapping to locate the target computer's IP address and substitute it for the user-friendly name to connect to the computer on the Internet.

DNS uniquely identifies computers connected to the Internet based on a hierarchy that includes a top-level domain, a second-level domain, and often one or more subdomains. The top-level domain is based either on generic codes or country codes. Generic top-level domains indicate the type of organization. This table lists the generic top-level domains and their corresponding organizations.

Generic code	Description
com	Commercial organizations
edu	Educational institutions
gov	Government agencies
int	International associations
mil	Military organizations
net	Major network support centers
org	Other organizations

Country code top-level domains are two-letter codes, such as US for the United States and CA for Canada. This table provides examples of some country code domains and their corresponding countries.

Country code	Country
ar	Argentina
au	Australia
be	Belgium
br	Brazil
fr	France
de	Germany

The second-level domain represents the name of a company, institution, or organization and is separated from the top-level domain by a period (called “dot”). An example of a second-level domain is microsoft.com. An individual or a small company typically use one domain name and one IP address, but large companies often acquire a block of IP addresses and establish subdomains. For example, microsoft.com is a domain name, and example.microsoft.com is a subdomain of the main Microsoft domain.

The Internet Corporation for Assigned Names and Numbers (ICANN) manages the assignment of domain names.

◆ Using Client Technologies

Slide Objective

To introduce the client technologies available for accessing information on the Internet.

Lead-in

You can use Web browsers, Internet protocols, and newsgroups to access information on the Web.

- **Newsreaders**
- **Web Browsers**
- **Internet Protocols**
- **Uniform Resource Locator (URL)**

The Internet was originally created for sharing scientific and educational research information. However, users found that accessing the information available from laboratories and universities required a number of complicated steps and did not use a standard interface.

Today, many client technologies are available for easy access to information on the Internet. With Windows 2000, these common end-user tools include:

- **Newsreaders**

Newsreaders enable you to access and join online discussion groups on the Internet. You can even obtain support information for running Windows 2000 by subscribing to Windows 2000-related discussion groups.

- **Web browsers**

Web browsers enable you to browse the Internet, send and receive e-mail messages, and display Internet content.

There are many Internet protocols, such as HTTP, HTTPS, FTP, NNTP, and SMTP, which are used to communicate with other computers connected to the Internet.

In addition to addressing computers connected to the Internet, you can also locate any file on a computer on the Internet. You can do this by using a file-addressing system called the Uniform Resource Locator (URL).

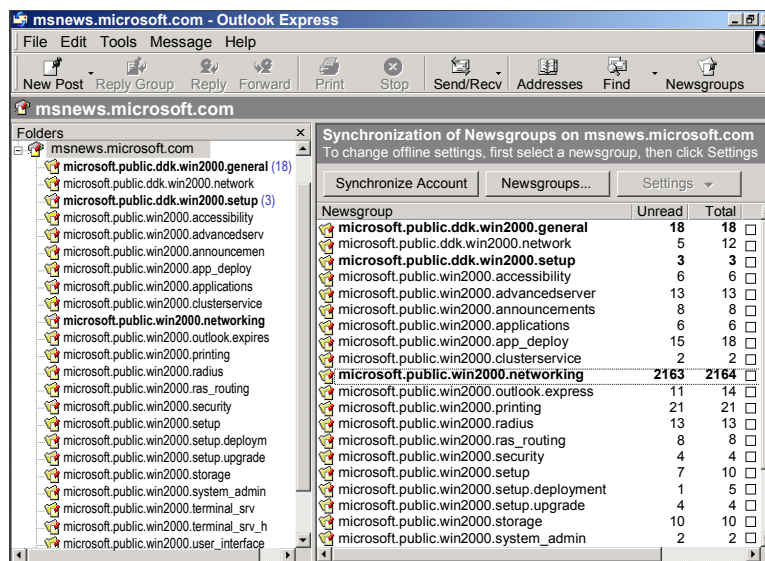
Newsreaders

Slide Objective

To describe a newsgroup and demonstrate how to use a newsreader.

Lead-in

You can exchange opinions about any conceivable interest on the Internet by using a newsreader to access various newsgroups.



Delivery Tip

Many students will be familiar with Outlook Express. Use this page to point out the usefulness of newsgroups, specifically msnews, to locate information about administering a network.

Internet News, or *Usenet*, is a popular Internet service. Usenet is a worldwide news service that you can access through the Internet. It is a 24-hour-a-day service that includes a bulletin board system (BBS) and chat rooms, as well as thousands of electronic discussion groups called *newsgroups*.

A newsgroup, also called a forum, is an online discussion group. On the Internet, thousands of newsgroups reflect the many interests and activities of their users. Online services and the bulletin board system also provide a variety of forums in which participants who share common interests can exchange messages.

There are three types of newsgroups: Usenet, public news servers, and private news servers.

