Microsoft®
BackOffice™

Microsoft®

Microsoft®
Internet
Information Server™

Web Server for Windows NT Server

Overview for Reviewers

March 1996

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Microsoft® Internet Information Server 1.0

Microsoft Internet Information Server Overview for Reviewers

Abstract

The following paper provides a framework and examples for evaluating the features and capabilities of the Microsoft® Internet Information Server. This document covers: the ease of installation and management, the powerful performance and security, and the ease of extensibility. Setup instructions help the reader establish a variety of testable installations. The "Test Drive" takes the reader on a guided tour that includes installing servers and clients, the creation of an intranet server, building an Internet 'presence' server, including sharing information securely, and concludes with an example of an extension to the Web site for sharing data dynamically from a SQL Server™ database.

Overview on

Welcome to the Microsoft® Internet Information Server (IIS) Reviewer's guide. This guide describes key capabilities and features of IIS. The Internet Information Server is the only World Wide Web (Web) server tightly integrated with the Microsoft Windows NT® Server operating system and designed to deliver a wide range of Internet and intranet server capabilities. It is a powerful Web server and also easy to install and manage. By optimizing around the Windows NT Server platform, the Microsoft Internet Information Server delivers high performance, excellent security, and ease of management. It serves as the best platform for both integrating with existing solutions and delivering a new generation of Web applications.

Customers of all types have long sought a method to establish global communications with their partners and customers. The Microsoft Internet Information Sever is the easiest way to publish information for customers—whether across the street or around the world. While the Internet and the Web provide a foundation for global communications, no server product available today delivers the necessary capabilities.

Customers told Microsoft that they wanted to use the Internet to improve their ability to interactively publish information to their customers, partners, and employees. They also described several challenges that needed to be overcome before they could take advantage of the Internet. The issues include:

• Installation and management are complex and inconsistent with the underlying operating system, forcing systems administrators to learn multiple tools to set up, manage, and run a single server.

• Today's products are too slow or unstable and do not deliver adequate security.

• Current platforms lack an open programmable interface for using packaged applications and developing customized solutions.

• Many of the offerings fail to integrate with existing software solutions or platforms.

Microsoft's strategy for Internet server products is to build on the Windows NT Server platform and the Microsoft BackOffice™ family of server applications to respond directly to these requirements.

The Microsoft Internet Information Server delivers an easily installed and managed, high speed, secure information publishing solution while also

The Easiest to Set Up and Manage Server

serving as a platform for developers and Independent Software Vendors (ISVs). The primary capabilities of the Microsoft Internet Information Server include:

- World Wide Web Service

- Gopher and FTP Service

- Internet Service Manager

- Internet Database Connector

- Secure Sockets Layer (SSL)

- Client browsers for Windows® 3.11, Windows® for Workgroups, Windows NT, and Windows® 95[1]

While other products provide some subset of these features, only the Microsoft Internet Information Server offers this customer-defined combination. In addition, the Internet Information Server delivers a unique set of advantages:

- Easy to set up and manage

- High performance, reliability, and security

- Solutions platform[2] that extends current tools

Before the Internet became a widespread phenomenon, the difficulty of installing traditional UNIX Web servers was not a limiting factor. Expert UNIX administrators were available to manage every server in operation. Administration was less of a concern because the person responsible usually sat at the machine. Using browsers for administration was not a secure model and the performance and administration tools were not integrated with the operating system, thereby causing duplicate work.

Today, server installations are exploding, with International Data Corporation forecasting 165,000 new servers for the U.S. alone in 1996. Implementation must be simple and integrated, or the extra work caused by UNIX will severely constrain the number of people and sites able to benefit from this new communication platform.

The Microsoft Internet Information Server addresses these fundamental customer concerns by delivering the right combination of facilities. They include:

- A simple graphical installation process. This ensures that even novice sites will be up and running in minutes.

- The Internet Service Manager uses the Windows NT DCE-compatible Remote Procedure Call (RPC) to securely administer the server and all the Web applications running on it. Customers can manage systems locally, over their LAN,

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[1] While these clients are shipped in the box, Internet Information Server works with all HTML browsers including those designed for the Macintosh® and UNIX® platforms.

[2] Including Microsoft BackOffice and other packaged solutions based on the Internet Server API.

and even over the Internet from a single desktop of Windows NT Workstation

The Most Powerful Web Server

3.51.[3]

- All user account creation and management and File Access Controls are managed through the graphical Windows NT Server administration tools.

- The Windows NT Performance Monitor makes it easy to analyze valuable performance information for systems management and site traffic analysis.

The Internet Information Server is the fastest Windows NT-based Web server available. IIS is also faster than more expensive UNIX solutions. In the past, Web servers did not focus on performance. This might have been acceptable because Web servers were running on dedicated servers and low-speed links were prevalent. Today, the importance of Web server performance is exploding for several reasons, including:

- Applications are being integrated with Web sites

- Content is increasingly dynamic

- The average Web page size is increasing

- Most Web servers will run on intranets

- Higher bandwidth is becoming available

Overall, the Microsoft Internet Information server optimizes valuable system resources, including CPU and memory, thus delivering better levels of system performance than other products. IIS delivers new levels of Web server performance by being tightly integrated with the Windows NT Server operating system.

When the primary purpose of the Internet was focused on academic uses and research, concerns about security were minimal. Today, users of the Internet consider it an extension of their own local and wide area networks. Customers want to make purchases, passing personal credit information to vendors in the process. And companies are seeking to make product information available to specific partners—but not to competitors. Hence, a key concern of Internet site managers (or *WebMasters*) is the security of their site. To be effective, a secure Internet server must:

- Be built on a highly secure operating system

- Have user account information integrated with the host operating system thereby avoiding duplication of administration effort

- Protect the information on the site and the server—whether internal or external

- Be easy to implement and manage

- Integrate into the base operating system's security for access control

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[3] Of course, Internet Service Manager can also run on any Internet Information Server. Remote administration works whether running from a server or a workstation.

- Protect user accounts and passwords even if the Web server is compromised by an

outside influence

- Control the security context of the anonymous user
- Offer encrypted communications between the server and its clients

To help ensure the optimal level of security, the Microsoft Internet Information Server integrates tightly with the native security features of Windows NT Server. The Internet Information Server uses the Windows NT User Accounts Database to manage individual user and group access to the server. It also uses the Windows NT Access Control Lists to ensure that, even though access to the server has been granted, only the intended files are actually available for access by the proper groups or individuals. Internet Information Server also includes the Secure Sockets Layer encrypted communication standard for private communication between the client and the server.

When the Internet served as a platform for experimentation and trial, high levels of reliability were not required. Today, customers installing Web servers are doing so to run important aspects of their business. Whether the goal of a Web site is the publication of information, the delivery of technical support, or the actual commercial sale of goods and services, servers are becoming mission critical platforms. Whether internal or external, if a server fails, the business suffers. As a result, high availability is critical.

Internet Information Server provides this reliable platform by relying on Windows NT Server to provide:

- **Protected Memory Architecture** that ensures that other failing applications will not effect the Web server. A single failing application will not impede the server itself.

- **Structured Exception Handling** which assures that a failing user request is handled gracefully by the operating system, returning all resources back to the system.

- **Reliable Storage Systems** such as RAID5, disk mirroring, and drive duplexing which ensures that the system continues to operate even if a disk or disk component fails.

- **Windows NT File System (NTFS***)* which is a transaction-based file system that ensures rapid file system recovery in the event of a system failure.

- **Built-in UPS Support** that protects against temporary power outages.

Because of its easy navigational capabilities, the Web was the first broadly interesting Internet application. In the past, offering a Web server that focused singularly on shuffling HTML documents over the Internet for users to browse was sufficient. Today, customers want a much wider range of capabilities. They need, for example, to publish their databases directly onto the Internet. Increasingly customers want to use the Web as the basis for delivering access to Microsoft BackOffice and to thousands of other Win32®-based applications that are already available.

The Internet Information Server offers a unique combination of development capabilities. In fact, many aspects of this open interface were designed as part of Microsoft's ongoing open design process. Hundreds of Independent Software Vendors and Internet Service Providers (ISPs) have visited Microsoft to guide us on the development of our server programmability. The result, is a uniquely rich and high-performance set of capabilities and a community of developers that are porting outstanding application solutions to the Internet Information Server.

It is possible to extend the capabilities of an Internet Information Server using a variety of methods.

- Internet Information Server brings the capabilities of Microsoft BackOffice to the Internet. This approach delivers immediate value to Web sites by serving as the basis for online database publishing. The Internet Information Server includes the ISAPI application called the *Internet Database Connector*. Internet Database Connector attaches to data bases such as Microsoft SQL Server™ and other Open Database Connectivity databases for both read and write operations over the Web. Moreover, when attached to SQL Server, customers will be able to take advantage of all of the advanced facilities and the tremendous transaction processing it offers, like stored procedures, triggers, and replication.

- Third parties that have developed applications for the BackOffice platform will find that extending the services of their solution over the Internet will be vastly simplified. The integration between BackOffice and the Internet Information Server becomes, essentially, the operating system against which "Internet-aware" accounting systems, search engines, indexing tools, and other solutions will be delivered. Some ISVs are already writing Web-aware applications based on the combination of Internet Information Server and the BackOffice family of products.

- The Internet Server Applications Programming Interface (ISAPI) provides the basis for developing new server functionality and interoperating with other systems in the enterprise. ISAPI can be used to develop applications like Microsoft's Internet Database Connector. Unlike typical Internet development environments, ISAPI's threaded architecture, based on Dynamic Link Libraries, optimizes server performance by avoiding expensive process creation. ISAPI also enables applications to maintain their present state between executions, further improving performance. ISAPI helps developers extend the thousands of Win32-based solutions for use on the Internet.

- Internet Information Server supports the industry standard Common Gateway Interface (CGI) as well as applications written in Perl, the most common method for developing simple Web applications such as data input forms and log analysis routines.

- Directing systems to monitor traffic on sites either in text files that can be automatically closed and restarted, or to an ODBC database. These logging options provide a rich store for creating reporting analysis using industry standard tools like Microsoft Excel and Microsoft Access.

Completing the exercises in the following section will assist you in your effort to appreciate the ca-
pabilities of
the

A Guided Tour of the Internet Information Server

Microsoft
Internet Information Server. Please note that once you have installed IIS a "Guided Tour" automatically installs along with a variety of samples. We encourage you to examine these pages. They can be found on the home page of your Internet Information Server. Browsers accessing your server will default to the samples automatically.