- Usenet

A huge collection of open discussion groups on a variety of topics.

- Public news servers

Newsgroups, such as msnews, which provide specific content and are open to the public.

- Private news servers

Newsgroups that provide specific content but are not open to the public. These newsgroups require a password to access them.

What is a Newsreader?

To view and post messages, many people use a *newsreader*, which is an application that connects you to a news server on the Internet. After obtaining a newsreader, you can subscribe to newsgroups that focus on subject matter of interest to you. When you subscribe to a newsgroup, you can download some or all articles from the news server or you can post your own opinions and responses to the opinions of others.

msnews.microsoft.com

Internet newsgroups, intranet newsgroups, and bulletin boards use Network News Transfer Protocol (NNTP) to post, distribute, and retrieve messages on the Internet. The Microsoft news server addresses customer demand for a single location to access information and services over the Internet. Any newsreader can access Microsoft-sponsored newsgroups.

The Microsoft-sponsored newsgroups offer peer-to-peer interaction on the Internet. A common news server is msnews.microsoft.com. To access the newsgroups on this server, configure your newsreader to connect to msnews.microsoft.com. No user name or password is required to access this server.

Microsoft Outlook Express News

You can use Microsoft Outlook Express News to gain access to bulletin board discussion groups, such as Usenet, by using NNTP-based news servers. Outlook Express News can also be used to receive technical support information for a variety of Microsoft products from the msnews.microsoft.com news server.

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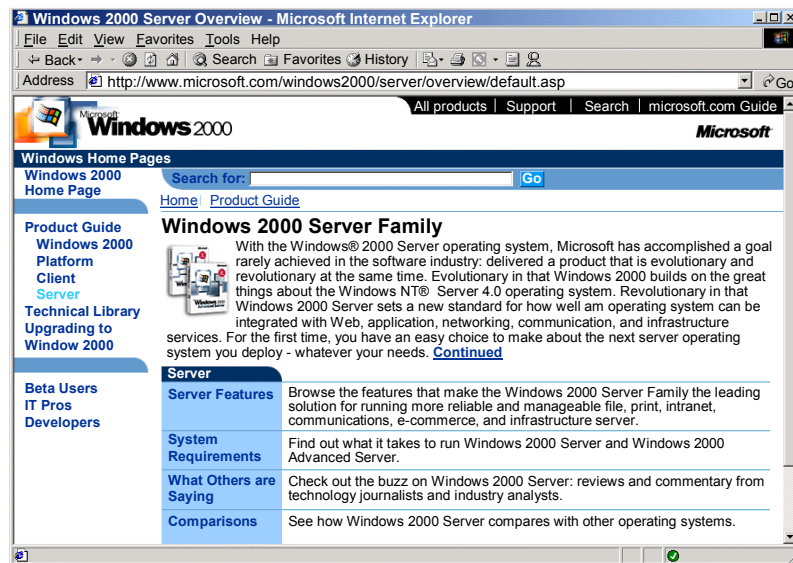
Web Browsers

Slide Objective

To introduce the functions of a Web browser by demonstrating a Web browser window.

Lead-in

A Web browser enables you to access information from the Web by using the HTTP protocol.



Delivery Tip

Students should already be familiar with Internet Explorer. Use this page to point out the advisability of using the Web to find product support information and product updates. Also point out that Internet Explorer can connect to FTP servers as well.

The World Wide Web (WWW), or Web, is the portion of the Internet that provides links to graphical content. The Web has developed into a network of interactive documents that you can easily locate and read using various Web browsers, such as Internet Explorer.

A Web browser is a client application that enables the client computer to gain access to a Web server or other server, such as an FTP server, running on the Internet. Web browsers can display text files and various graphic and multimedia format files. A browser also interprets and displays documents.

Methods of Locating Information on the Web

One of the most common uses of a Web browser is to locate information. You can use either of two methods—search engines or portals—to locate information on the Web.

■ Search engines

To reduce time spent browsing Web sites for information, many sites offer *search engines*, tools for finding specific information on the Web. Most sites allow you to conduct a search by using an advanced feature that exists in most search engines.

- Portals

A *portal* is a Web site that offers a broad array of resources and services, such as e-mail messages, forums, search features, and on-line shopping sites. Using a portal to locate information is easier than using a search engine because the information is sorted and arranged in advance. Portals are good places to begin a search and often categorize sites by type, which further helps people search and navigate Web sites.

Microsoft Internet Explorer

Microsoft Internet Explorer is one of the commonly used Web browsers and is available with Windows 2000. You can use Internet Explorer to browse the Internet, search for information, and even connect to an FTP site.