Getting Ready for the Internet Information Server Test Drive

To successfully set up this test drive of Microsoft Internet Information Server, some level of familiarity with the following will be helpful:

- Installing and configuring Microsoft Windows NT Server

- Creating accounts, policies, and assigning user rights on Windows NT Server

- Installing and configuring Windows 95

- Installing Microsoft SQL Server

Note All server hardware must be on the Windows NT version 3.51 Hardware Compatibility List (HCL).

Windows NT Server 3.51 Service Pack 3 needs to be installed on all of you machines that are running Windows NT Server. For our customers's convenience we include the Service Pack on our CD-ROM. See Appendix A for installation instructions.

Computer 1 (IISServer)

Hardware

50 MHz 80486 or higher CPU (a Pentium® 90 is recommended)

Minimum of 16 MB RAM (32 to 64 MB of RAM is recommended)

Minimum of 50 MB free hard disk space

Microsoft Mouse

Network Adapter Card and related cables

VGA, SVGA, or XGA display adapter and monitor

CD-ROM drive3.5-inch 1.44 MB floppy disk drive

Software

Microsoft Windows NT Server 3.51 with Service Pack 3

Windows NT Server set up as a Server with TCP/IP installed

Set TCP/IP addresses to 10.100.100.1 and TCP/IP address 10.100.100.2 (Additional TCP/IP address can be configured in the TCP/IP Configuration Advanced Dialog box)

The C drive installed using the NTFS file system (this is required for the security exercises)

Computer 2 (Client Machine)

Hardware

50 MHz 80486 or higher CPU

Minimum of 8 MB RAM

Minimum of 200 MB hard drive

Microsoft Mouse

Network Adapter Card and related cables

VGA, SVGA, or XGA display adapter and monitor

CD-ROM drive (optional)3.5-inch 1.44 MB floppy disk drive (optional)

Software

Microsoft Windows 95

Windows Networking with TCP/IP installed

TCP/IP Address set to 10.100.100.3

Microsoft Internet Explorer 2.0

(Optional) Computer 3 (IISSQL)

Hardware

50 MHz 80486 or higher CPU (a Pentium 90 is recommended)

Minimum of 16 MB RAM (32 to 64 MB of RAM is recommended)

Minimum of 45 MB free hard disk space

Microsoft Mouse

Network Adapter Card and related cables

VGA, SVGA, or XGA display adapter and monitor

CD-ROM drive3.5-inch 1.44 MB floppy disk drive

Software

Microsoft Windows NT Server 3.51 Service Pack 3

Windows NT Server set up as a Server with TCP/IP installed

TCP/IP Address set to 10.100.100.4

Microsoft SQL Server 6.0

The following materials should be available:

1. Microsoft Internet Information Server Installation and Planning

        Guide

2. Microsoft Internet Information Server Product Documentation (installed as a help file in the Internet Information Server program group)

3. Windows NT Server documentation

4. Microsoft SQL Server documentation

The test drive requires a minimum of two computers. Computers will be configured according to their roles. Installation instructions for an optional second server are included also.

Note These lab exercises are predicated on two or three computers networked together with one of the following network protocols: TCP/IP for Internet protocols (HTTP, FTP, Gopher) and TCP/IP, IPX, or NetBEUI for administration. A MicroHub can be used to isolate the test drive systems from other networks. No Internet connection is required to complete this test drive.

    The following set up instructions gives the machine and workgroup names for this test drive. You are free to use whatever existing machine names and structures that you currently have in place. These names have been established and tested for purposes of the test drive scenarios but are not mandatory.

Remember If your card is not on the HCL, you'll need to obtain a Windows NT driver from the card manufacturer.

1. Read this documentation before you begin configuring the computers.

2. Computer 1's Windows NT Server computer name will be **IISServer**. The domain or workgroup name will be **IISDOM1**.
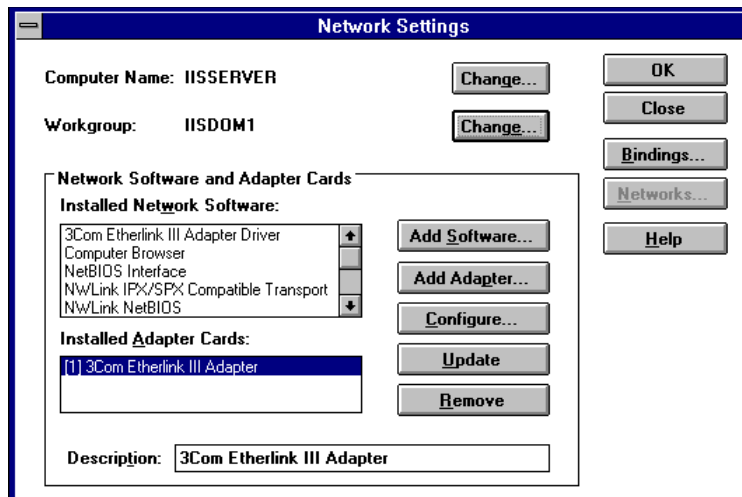
3. Computer 2's Windows 95 computer name will be **Explorer**. The domain or workgroup name will be **IISDOM1**.
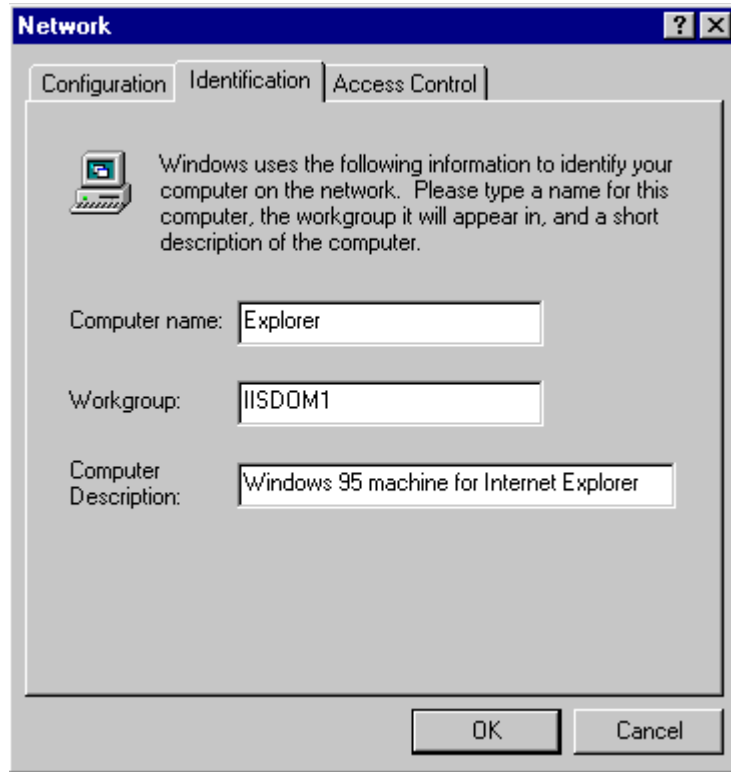
4. Computer 3, if used, will be a Windows NT Server and computername will be **IISSQL**. The domain or workgroup name will be **IISDOM1**.

5. Make sure all Windows NT Server machines have Service Pack 3 installed. Look in Appendix A for Service Pack installation instructions.

6. The Administrator account on the Windows NT Server "IISServer" must be created using *password* for the account password. If you set up the second optional server "IISSQL" you should also use *password* as the Administrator account password.

Security Note When setting up a real IIS server for connection to an intranet or the Internet you should always use passwords that are difficult to guess. A good rule is to always make passwords greater then 12 characters, make passwords alpha-numeric, and change them frequently. For this Test Drive we have made the Administrative password, *password*, only to make the test easier.

Internet Information Server Test Drive

Exercise #1: Creating remote client setup shares on the IISServer

This exercise sets up a network share for installing all the Internet Information Server
clients remotely. This enables you to remotely install any of the Internet Explorer
clients from over the network thereby saving administrative time.

Note Intranet users of the Internet Information Server are all automatically licensed to
use any Microsoft Windows Internet Explorer browser at no additional charge.

1. Insert IIS compact disc into CD-ROM drive of the IIS Server.

2. Start File Manager.

3. Create a directory on the C drive called CLIENTS.

4. Copy the CLIENTS directory off of the IIS CD-ROM into the ***CLIENTS***
    directory on the C drive.

5. From File Manager share the CLIENTS that can be accessed over the net-
    work. Highlight the ***c:\client*** directory in File Manager, then from the **Disk**
    menu click **Share As** to create the share.

Note If you choose to copy these files off the compact disc from the com-
mand prompt instead of File Manager, make sure to use XCOPY because there
are sub-directories that need to copied. XCOPY /S will copy all the files in the
root and all sub-directories.

Exercise #2: Setting up Windows 95 Internet Explorer

1. Connect to the IISServer, Clients share

2. Change directories to ***c:\windows***

3. From the start button select **Run**, then type ***install c:\win95.*** Click **OK**

4. Click **Yes** from the dialog box asking for installation confirmation

5. Click **I Agree** from the **License Agreement** dialog box

6. Click **OK** on **Installation Complete** dialog box

7. Click **Yes** on the **Windows NT LAN Manager Authentication Exten-
    sions for Microsoft Internet Explorer** dialog box

8. Click **OK** on **Installation Complete** dialog box

Exercise #3: Setting up SQL Server on the optional Windows NT Server

This set can be performed either on the optional second server, IISSQL, or on the IISServer (the same machine as the Internet Information Server). If you are going to install IISServer on this machine it should be at least a Pentium with 32 megabytes of memory.

1. Insert the Microsoft SQL Server 6.0 compact disc into the CD-ROM drive on the server you are installing to.

2. Log on to the server as **Administrator** using *password* for the password.

3. Start File Manager, and then select the **CD-ROM** drive.

4. From the root of the CD-ROM, switch the directory into the directory of the server processor type you are running, either an I386 for an Intel-based processor, Alpha for a Digital Alpha-based processor, and MIPS® for a MIPS R4x00.

5. Highlight **Setup.exe** in the processor specific directory and from the File menu select **Run.**

6. Click **OK.**

7. Click **Continue** at the **Welcome** dialog box.

8. ENTER your Name and Organization, then click **Continue.**

9. Click **Continue** to verify the Name and Organization.

10. Click **Continue** to install the SQL Server and the Utilities.

11. For this Test Drive you should select **Per Server** for 10 connections Licensing Mode and click **Continue** (see note at the end of this section).

12. Select **I agree that,** and then click **OK.**

13. Click the directory you would like SQL Server to install in, the default is *c:\sql60*. Click **Continue.**

14. Click **Continue** to accept the default Master device creation (25 megabytes).

15. At this point you can click to install the SQL Server Books Online on the hard disk, to run them from the compact disc or to not install them at all. Make a choice and then click **Continue**.

16. Click **Continue** to select the default for the Installation Options.

17. ENTER the password for the Administrative account you want the SQL Executive to run in. In this case ENTER *password* (because you have created the Administrative password as *password*) and click **Continue.**

18. Setup will now set up the software and create the master database. This will take about 10-15 minutes (depending on the server you are installing on).

19. Click **Reboot** to complete the installation.

Note When licensing Microsoft SQL Server to connect via a World Wide

Web server the Administrator needs to purchase the SQL Server Internet Con-nector in addition to a valid license for Microsoft SQL Server.

Exercise #1: Test Drive installation and set up

Internet Information Server installs in less then 10 minutes and is immediately running, which allows you to start publishing information right away.

1. Make sure Windows NT Server 3.51 with Service Pack 3 (SP3) is in-stalled. (SP 3 is included with the IIS compact disc. See Appendix A for instructions on installing the Service Pack.)

2. Insert the Internet Information Server compact disc into the CD-ROM drive in the IISServer.

3. Log on to the IISServer server as **Administrator** using *password* for the **password**.

4. Start File Manager, and then select the CD-ROM drive.

5. From the root of the CD-ROM, start SETUP.EXE to begin installing Microsoft Internet Information Server.

6. A **Microsoft Internet Information Server Welcome** message box ap-pears, click **OK**.
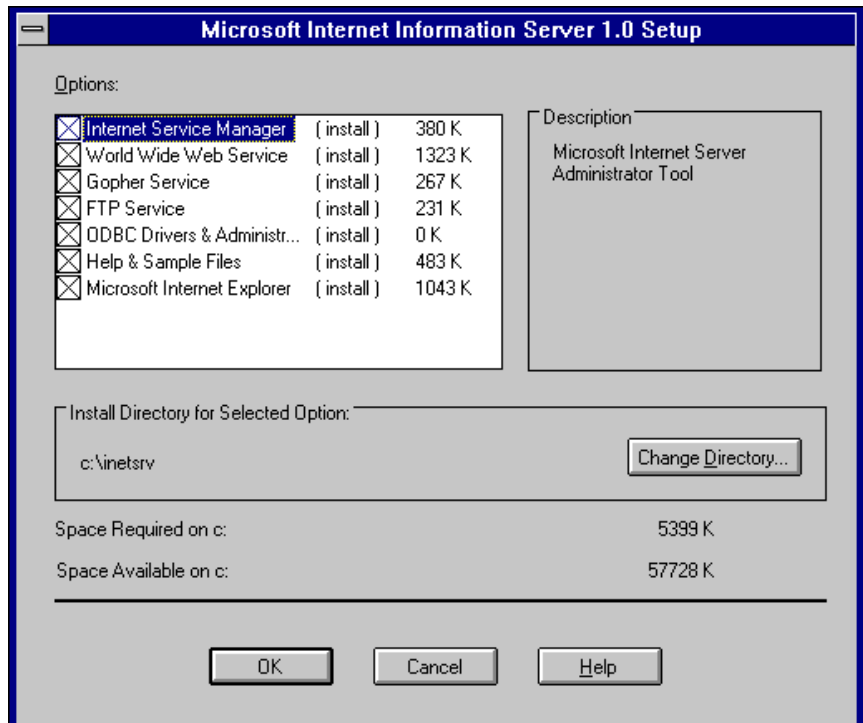
7. When the **Microsoft Internet Information Server Options** dialog box appears, click **OK**.

8. The **Setup** install dialog box appears to verify creating the server directory, click **Yes**.

9. The **Publishing** properties dialog box appears suggesting publishing directories, click **OK**.

10. A confirmation dialog box appears to verify creating the publishing directories, click **Yes**.

11. If during the Windows NT Server installation you did not specifically add your Internet domain name to the TCP/IP DNS configuration, setup will warn you that Gopher will not function properly. Click **OK.**

12. If the guest account is enabled on Windows NT Server, a dialog box will appear **asking if you want to disable the guest account** on the FTP service, click **Yes**.

13. The **Install Drivers** dialog box appears for ODBC SQL Server drivers.

14. **Do not select SQL Server**, as the drivers are already installed. Click **OK**.

15. When you see the **Successful installation** dialog box, click **OK**.

16. All services are now installed and running. From this point any browser on your local network can connect to your server using **http://iisserver**.

Security **Note** Step 13 in the previous exercise disables the Guest account from accessing the FTP service. It does not change the status of the Guest account to the Windows NT Server.

Note Microsoft Internet Information Server Setup will automatically detect whether or not Windows NT Server Service Pack 3 is installed. If it determines that it is not installed the administrator will be given the option to install it automatically. Automatic installation of the Service Pack is only activated on U.S./Canada versions of the server. On English/Non-U.S. versions please see the Release Notes for how to install the Service Pack. If the administrator chooses to install the Service Pack as part of the Microsoft Internet Information Server installation the server will reboot to enable the new system files installed at the end of the process.

Exercise #2: Adding comments to Internet Information Server services

Entering comments for each server allows you to easily identify each Web server from other Internet services running on your corporate Web when using the Internet Service Manager.

From the IISServer

1. Click the Internet Service Manager icon in the Microsoft Internet Server group.

2. Highlight the **IISServer Web service.**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line).

4. Tab down to the Comment field, ENTER *Web Test Drive Server for Reviewers Guide.*

5. Click **OK** to save the comment.

6. Highlight the **IISServer FTP service.**

7. From the **Properties** menu, select **Service** properties to access the FTP properties sheets (you can also double-click on the IISServer name on the FTP line).

8. Tab down to the **Comment** field, ENTER *FTP Test Drive Server for Reviewers Guide.*

9. Click **OK** to save comment.

10. Highlight the **IISServer Gopher service.**

11. From the **Properties** menu, select **Service** Properties to access the **Gopher** properties sheets (you can also double-click on the IISServer name on the Gopher line).

12. Tab down to the Comment field, ENTER *Gopher Test Drive Server for Reviewers Guide.*

13. Click **OK** to save the comment.

Exercise #3: Directory browsing enables instant information publishing.

Directory Browsing allows you to immediately and securely publish existing files from Windows NT and Novell® NetWare® file servers.

From the IISServer

1. Click on the Internet Service Manager icon in the Microsoft Internet Server group.
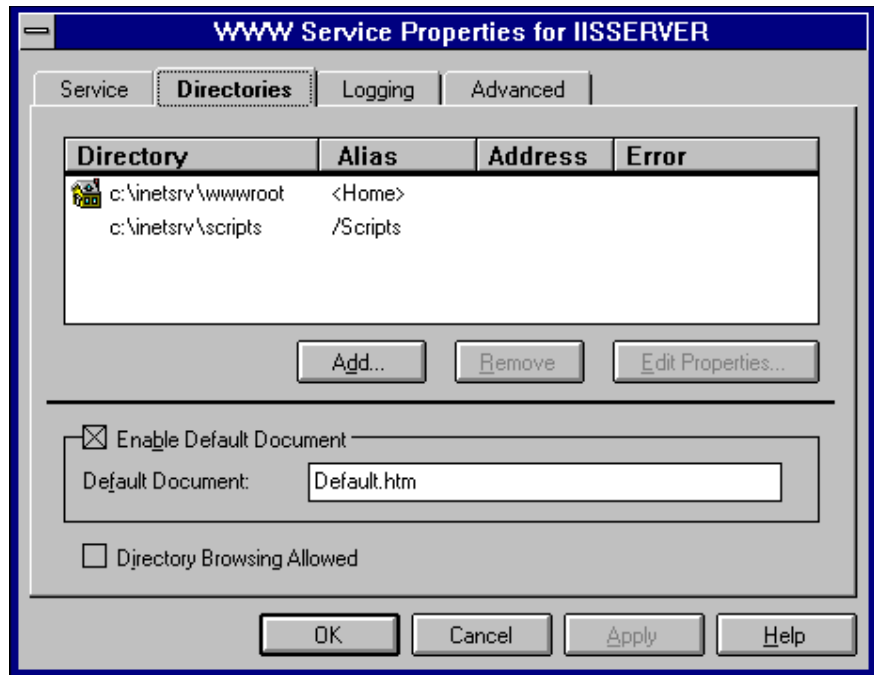
2. Highlight **IISServer Web service.**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line).

4. Select the **Directories** property page.

5. Click the **Directory Browsing Allowed** check box.

6. Click on **Apply** to enable directory browsing ("Apply" means that the server will immediately pick up this action rather than waiting for OK).

7. Click the **Add** button (virtual directories will be covered in detail in a later exercise).

8. ENTER *c:\inetsrv* in the **Directory** field.

9. ENTER *inetsrv* in the **Alias** field.

10. Click **OK** to add the Virtual Directory.

11. Click **OK** to enable the new additions (you can also click **Apply** to enable the new addition without leaving the dialog box).

> Security **Note**   Administrators need to manage the use of directory browsing to ensure the desired level of security is not compromised. The default installation of Internet Information Server does not enable Directory Browsing.

From a Windows 95-based machine

1. Start Internet Explorer

2. Connect to URL **http://iisserver/inetsrv**

3. Notice you can browse the entire Internet Information Server directory tree. If Directory Browsing is not functioning, make sure you completed the previous exercise.

4. Exit Internet Explorer.

> **Note** If you select a directory that has a **default.htm** present it will display as an HTML document in the browser. For example click on the **wwwroot** URL to see the default sample home page.

Exercise #4: Installing Virtual Directories

Virtual Directories give the administrator maximum flexibility for adding additional storage as a site grows. Information can be stored locally on the server, on additional hard drives for more capacity, and on departmental servers on the local area network, which gives each department maximum control of their own information. (See Exercise #8, Setting up a Ssecond Virtual Server, on page 46.)

Note This example is a two-step process.

From the IISServer

1. Start File Manager and click on the IISServer icon.

2. Using Windows File Manager move the directory *c:\inetsrv\wwwroot\ samples* to *c:\samples* (make sure to move the files and not copy them).