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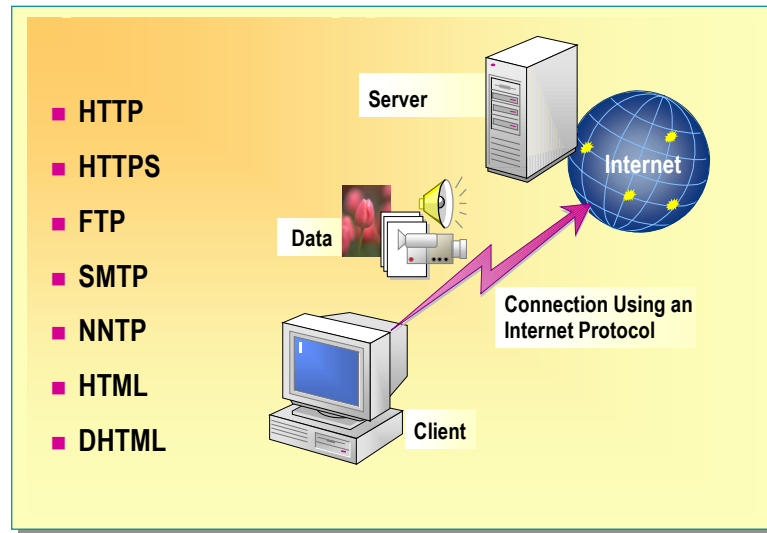
Internet Protocols

Slide Objective

To introduce the protocols used for communication over the Internet.

Lead-in

You can use different protocols to communicate over the Internet.

**Delivery Tip**

Compare the various protocols used on the Internet. Point out that the last two protocols are simply formatting protocols used on the Web.

Common Internet protocols that enable you to access the Internet are Hypertext Transfer Protocol (HTTP), HTTP Secure (HTTPS), File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), and Network News Transfer Protocol (NNTP). In addition, Hypertext Markup Language (HTML) and Dynamic HTML (DHTML) specify the formats of pages displayed on the Web.

- HTTP

HTTP is a convention for sending messages from a server to a client by using TCP/IP. HTTP communications are in plain text and not encrypted.

- HTTPS

HTTPS enables you to make a secure Web server connection by using Secure Sockets Layer (SSL). SSL is an encryption technology that enables a secure connection between a server and a client. The URLs for Web pages that require an SSL connection start with `https://`.

- FTP

FTP enables you to transfer files between two computers on a network.

- SMTP

SMTP enables you to send e-mail over the Internet.

- NNTP

NNTP enables you to post, distribute, and retrieve messages on Internet and intranet newsgroups.

- HTML

HTML is the standard language for creating and formatting Web pages. HTML defines how text appears when viewed in a Web browser.

- DHTML

DHTML refers to HTML extensions that support animations and enable you to create interactive Web pages.

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Uniform Resource Locator (URL)

Slide Objective

To introduce the concept of a URL.

Lead-in

A URL specifies a unique address for files on a computer connected to the Internet.

■ **URL (<http://example.microsoft.com/tutorial/default.html>)**

- Protocol used (<http://>)
- DNS address (example.microsoft.com)
- Path on the server ([/tutorial/default.html](http://example.microsoft.com/tutorial/default.html))

<http://example.microsoft.com/tutorial/default.html>

Key Point

The Tip at the bottom of the page mentions that URLs are not case-sensitive on a Windows 2000-based server. This is true only when the Web site you are accessing is on a Windows 2000-based server and not if you are accessing a Web site from a Windows 2000-based server.

Although a domain name provides a convenient way of referring to a specific computer on the Internet, you rarely want to just connect to a computer. More often, you want to retrieve information from a file on the computer. To access a file on a computer connected to the Internet, you must know the path to that file, known as its address. The addressing system developed for this purpose is called a Uniform Resource Locator (URL).

What is a Uniform Resource Locator (URL)?

A URL specifies a unique address for each file stored on a computer that is connected to the Internet. An example of a URL is:

<http://example.microsoft.com/tutorial/default.html>

The first part of the URL ([http](http://)) corresponds to the particular protocol you are using, such as HTTP, HTTPS, or FTP. The second part of the URL (example.microsoft.com) corresponds to a domain name or DNS address, which is translated into a numeric IP address when a request to transmit data is sent.

The information to the right of the domain name in the URL ([/tutorial/default.html](http://example.microsoft.com/tutorial/default.html)) is the path to the actual resource and includes the name and type of file you want to display or retrieve. This path is similar to the path to a file on your computer. If the path is omitted, the server normally provides a default response based on the protocol used. For example, the default response to an HTTP request may be to display the file named `Index.html` or `Default.html`.

Tip Some URLs are case-sensitive. The first part of the URL is not case-sensitive, but path and file name information may be case-sensitive on some computer operating systems. So, if a URL does not seem to work, verify that you typed it in the same case as it was given to you. However, all URLs are not case-sensitive on a Windows 2000-based server.