From a Windows 95-based machine

1. Start Internet Explorer.

2. Connect to URL **http://iisserver.**

3. Click the red **Site Sample** icon next to the **Sample Pages and Application Ideas** graphic.

4. Notice you cannot browse the Sample Site since it has been moved to another directory on the disk.
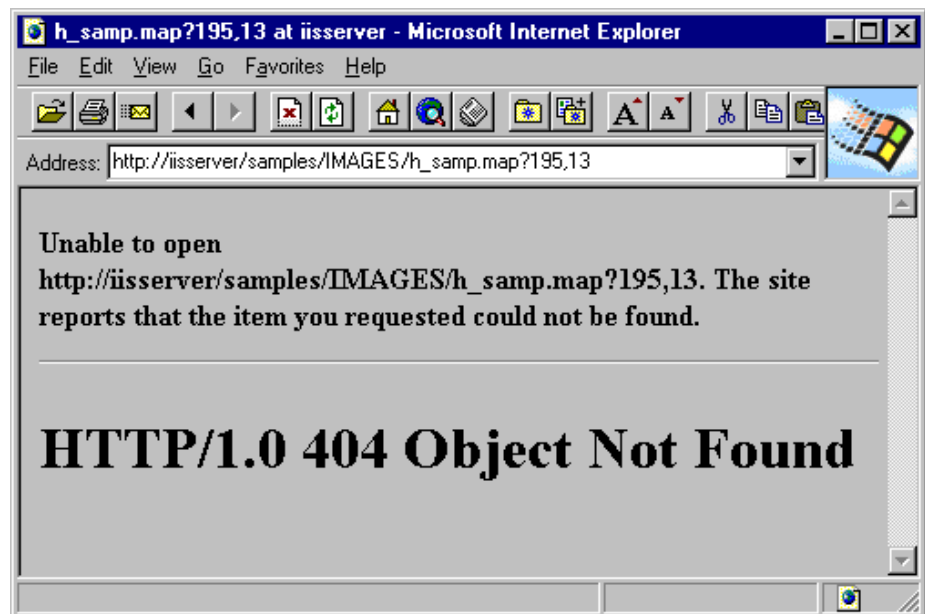
From the IISServer

1. Start the Internet Service Manager.

2. Highlight the **IISServer Web service.**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line).

4. Select the **Directories** property page.

5. Click the **Add** button (Virtual Directories will be covered in detail in a later exercise).

6. ENTER *c:\samples* in the **Directory** field.

7. ENTER *samples* in the **Alias** field.
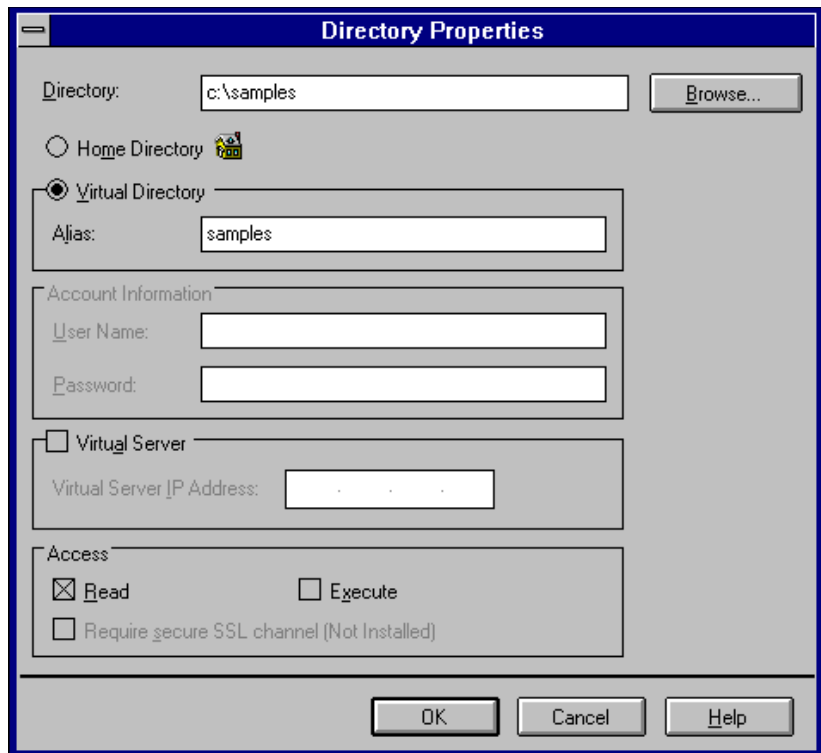
8. Click **OK** to add the Virtual Directory.

9. Click **OK** to enable the new additions (you can also click **Apply** to enable the new addition without leaving the dialog box).

From a Windows 95-based machine

1. Start Internet Explorer.

2. Connect to URL **http://iisserver**.

3. Click the red **Site Sample** icon next to the **Sample Pages and Application Ideas** graphic.

4. Notice that you can now browse the Sample Site even through it has been moved another directory on the disk by enabling a Virtual Directory.

5.   Click the **Volcano Coffee Company** URL to view a sample home page.

Note   Virtual directories work not only on the local Web server drive, but also on other disks in the same machine, and on network drives accessible via a Universal Naming Convention (UNC) connection. UNC connections work on organizational intranets to immediately publish existing information stored on installed Windows NT Server or Novell Netware servers.

Exercise #5: Internet Information Server service management (starting, stopping, pausing)

Easy remote administration reduces the cost of managing a Web site. Internet Service Manager can automatically discover all the IIS servers on your intranet and can securely administer your Web sites over the Internet.

From the IISServer

1.   Start Internet Service Manager

2.   From the **View** menu select **Servers** view

3.   Click the + at the left of the IISServer

4.   Highlight the **WWW service**

5.   From the **Property** menu select **Pause Service** (notice that the stoplight turns yellow)

6.   You can accomplish the same task by using the Toolbar VCR buttons.

From a Windows 95-based machine

1.   Start Internet Explorer

2.   Connect to URL **http://iisserver** (if the client has the paged cached, force a refresh using F5)

3.   Notice the page cannot be refreshed because the server is paused.

> **Note** To ensure consistency and ease of management Internet Information
> Server offers a user interface similar to other Microsoft BackOffice products.
> For example, the Internet Service Manager uses stoplights to indicate the cur-
> rent state of Internet Information Server services. Green indicates the service is
> running, yellow paused, and red stopped. Stoplights can be viewed from the
> Servers view or the Services view in Internet Service Manager, but not in the
> Report View.

From the IISServer

1. From the **Property** menu select **Start Service** (notice the stoplight turns
   Green).

Exercise #6: Using a performance monitor with Internet Information Server

Keeping track of key performance metrics is critical to the successful implementation
of an Internet presence. The tight integration of Internet Information Server with both
Windows NT Server Performance Monitor and SNMP allows the administrator to
closely monitor and manage their server for maximum performance.

> **Note** Windows NT Performance Monitor is an extensible tool provided with both
> Windows NT Workstation and Windows NT Server. Internet Information Server has
> added counters for all of the Internet services installed with Internet Information Server.
> There are four types of performance monitoring that Windows NT Performance Moni-
> tor provides: the Chart, Log, Report, and Alert. All four are demonstrated in the Internet
> Information Server Tour home page **http://iisserver/samples/tour/pmstar.htm**.

From the IISServer

1. Click on the Internet Explorer icon in the Microsoft Internet Server pro-
   gram group.

2. Connect to the local server URL **http://iisserver.**
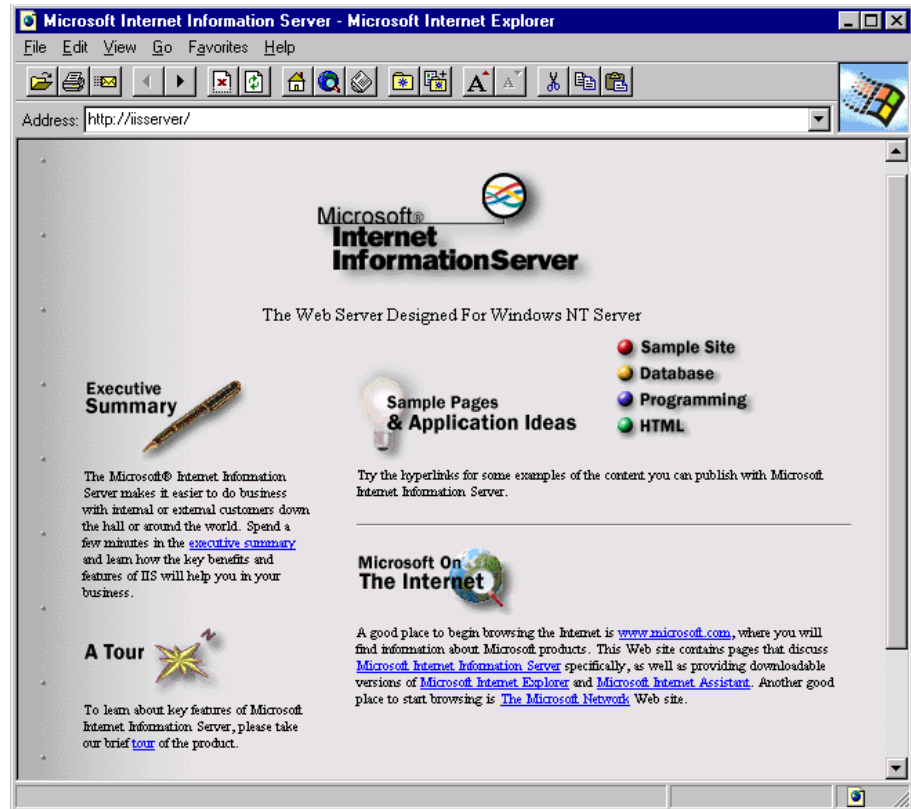
3. Click the **A Tour** graphic.

4. Scroll down to the Performance monitoring section and click the **Sample Performance Monitor Settings** URL.

5. Select the **Sample Chart Settings** URL. This is the default Performance Monitor view. In this example we are looking at the % of Total Processor Time, % Processor Time, Page Faults/Sec, Working Set, and Current Connections.

Performance Monitor - msiis.pmc

Color	Scale	Counter	Instance	Parent	Object	Computer
	1.000	% Total Processor Time	---	---	System	\\IISSERVER
	1.000	% Processor Time	inetinfo	---	Process	\\IISSERVER
	0.1000000	Page Faults/sec	inetinfo	---	Process	\\IISSERVER
	0.0000100	Working Set	inetinfo	---	Process	\\IISSERVER
	1.000	Current Connections	---	---	HTTP Server	\\IISSERVER

Last 29.997 Average 19.491 Min 0.000 Max 100.000 Graph Time 100.000

Data: Current Activity, Save File: msiis.pmc

6. In the Internet Information Server Tour you will also find examples for Performance Monitor Log, Alert, and Report data.

7. The chart Options are set to an Update Interval of 10 seconds. To get more frequent updates, from the **Options** menu select **Chart** and change the Update Interval to 1 second.

8. To see traffic on the server use the Internet Explorer to hit several pages on the site in a rapid fashion. One client will not generate a significant load on the server so the indicators in Performance monitor will not be dramatic.

Technical **Note**   The previous example uses the following Performance Monitor counter % Total Processor Time, % Processor Time, Page Faults/sec, and Current Connections. To get a technical explanation of what these counters are monitoring, double-click on any counter at the bottom of the performance monitor in Chart mode and from the Edit Chart Line dialog box click Explain. A technical description of the counter will appear at the bottom on the dialog box.

From the IISServer

1. From the Performance Monitor **Edit** menu select **Add To Chart**

2. Highlight the **Object** field and scroll to the HTTP Service

3. Scroll through the list of Counters active for the HTTP Service

4. The same process can be followed for the FTP Service, the Gopher Server, and the Global Internet Information Server counters

5. Exit Performance Monitor

From the IISServer

1. Click on the Internet Explorer icon on the Microsoft Internet Server program group.

2. Connect to the local server URL **http://iisserver.**

3. Click the **A Tour** graphic.

Lab #3 The most powerful Web server available (30 - 45 minutes to complete).

4. Scroll down to the Performance monitoring section and click the **Counter Definitions** URL—this page lists all of the Performance Monitor counters used by Internet Information Server.

5. Exit Internet Explorer.

Note All the counters available for the Windows NT Performance Monitor locally on a machine are also available over a network (that includes the Internet) and are also reported through a SNMP Agent to third-party SNMP Management Councils.

Security, both in terms of logging into a Web site and private communications, is a necessity on the Internet and intranets. Microsoft's Internet Information Server is tightly integrated with Windows NT Server security and brings the power of Windows NT Server's Domain Security to the Internet. An administrator can utilize existing Windows NT accounts for assigning Internet Information Server access permission or can use the same Windows NT Server tools to create new accounts. By relying on the underlying capabilities of Windows NT Server, the Internet Information Server minimizes the work required to manage the security attributes of Web servers. This exercise looks at some of the integrated security features of Internet Information Server.

Exercise #1: Enabling Basic password authentication

The ability to limit access to specific files on your Internet servers is critical on both internal corporate Webs and Internet sites. Internet Information Server uses the underlying security of Windows NT Server to simplify security administration.

An administrator can also assign file-level permissions to individual users using the Windows NT Server user account database and Access Control Lists (ACLs). In this exercise we will limit access on some files to particular users other then the anonymous mapped account IUSR_IISSERVER.

Security **Note** Included with Internet Information Server are two types of password protection, Basic (Clear Text) and Windows NT Challenge/Response. The HTTP standard for password authentication is Basic authentication and it is designed to work with any standard HTML browser like, Internet Explorer 1.5, NCSA Mosaic, and Netscape Navigator. Windows NT Challenge/Response is an encrypted password authentication method that uses integrated login with standard Windows-based networking. At this time Windows NT Challenge/Response is only supported by Internet Explorer 2.0 for Windows 95. We will use Basic authentication for this exercise. Since Basic authentication is sent in clear text, Internet Information Server has it disabled by default and warns the administrator that clear text passwords will be used when using basic authentication.

From the IISServer

1. Start the Internet Service Manager

2. Highlight the **IISServer's Web service**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line)

4. From the **Service** property sheet, click on **Basic (Clear Text)**
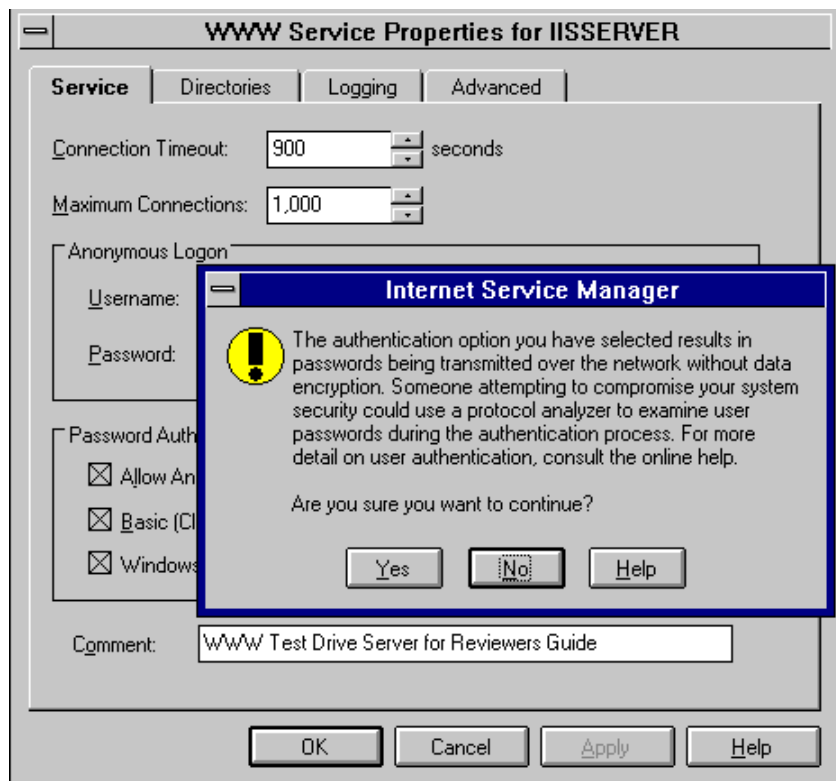
5. Read the security warning and then click **Yes** that you want to continue.

6. Click **OK**

Exercise #2: Creating new users and groups

Integration with Windows NT Server directory services enables administrators to leverage existing accounts already created, thereby not forcing a another new security model on your company. It also leverages your existing knowledge of Windows NT Server administration. This tight integration with Windows NT Server security will directly reduce support costs.

For this exercise we will create a number of new users and a new groups and assign permissions to files using the Windows NT Server Access Control Lists.

From the IISServer:

1. From the Windows NT Server Program Manager start the User Manager for Domains in the Administrative Tools program group.

2. From the **User** menu select **New User.**

3. In the **Username** field ENTER *Webuser1.*

4. In the **Full Name** field ENTER *Web User #1.*

5. In the **Description** field ENTER *This account for testing only.*

6. Create a password you can remember, like **Webpassword.**

7. Confirm the password.

8. Click **Add** to create the user.

9. Repeat steps 1-8 with **Webuser2.**

10. Click **Close** to exit the **Add User** dialog box.

11. From the **User** menu select **New Local Group.**

12. In the **Group Name** field ENTER *WebGroup.*

13. In the **Description** field ENTER *IIS Test Drive* group.

14. Add Webuser1 and Webuser2 as members by using the **Add** button.
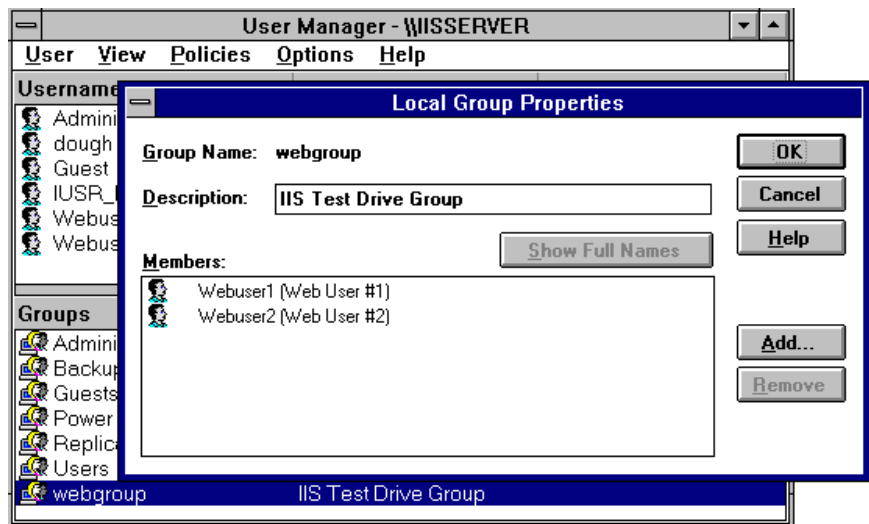
15. Click **OK** to create the group.

16. Exit the User Manager.

Notice in the Username list Webuser1 and Webuser2 have been created and in the Groups list Webgroup has been created. In the next exercise we will use these accounts to assign permissions to Web files.

Exercise #3: Assign Access Control lists to files

Note This exercise requires that you have installed Internet Information Server on a Windows NT NTFS partition per the installation instructions. You will not be able to assign file Access Control Lists on a FAT partition.

From the IISServer:

1. Start the Windows File Manager.

2. Go to the **Samples** directory (*c:\samples* if you completed Lab #2 Exercise 3#, or *c:\inetsrv\samples* if you did not).

3. Under the *c:\samples* directory go to *c:\samples\htmlsamp.*

4. Highlight the file **htmlsamp.htm.**

5. From the **Security** menu select **Permissions** (or you can use the toolbar and click on the Key icon).

6. Click **Add.**

7. Click **Show Users.**

8. Scroll down until you see **Webuser1** and highlight this account.

9. Click **Add** (notice that the **Type of Access** defaults to Read. You have the options of: No Access, Read, Change, or Full Control), leave the default as Read.