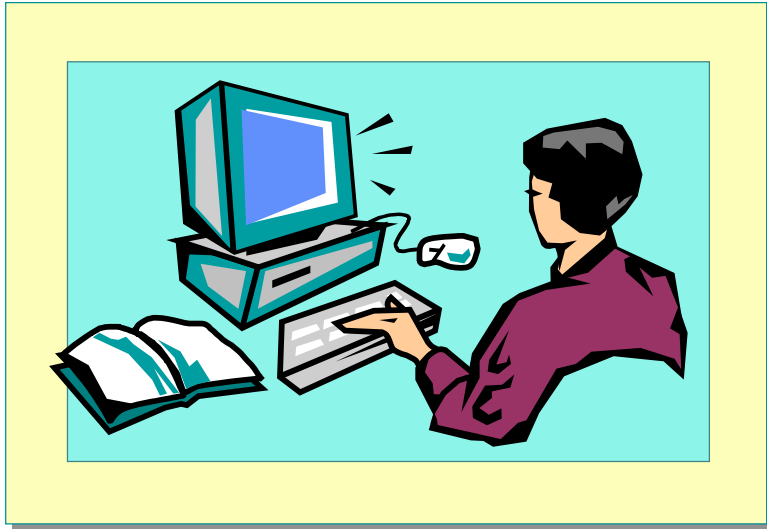
Lab A: Accessing an FTP Site by Using Internet Explorer

Slide Objective

To introduce the lab.

Lead-in

In this lab, you will access an FTP site by using Internet Explorer.



Objectives

After completing this lab, you will be able to:

- Use a Uniform Resource Locator (URL) to locate information on the Internet by using Internet Explorer.
- Use Internet Explorer to access an FTP site.

Prerequisites

Before working on this lab, you must have:

- Knowledge of how to log on to Windows 2000.

Lab Setup

To complete this lab, you need the name of the instructor's FTP server.

Estimated time to complete this lab: 15 minutes

Exercise 1




Accessing an FTP Site by Using Internet Explorer

Scenario

You are an administrator responsible for updating client computers with the most recent drivers. You need to download both the video and network adapter files from the corporate FTP site.

Goal

In this exercise, you will use Internet Explorer to connect to an FTP site and download files to your local computer.

Tasks	Detailed Steps
1. Log on as Administrator with a password of password , and then download both files from the FTP server located at london.nwtraders.msft. Log off when you are finished.	<ol style="list-style-type: none"> Log on to Windows 2000 as Administrator with a password of password. On the desktop, double-click the Internet Explorer icon.
<p> Which protocol in the URL is used to connect to the page that opens by default in Internet Explorer?</p> <p>http.</p> <p>_____</p> <p>_____</p>	
<p> Which protocol in the URL will you use to connect to an FTP site?</p> <p>ftp.</p> <p>_____</p> <p>_____</p>	
1. (continued)	<ol style="list-style-type: none"> Type ftp://london.nwtraders.msft in the Address bar, and then press ENTER. Open the Drivers folder. Right-click the Nadriver.zip file, and then click copy to folder. <p> <i>The Browse for Folder dialog box appears.</i></p> <ol style="list-style-type: none"> In the console tree, expand My Computer, Local Disk (C:), Moc, 2151A, Labs, and Lab09, and then click OK. Right-click the Videodriver.zip file, and then click copy to folder. In the console tree, expand My Computer, Local Disk (C:), Moc, 2151A, Labs, and Lab09, and then click OK. Close all windows and log off from Windows 2000.

◆ Connecting to the Internet

Slide Objective

To introduce the physical components used to securely connect your network to the Internet.

Lead-in

Network security is an important consideration when connecting your network to the Internet.

- **Network Address Translators (NATs)**
- **Proxy Servers**
- **Firewalls**
- **Microsoft Proxy Server**

It is important to consider network security when connecting your Windows 2000 network to the Internet. When a user connects to the Internet, other computers can access the user's computer, which increases the possibility of unauthorized access by other users. In a private intranet, however, security threats are reduced because a private intranet is internal to an organization and is not easily accessible to the public. The physical components used to securely connect a network to the Internet include network address translators (NATs), proxy servers, and firewalls.

- *Network address translators (NATs)*. Enable you to configure a home or small office network to share a single connection to the Internet.
- *Proxy servers*. Replace the private IP addresses of the computers sending requests to an Internet server with the public IP addresses assigned by an ISP to the proxy servers.
- *Firewalls*. Act as security barriers between an intranet and the Internet to guard against intrusion by unauthorized users.

Microsoft implements both a proxy server and a firewall in a single product, the Microsoft Proxy Server.

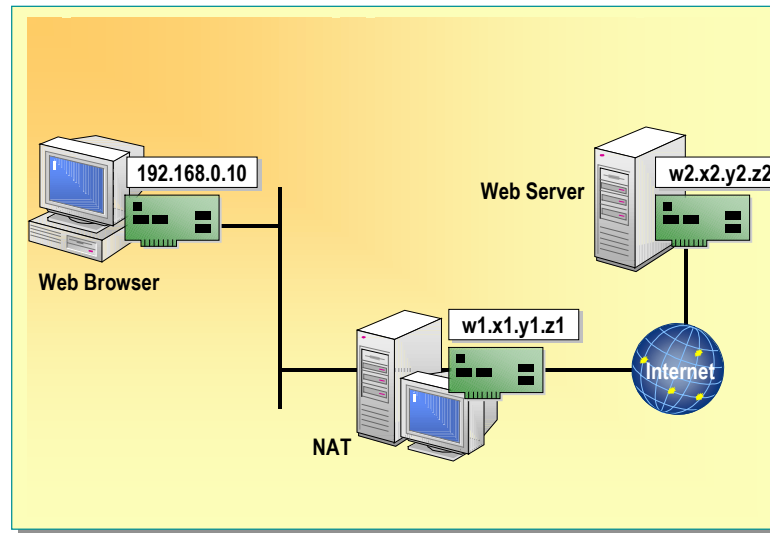
Network Address Translators (NATs)

Slide Objective

To introduce the role of NATs in Internet communications.

Lead-in

NATs enable intranets to connect to the Internet by translating the private addresses used by intranets to public addresses and vice versa.

**Delivery Tip**

NAT officially stands for Network Address Translator, however many sources also use NAT to represent Network Address Translation.

Private addresses cannot receive traffic from Internet locations. Therefore, to enable a network, which uses private addresses internally, to communicate with Internet locations, you must use a *network address translator (NAT)*. The NAT is a device, or service, that translates private IP addresses to public IP addresses. Network address translation is an Internet standard that enables a public intranet to use a set of private IP addresses for internal traffic and to connect to a computer that uses a public IP address for external traffic.

How Does a NAT Work?

The NAT is a router that is placed between a public intranet, which uses private IP addresses, and the Internet, which uses public IP addresses. The NAT translates the private IP addresses of outgoing packets into public IP addresses. It also translates the public IP addresses of incoming packets from the Internet into private IP addresses.

NATs serve two main purposes:

- Increase security by hiding internal IP addresses
- Enable an organization to require fewer public IP addresses

Windows 2000 NAT Services

Microsoft Windows 2000 includes NAT services that enable you to configure your home network or small office network to share a single connection to the Internet.

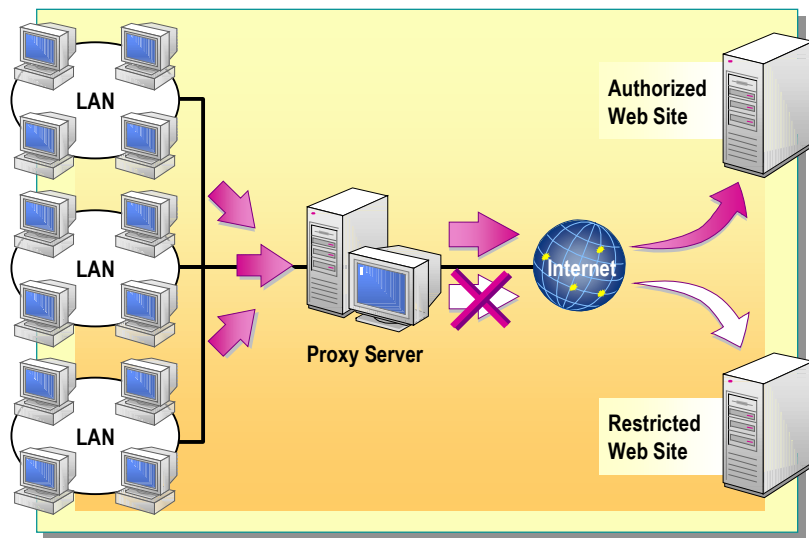
Proxy Servers

Slide Objective

To illustrate the role of a proxy server in connecting to the Internet.

Lead-in

A proxy server enables you to connect multiple users to the Internet by using a single IP address.



Delivery Tip

Point out to the class that in this topic you will be discussing the concept of a proxy server in general, not the Microsoft Proxy Server software specifically. Note that a proxy server is more robust than a NAT.

Use the slide to explain that a proxy server can be used to prevent users in a Windows 2000 network from accessing restricted Web sites.

Most home and small office networks use a dial-up or modem network connection to an ISP, which in turn connects them to the Internet. The ISP assigns a single IP address to each network for connecting to the Internet. In addition, each computer in a network requires an IP address for Internet connection. Rather than using separate IP addresses for each computer, it is more cost-effective to use a single IP address for multiple computers. A *proxy server* is a firewall component that enables you to connect multiple computers in a network to the Internet by using a single IP address.