10. Click **OK** to exit **Add Users and Groups** dialog box.

11. Highlight **IUSR_IISSERVER** and click **Remove** (this will disable anony-
     mous access to this file).
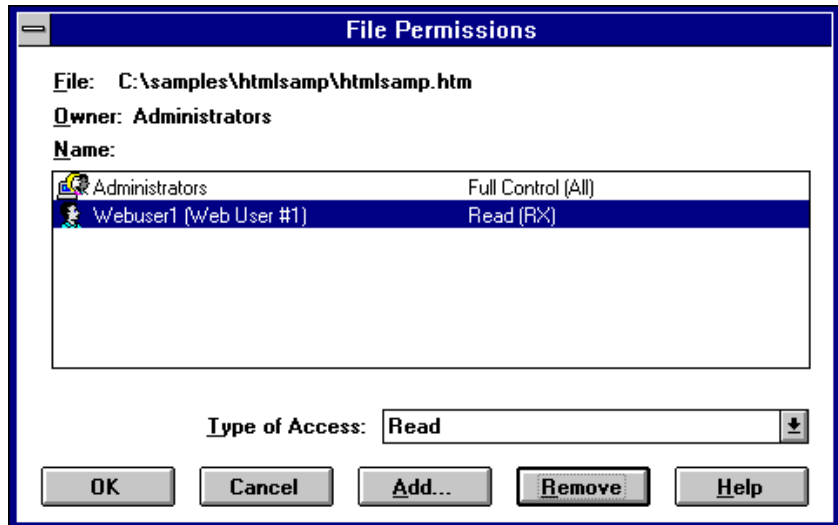
12. Click **OK** to exit the **File Permissions** dialog box

From a Windows 95-based machine

1. Start Internet Explorer

2. Connect to URL **http://iisserver**

3. Click on the green **HTML** button on the IISServer home page

4. You will be asked to ENTER a username and password

5. Try to ENTER the username as *Webuser2*, and the password as *Webpass-
   word*

6. It failed, because only Webuser1 was assigned permissions in the previous
   exercise
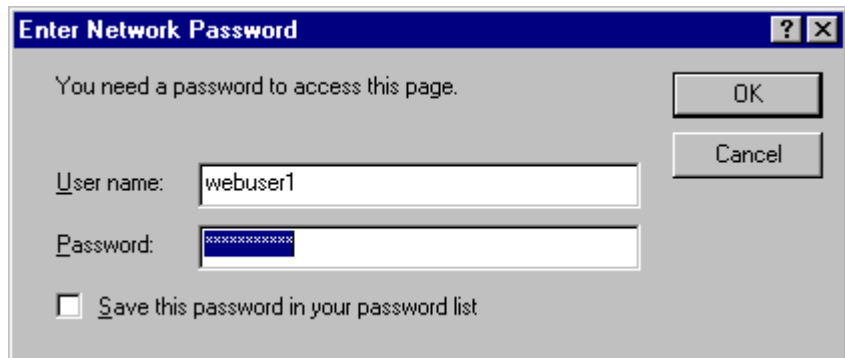
7. Now ENTER **Webuser1** as the user name, with the password as **Webpass-
   word**

8. Notice that all pages continue to work with the exception of the pages specifically assigned Access Control Lists

9. Exit Internet Explorer

From the IISServer:

1. Start the Windows File Manager.

2. Go to the samples directory (*c:\samples* if you did Lab #2 Exercise 3#, or *c:\inetsrv\samples* if you did not).

3. Under the *c:\samples* directory go to *c:\samples\sampsite.*

4. Highlight the file **sitesamp.htm.**

5. From the **Security** menu select **Permissions** (or you can use the toolbar and click on the Key icon).

6. Remove File Permissions for **Everyone**

7. Click **Add.**

8. Scroll down until you see **Webgroup** and highlight this group.

9. Click **Add** (notice that the **Type of Access** defaults to Read. You can change this to: No Access, Read, Change, or Full Control).
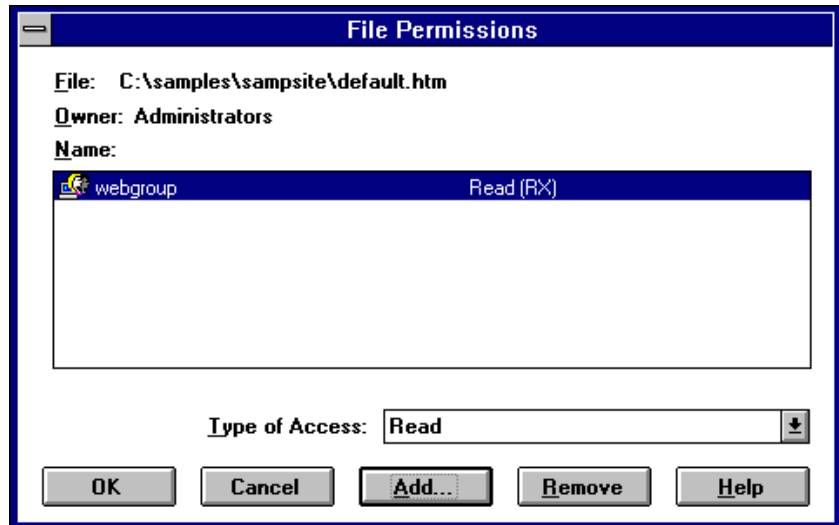
10. Click **OK** to exit the **Add Users and Groups** dialog box.

11. Click **OK** to exit the **File Permissions** dialog box.

12. Exit File Manager.

From a Windows 95-based machine

1. Start Internet Explorer

2. Connect to URL **http://iisserver**

3. Click on the red **Sample Site** button on the **IISServer home page**

4. You will be asked to ENTER a username and password

5. Try to ENTER the username as *Webuser2*, and the password as *Webpassword*

6. It works, because both **Webuser1** and **Webuser2** are members of **Webgroup. Webgroup** was assigned permissions in the previous exercise to the sample site

7. Exit Internet Explorer

Exercise #4: Setting up Auditing on security

Windows NT has a very rich security architecture which gives the administrator discretionary access control capabilities to all files and objects on the server. One key aspect of discretionary control is the ability to audit successful and failed attempts to get access to files. This audit information provides a key link for administrators to track security events in order to maintain tight control on their important information.

In this section we will enable file logging so we can track file accesses from a security perspective.

From the IISServer:

1. From the Administrative Tools program group start the User Manager for Domains

2. From the **Policies** menu, select **Audit.**

3. Click **Audit These Events,** then select **Logon and Logoff, Success** and **Failure,** and **File and Object Access, Success** and **Failure**
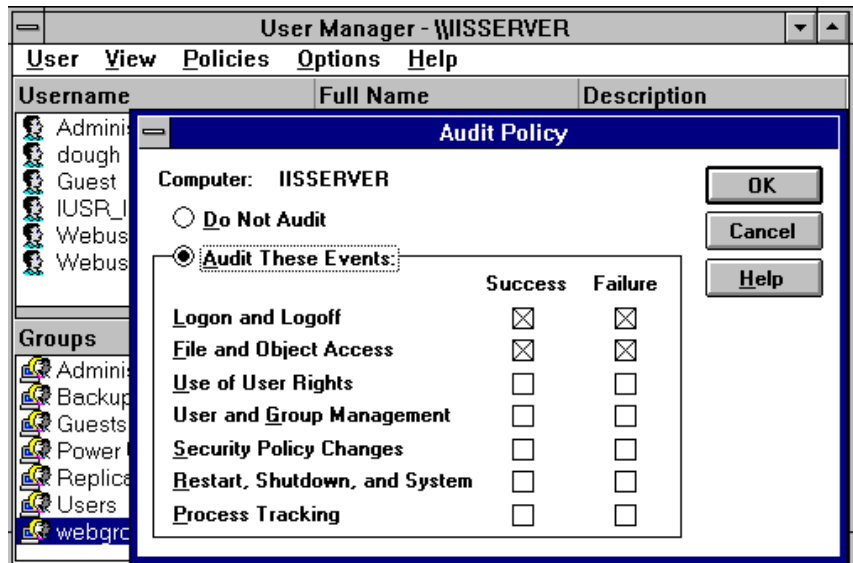
4. Click **OK**

5. Exit User Manager

6. Start the Windows File Manager

7. Hightlight the samples directory (*c:\samples* if you did Lab #2 Exercise 3#, or *c:\inetsrv\samples* if you did not)

8. From the **Security** menu, select **Auditing**

9. Click on **Replace Auditing on Subdirectories**—this will ensure auditing is enabled for all files in the *Samples* directory

10. Click **Add**

11. Highlight **Everyone** and click **Add**

12. Click **OK**

13. Select **Read**, **Success** and **Failure**
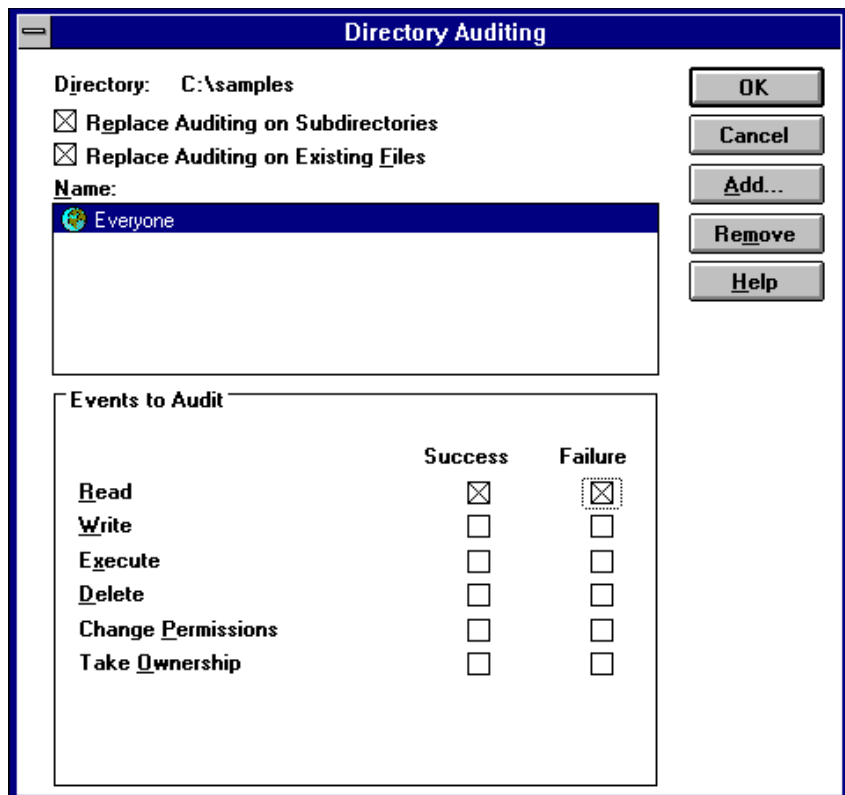
14. Click **OK**

15. At the confirmation dialog box click **Yes** to replace security information on all files (auditing is now set up)

16. Exit File Manager

From a Windows 95-based machine

1. Start Internet Explorer

2. Connect to URL **http://iisserver**

3. Click on the red **Sample Site** button on the **IISServer home page**

4. You will be asked to ENTER a username and password

5. Try to ENTER the username as—***Webuser***, password—***password***

6. It, of course, failed because Webuser is not a valid account.

7. Now ENTER ***Webuser1*** for the username, password—***Webpassword***

8. This was a successfull logon

9. Click on the **Volcano Coffee Company** URL to see the sample home page that isincluded

10. Exit Internet Explorer

From the IISServer:

1. From the Administrative Tools program group start the Event Viewer

2. From the **Log** menu, select **Security**

3. Highlight the first entry in the list

4. From the **View** menu, select **Detail**

Date	Time	Source	Category	Event	User
2/4/96	2:36:27 PM	Security	Object Access	562	SYSTEM
2/4/96	2:36:27 PM	Security	Object Access	562	SYSTEM
2/4/96	2:35:47 PM	Security	Object Access	560	Webuser1
2/4/96	2:35:47 PM	Security	Object Access	562	Webuser1
2/4/96	2:35:47 PM	Security	Object Access	560	Webuser1
2/4/96	2:35:47 PM	Security	Logon/Logoff	528	Webuser1
2/4/96	2:35:30 PM	Security	Logon/Logoff	529	SYSTEM
2/4/96	2:35:23 PM	Security	Object Access	560	IUSR_IISSE
2/4/96	2:35:23 PM	Security	Object Access	560	IUSR_IISSE

5. Repeatedly click the **Next** button to view each **Security Audit** entry. Notice that some entries are successful accesses, some are failed. You may click to just audit Failures by not selecting to audit Success attempts in the Windows File Manager.

6. Hit ESC to exit detail view

7. Exit Event Viewer.

Note Notice the large number of security log entries. Since you have enabled logging on to all files, in the samples directory all successful and failed attempts to get access to the files is logged. Notice that the Key icons are successful access to files or objects while the Lock icon is a failed access. If you look at the most recent Lock event it will be the failed logon by Webuser from this exercise.

From the IISServer:

1. From the Administrative Tools program group start the User Manager for Domains.

2. From the **Policies** menu, select **Audit.**

3. Click **Do Not Audit** to disable logging for the remainder of this Test Drive.

4. Exit User Manager.

Exercise #5: Setting read vs. execute settings on Virtual Directories

A key security feature of Internet Information Server is the ability to set up Web virtual directories for publishing information and separate directories for running programs. By separating publishing information from running programs, the administrator can greatly reduce the likelihood of a security breach.

In this exercise we will examine an example of Execute only permissions.

From the IISServer

1. Start the Internet Service Manager in the Microsoft Internet Server group

2. Highlight the **IISServer Web service**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line)

4. Select the **Directories** property page

5. Highlight the Directory *c:\inetsrv\scripts*

6. Click **Edit Properties**

7. Notice that the **Scripts** directory has its **Access** set to Execute, with Read disabled.

8. Click **Cancel** to exit the **Edit** properties page

9. Click **Cancel** to exit the **Directories** page

10. Exit Internet Service Manager

From a Windows 95-based machine

1. Start Internet Explorer.

2. Connect to URL **http://iisserver/scripts.**
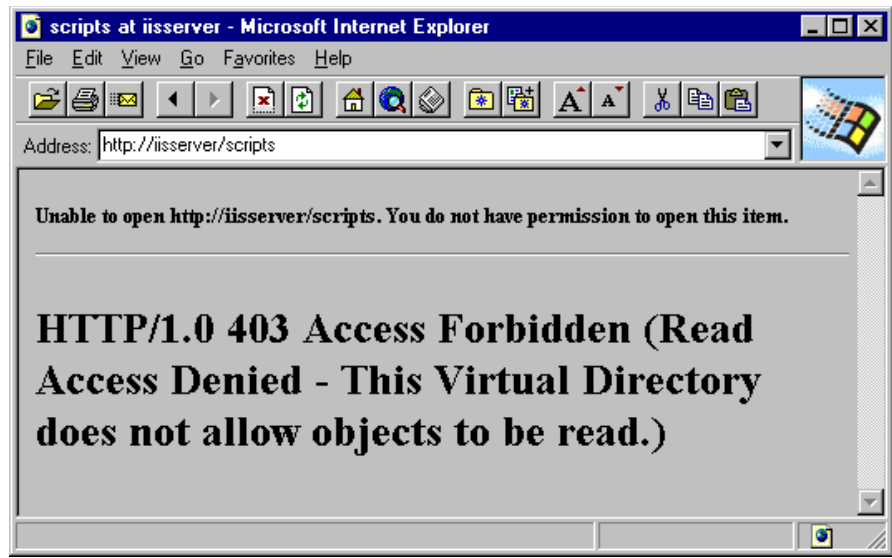
3. Notice the error that is displayed because this directory has been set up for Execute only.

4. Exit Internet Explorer.

> **Security Note** The ability to hide Web scripts in directories that are not readable, combined with extension mapping (similar to File Associations in Windows) allows the administrator to lock out attempts by hackers to add programs to the server or install new scripts.
>   Extension Mapping is explained in detail in the Product Documentation. See: Help Book Web Service, Chapter, Implementing Server Applications, Page, File-Extension Mapping.

Exercise #6: Grant and deny server access based on TCP/IP address

TCP/IP security allows an administrator to establish very controlled sites on the Internet. Access can be strictly limited to a pre-defined list of valid TCP/IP addresses. It is also possible to deny access to specific TCP/IP addresses or groups of addresses in case of hacker attacks.

From the IISServer

1. Start the Internet Service Manager in the Microsoft Internet Server group

2. Highlight the **IISServer Web service**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line)

4. Select the **Advanced** property page

5. Click **Add** to create a deny record

6. Leave **Single Computer** selected

7. Tab to the **IP Address field** and ENTER *10.100.100.3* (if you did not use the suggested TCP/IP addresses use your client address here)

8. Click **OK**
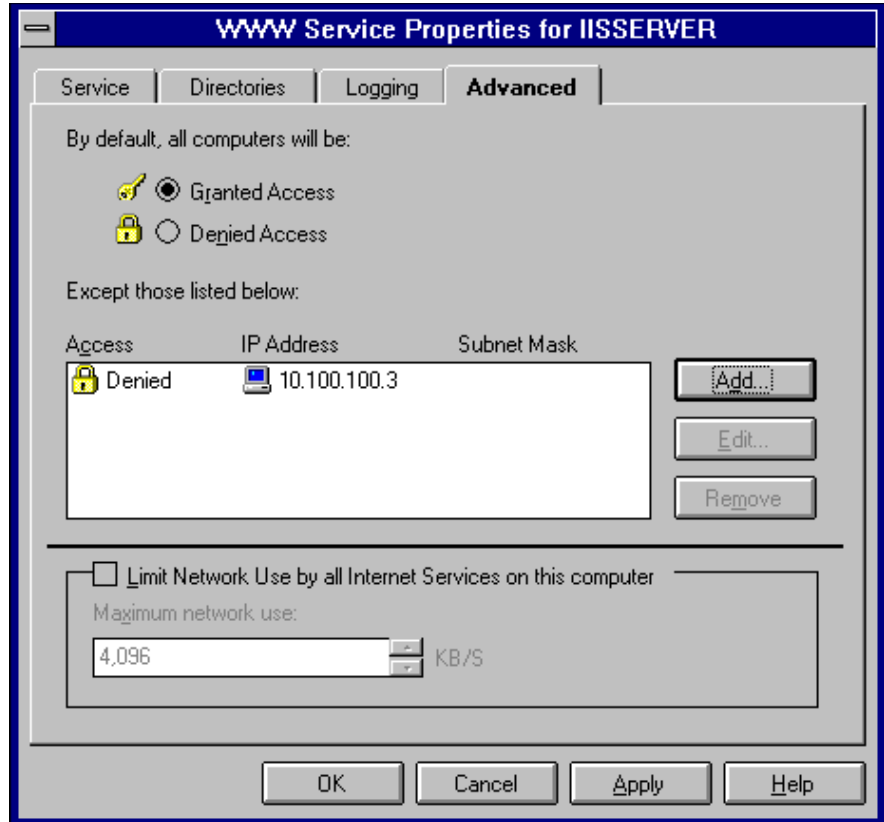
9. Click **OK** to enable the new additions (you can also click **Apply** to enable the new addition without leaving the dialog box)

10. Exit Internet Service Manager

From a Windows 95-based machine

1. Start Internet Explorer

2. Connect to URL **http://iisserver**

3. Notice the error that is displayed:

> **Unable to open http://iisserver. You do not have permission to open this item.**
>
> **Access Denied**
>
> **Your site has been denied access to this server**.

4. Exit Internet Explorer

Security **Note**   The Grant/Deny TCP/IP address feature can either Grant all addresses and limit access by some addresses, or Deny all addresses and allow

> access by some addresses. By definition the server has to be in a default state, Grant or Deny.
>
> The Grant/Deny TCP/IP address feature also allows you to Grant or Deny a group of addresses using Subnet masks.

From the IISServer

Follow these steps to return access to your Windows 95-based client machine for future exercises.

1. Start the Internet Service Manager in the Microsoft Internet Server group

2. Highlight the **IISServer Web service**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line)

4. Select the **Advanced** property page

5. Highlight the **Deny** record for 10.100.100.3

6. Click **Remove**

7. Click **OK**

8. Exit Internet Service Manager

Exercise #7: Changing the default document settings

When upgrading existing Web sites to the high-performance Internet Information Server it's important that the upgraded site preserve existing standards. Many such features have been designed explicitly for this purpose. For example, an entire Web site might use a file called index.html as the default page in every root directory. IIS allows the administrator to change the name of the default if required. In this exercise we will change the default document from default.htm to index.html.

From the IISServer

1. Start the Internet Service Manager in the Microsoft Internet Server group

2. Highlight the **IISServer Web service**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line)

4. Select the **Directories** Property page

5. Tab down to the Default Document field

6. Change the default document to index.html

7. Click **OK** to enable the new additions (you can also click **Apply** to enable the new addition without leaving the dialog box)

8. Exit Internet Service Manager

From a Windows 95-based machine

1. Start Internet Explorer

2. Connect to URL **http://iisserver**

3. If you performed Lab #2 Exercise #2 "Directory Browsing" earlier you will see the default.htm file in directory browsing mode, if you did not do Lab #2 Exercise #2 then the follow error that is displayed:

> **Unable to open http://gibraltar5/. You do not have permission to open this item.**
>
> **HTTP/1.0 403 Access Forbidden**

4. Exit Internet Explorer

From the IISServer

1. Start the Windows File Manager from the Main Program group

2. Highlight the *c:\inetsrv\wwwroot* directory

3. Highlight the **default.htm** file

4. From the **File** menu, select **Rename**

5. Rename the file *index.html*

6. Exit File Manager

From a Windows 95-based machine

1. Start Internet Explorer.

2. Connect to URL **http://iisserver**—You may need to Refresh (F5) the Internet Information Server sample home page if the client has cached that page.