Proxy servers have two main functions: to improve network performance and filter client requests.

- Improve performance

Proxy servers reduce the time it takes to respond to requests made by groups of users. This is because a proxy server caches, or saves, the results of all requests made during an interval of time. If a user wants to redisplay a Web page that was requested earlier, the proxy server simply returns that page to the user rather than forwarding the request to the Web server and downloading the page again.

- Filter client requests

Proxy servers can also be used to filter client requests for certain Internet connections. For example, a company can use a proxy server to prevent its employees from accessing a specific set of Web sites.

How Does a Proxy Server Work?

When using a proxy server, the computers on the local network are configured for private IP addresses. When a computer makes a request to connect to the Internet, the computer passes its data through the TCP/IP network to the proxy server. The proxy server modifies the request, inserts its own name and IP address, which was provided by the ISP, and sends the data out on the Internet. When a response to the request is received, the proxy server passes it back through the local network to the computer that initiated the request.

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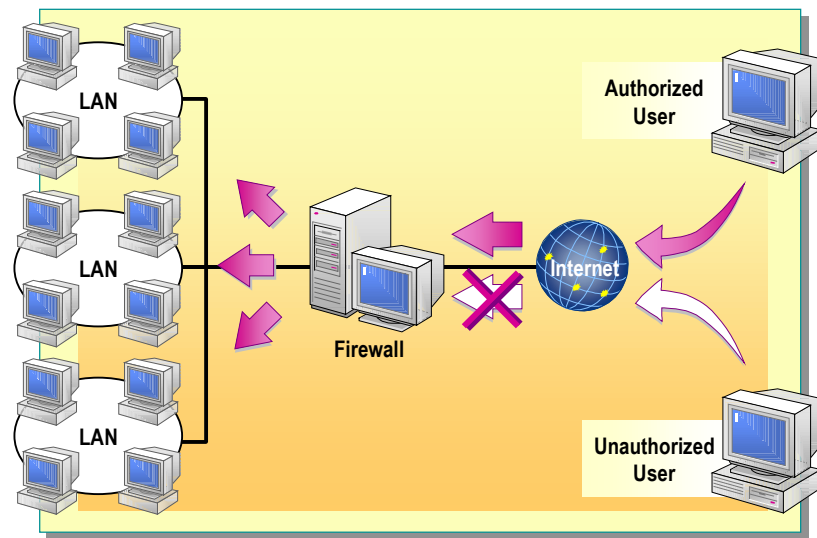
Firewalls

Slide Objective

To illustrate how firewalls function.

Lead-in

Firewalls prevent unauthorized access to a private network.

**Delivery Tip**

Use the graphics slide to explain that a firewall can be used to restrict access to a network by unauthorized users.

Any network that is connected to the Internet should pass communication through a *firewall*. A firewall is a combination of hardware and software that prevents unauthorized access to an internal network from outside. All messages entering or leaving a network pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria. A firewall filters out traffic that should not pass between the Internet and your private network, such as messages between two computers within your private network.

How Does a Firewall Work?

A firewall prevents direct communication between network and external computers by routing communication through a proxy server located outside of the network. The firewall determines if it is safe to let a file pass to the network and from the network. A firewall is also called a security-edge gateway.

Note A gateway is a system that is connected to multiple physical TCP/IP networks and is capable of routing or delivering IP packets between them. A gateway translates between different transport protocols or data formats, such as IPX and IP, and is added to a network primarily for its translating ability.

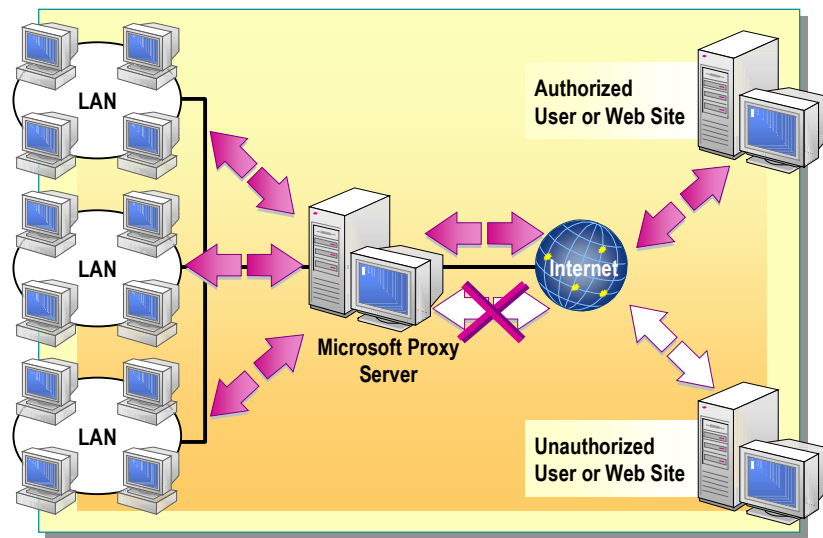
Microsoft Proxy Server

Slide Objective

To introduce Microsoft Proxy Server.

Lead-in

Microsoft Proxy Server enables users to access the Internet from a secured local area network (LAN).

**Delivery Tip**

Use the slide to explain that Microsoft Proxy Server can be used to prevent users in a network from accessing restricted Web sites, as well as to deny unauthorized users access to a private network.

Microsoft provides software that combines the features of a proxy server and a firewall into a single product, Microsoft Proxy Server.

How Does Microsoft Proxy Server Work?

Microsoft Proxy Server acts as a secure gateway between your LAN and the Internet. A gateway enables two different networks to communicate. Proxy Server provides a connection to the Internet for your group, division, or your entire intranet. Proxy Server also acts as a secure gateway and a firewall by allowing inbound access from the Internet to your network.

By using a Proxy Server gateway, you can secure your network against intrusion. Proxy Server enables you to make requests to the Internet and to receive information, but it prevents unauthorized users from accessing your network.

You can configure Proxy Server to enable your workstations to communicate with remote services on the Internet. To do this, you select the appropriate hardware for Proxy Server, making sure that you have adequate bandwidth for the Internet connection, and choose the level of security at which you want to protect your LAN.

Note Microsoft Proxy Server is not a part of the Windows 2000 operating system.

◆ Identifying Web Server Concepts

Slide Objective

To introduce such concepts as Web servers and Internet Information Services.

Lead-in

You can set up a Web server to host your own Web site.

- **Defining a Web Server**
- **Microsoft Internet Information Services (IIS)**

You can host your own Web services on the Internet by setting up a Web site. However, to set up your own Web site on the Internet, you must be familiar with the server technologies and methods available for providing content on the Internet.

Microsoft Internet Information Services (IIS) is a common software that enables you to provide content on the Internet. Using IIS, it is possible to provide services, such as Web pages, interactive applications, and catalogs for customers, and to post and track databases on the Web.

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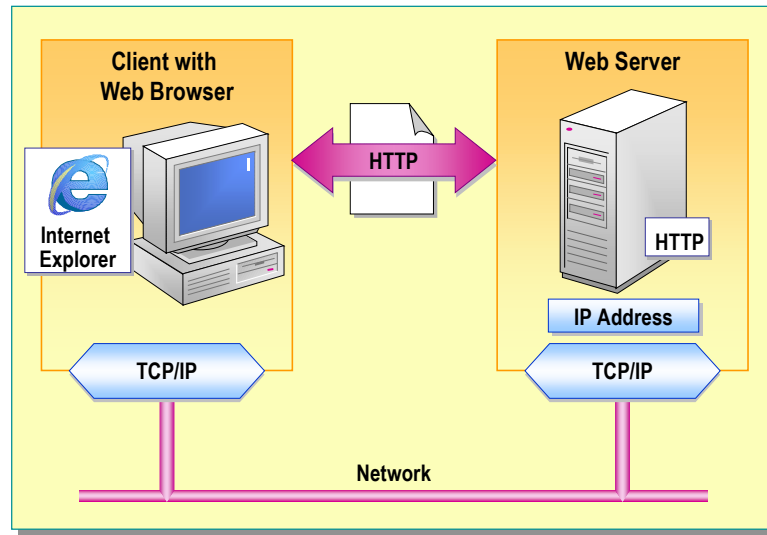
Defining a Web Server

Slide Objective

To define a Web server.

Lead-in

A Web server is a computer that sends Web page content to the client computers requesting it.

**Key Point**

The terms Web server and HTTP server are synonymous because URLs that identify data on a Web server begin with http.

A client computer connects to the Internet or an intranet by using a Web browser to find information stored and organized on a *Web server*.

A Web server is a computer that uses TCP/IP to send Web page content to client computers over a network. A Web server communicates with clients by using an appropriate protocol, such as HTTP or HTTPS. The terms Web server and HTTP server are synonymous, because URLs identifying data on a Web server begin with http. For example, the Microsoft Web site is <http://example.microsoft.com/>.

Every Web server has an IP address and perhaps a domain name. For example, when you enter the URL <http://example.microsoft.com/webpage.htm> in your Web browser, it sends a request to the Web server with the domain name microsoft.com. Then the Web server locates and retrieves the page ms.htm, and sends it to your browser.

Microsoft Internet Information Services (IIS)

Slide Objective

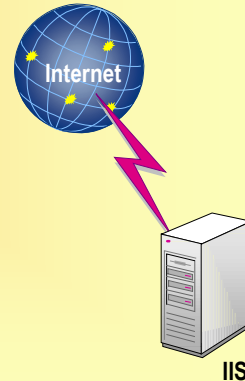
To introduce the features of IIS.

Lead-in

IIS is network file and application server software that uses HTTP and FTP to provide information over the Internet or over an intranet.

Features of IIS

- Indexing Service
- Secure Sockets Layer
- Windows Media Services
- Additional Developer Support
 - Active Server Pages
 - VBScript and JavaScript support
 - Remote administration

**Key Point**

IIS provides HTTP, FTP, NNTP, and SMTP services. Note that HTTPS is supported as well but is considered a part of HTTP.

Windows 2000 includes Microsoft Internet Information Services (IIS), a network file and application server service that uses HTTP, FTP, NNTP, and SMTP to provide information over the Internet or an intranet.

IIS provides many useful features, including Microsoft Indexing Service, Secure Sockets Layer (SSL) support, Microsoft Windows Media Services, and additional developer support.

Indexing Service

Microsoft Indexing Service is a search engine that is integrated with IIS. When you install Indexing Service, it builds an index of files on the Web server. You can then search this index by using any Web browser with built-in search forms. The index is updated automatically whenever a file is added, deleted, or changed on the Web server.

Secure Sockets Layer (SSL)

IIS supports Secure Sockets Layer (SSL), which provides a security handshake between the Web server and a client before initiating a TCP/IP connection. This handshake establishes the level of security the client and Web server use and fulfills any authentication requirements for the connection. SSL also enables you to encrypt all of the information sent between the client and the Web server. HTTPS is a version of the HTTP protocol that uses SSL to secure communications between a Web server and clients.

Windows Media Services

IIS includes Microsoft Windows Media Services. Windows Media Services is a specification that enables Internet users to download live video, audio, and animation files from Web pages. It is a standards-based platform that delivers on-demand and live content for enhanced communication over the Internet.

Additional Developer Support

IIS provides additional developer support for Active Server Pages, scripting languages, such as VBScript and JavaScript, and remote administration using Microsoft FrontPage®.

- Active Server Pages (ASP) is an open environment in which developers can combine HTML and programming to create dynamic and powerful Web sites. The creation of dynamic content for Web pages is made possible by providing users with live access to a local database containing the latest information.
- VBScript and JavaScript are two of the scripting languages that developers commonly use to create dynamic Web pages. The content of such Web pages changes based on user interaction or input. For example, a Web site that requires a valid user name and access password returns different pages based on whether or not the user enters a correct user name and password.
- IIS enables developers to remotely administer Web pages by using Microsoft FrontPage, a visual authoring and Web-site management tool.

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Lab B: Identifying Web Concepts

Slide Objective

To introduce the lab.

Lead-in

In this lab, you will demonstrate your knowledge of Web concepts and terminology.



Objectives

After completing this lab, you will be able to:

- Demonstrate your knowledge of Web concepts and terminology.

Lab Setup

This lab is a simulation. To complete this lab, you need the following:

- A computer running Microsoft Windows 2000, Microsoft Windows NT® version 4.0, Microsoft Windows 98, or Microsoft Windows 95.
- Microsoft Internet Explorer 5 or higher.
- A minimum display resolution of 800 x 600 with 256 colors. Recommended display resolution of 800 x 600 with high color (16-bit).

► To start the lab

1. Log on to Windows 2000 as Administrator with a password of **password**.
2. On the desktop, double-click the **Internet Explorer** icon.
3. On the Student Materials Web page, click **Lab Simulations**.
4. Click **Identifying Web Concepts**.
5. Read the introduction information, and then click the link to begin the simulation.

Estimated time to complete this lab: 15 minutes

Review

Slide Objective

To reinforce module objectives by reviewing key points.

Lead-in

The review questions cover some of the key concepts taught in the module.

- Identifying Internet Concepts
- Using Client Technologies
- Connecting to the Internet
- Identifying Web Server Concepts

-
1. You want to register a domain name for use on the Internet. What is a valid example of a domain name that could be used to communicate on the Internet?

example.microsoft.com.

2. You want to use a Web browser and an Internet-based application, such as a newsreader, to improve the sharing of information on your local network. Which protocol stack do you need to install before using these applications?

TCP/IP.

3. You want to find information on the Internet by using a Web browser. What must you type in the Web browser's Address bar to access a particular site? Which three pieces of information are included in the information you've typed?

A URL that includes the protocol used to connect to the Internet, the domain name, and the path to the file you want to download.

4. You want to reduce the number of public IP addresses you are leasing from an ISP. What can you install that will enable you to use private IP addresses for your internal network and still maintain connectivity with the Internet?

You can install either a NAT or a proxy server.

5. You want to create a Web site that allows your customers to view all of your products on the Internet. You also want your customers to be able to communicate online to share suggestions about using your products. What can you use to enable both HTTP and NNTP access to a computer on your network?

IIS.

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