3. You should see the Internet Information Server home page.

4. Exit Internet Explorer.

IMPORTANT **The following steps puts the server back to its original configuration for future labs. It is important to finish these steps before going on.**

From the IISServer

1. Start the Windows File Manager from the Main Program group.

2. Highlight the *c:\inetsrv\wwwroot* directory.

3. Highlight the **index.html** file.

4. From the **File** menu, select **Rename.**

5. Rename the file *default.htm.*
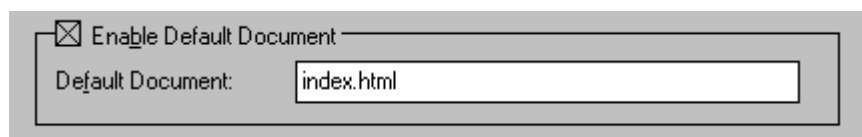
6. Exit File Manager.

7. Start the Internet Service Manager in the Microsoft Internet Server group.

8. Highlight the **IISServer Web service.**

9. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line).

10. Select the **Directories** property page.

11. Tab down to the **Default Document** field.

12. Change the default document to *default.htm.*

13. Click **OK** to enable the new additions (you can also click **Apply** to enable the new addition without leaving the dialog).

14. Exit Internet Service Manager.

Exercise #8: Setting up a second Virtual Server (also known as *Multi-Homing*)

Having a unique identity on the Internet is a very important marketing concern even to small- to medium-sized business that cannot afford to maintain their own World Wide Web site. By supporting multiple Virtual Servers, Internet Information Server allows Internet Service Providers (ISP) to create many Web servers on a single server, which provides an important point of contact for their customers, while optimizing valuable system resources for the ISP.

For this exercise, make sure you have configured the Windows NT Server the IISServer to have two TCP/IP addresses active. See the Windows NT Books OnLine, installed with your server, under "Configuring Advanced TCP/IP Options" to find out how to configure your server this way.

Note This is a two-step process.

From a Windows 95-based machine

Since we do not have configure a DNS for this Test Drive, we are going to configure the Windows 95 client to recognize two different TCP/IP addresses on the server with two different domain names. We will accomplish this by editing the **hosts** on the Windows 95 machine and by adding the two domain name mappings required.

1. From Windows 95 click the **Start** button and select **Run**

2. In the **Open** field on the **Run** dialog box type *"notepad c:\windows\hosts."* (it is important to include the period and closing quote (.") after hosts)

3. Click **OK**. This will open the sample hosts file included with Windows 95.

Note The Windows directory is the directory in which you installed Windows 95. The default installation directory for Windows 95 is **c:\windows**—if you installed Windows 95 in a different directory you should substitute the name of that directory in the above example.

---

1. Click **Yes** to create the new file.

2. ENTER the following two address in the hosts file, following the examples listed below:

10.100.100.1 www.iis.com

10.100.100.2 www.volcano.com

3. From the **File** Menu, select **Save**

4. Exit Notepad

5. Start Internet Explorer

6. Connect to URL **http://www.iis.com**

7. You will see the Internet Information Server home page

8. Connect to URL **http://www.volcano.com**

9. You will see the Internet Information Server home page again.

10. Exit Internet Explorer.

Note   The reason you see the same home page from both URLs is because when a home directory is defined in Internet Information Server with the default TCP/IP address setting (which is Blank) it will respond to all TCP/IP addresses configured for that server. You can limit which TCP/IP addresses the Web service responds to by explicitly identifying which addresses a home directory should respond to in the Internet Service Manager.

From the IISServer

1. Start the Internet Service Manager in the Microsoft Internet Server group

2. Highlight the **IISServer Web service**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line)

4. Select the **Directories** property page (Notice there is only one Home directory active, *c:\inetsrv\wwwroot*)

5. Click the **Add** button

6. ENTER *c:\samples\sampsite* in the directory field

7. Select **Home Directory**, notice that the **Alias** field is now disabled, home directories do not have aliases.

8. Click **Virtual Server** and ENTER the TCP/IP address as *10.100.100.2*

9. Click **OK** to add the virtual directory

WWW Service Properties for IISSERVER

Directory	Alias	Address	Error
c:\inetsrv\wwwroot	<Home>		
c:\samples\sampsite	<Home>	10.100.100.2	
c:\inetsrv	/inetsrv		
c:\inetsrv\scripts	/Scripts		
c:\samples	/samples		
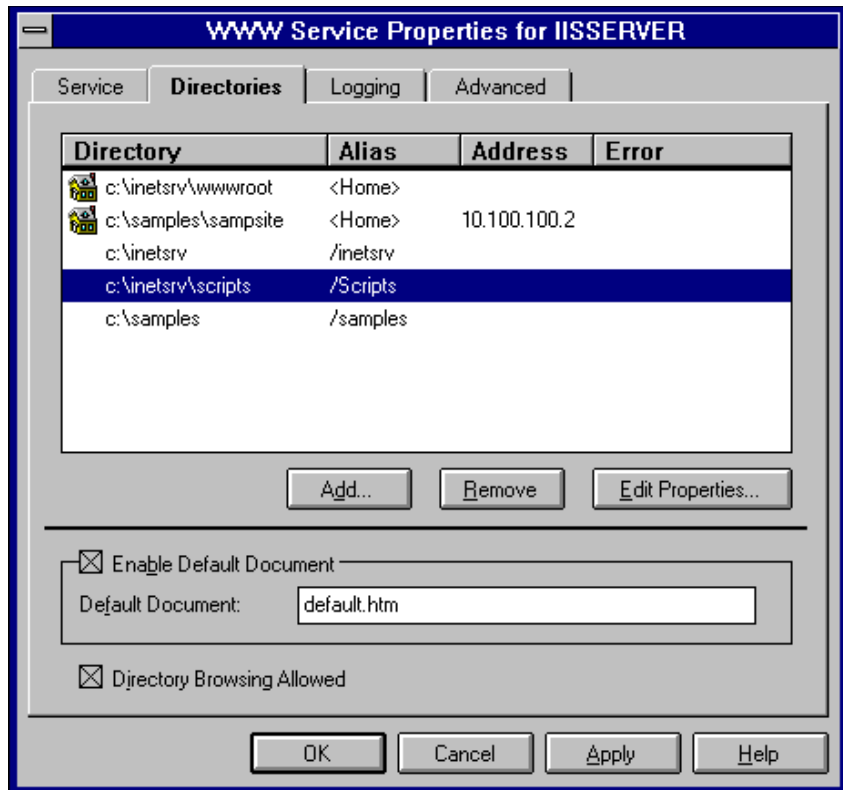
10. Click **OK** to enable the new additions (you can also click **Apply** to enable the new addition without leaving the dialog box).

11. Exit Internet Service Manager.

Note   At this point the default Virtual Home directory is *c:\inetsrv\wwwroot* and does not have a specific TCP/IP address assigned to it. The new Virtual Home Directory you created is *c:\samples\sampsite* and is assigned the following TCP/IP address: 10.100.100.2. Therefore the default Virtual Home will respond to all other TCP/IP addresses with the exception of 10.100.100.2. In this test drive we only have two addresses defined which means the default Virtual Home will only respond to 10.100.100.1. If we had a third address defined in the Windows NT Server TCP/IP configuration, for example 10.100.100.10, then the default Virtual Home would respond to both 10.100.100.1 and 10.100.100.10.

From a Windows 95-based machine

1. Start Internet Explorer.

2. Connect to URL **http://www.iis.com.**

3. You will see the Internet Information Server home page.

4. Connect to URL **http://www.volcano.com.** You may need to Refresh (F5) the Volcano home page if you have the Internet Information Server home page cached.

5. You will now see the Volcano home page.

6. You now have two Virtual Servers running on one Internet Information Server server each responding to separate TCP/IP addresses.

7. Exit Internet Explorer.

Exercise #9: Setting up your server to limit the amount of data sent— (Bandwidth Throttling)

For small- and medium-sized businesses that have a limited Internet connection, Internet Information Server includes the ability to limit the amount of data sent by the Internet services (Web, FTP, and Gopher). Bandwidth throttling can protect a site from getting saturated by the publishing services thereby allowing other Internet services, like mail, to get through the limited connection. This exercise shows you how to enable Bandwidth Throttling.

From the IISServer

1. Start the Internet Service Manager in the Microsoft Internet Server group.

2. Highlight the **IISServer Web service.**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line).

4. Select the **Advanced** property page.

5. Select **Limit Network Use by all Internet Services on this computer.**
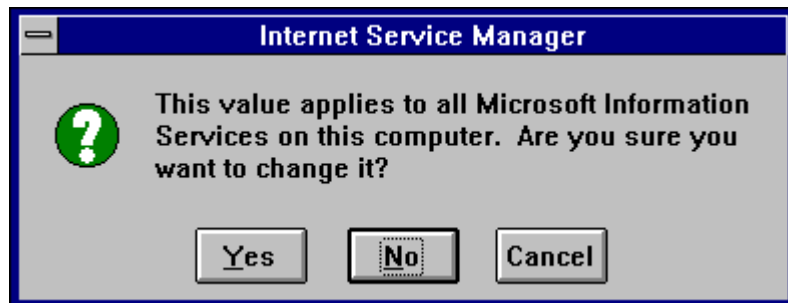
6. Internet Service Manager warns you that this will effect all Internet Information Server services (Web, FTP, and Gopher) running on this computer, Click **Yes**.

7. The default limit is 4,096 KB/S, you can change this to any value you want. Change the **Maximum Network Use** to 10KB/Sec.

8. Click **OK** to save changed to the **Advanced** property page.

9. Exit Internet Service Manager.

From a Windows 95-based machine

1. Start Internet Explorer

2. Connect to URL **http:/www.iis.com.** You may need to Refresh (F5) the IIS home page to ensure it is actually requesting data from the server.

3. You will see the Internet Information Server home page

4. Connect to URL **http:/www.volcano.com.** You may need to Refresh (F5) the Volcano home page to ensure it is actually requesting data from the server

5. You will now see the Volcano home page.

6. Notice how the pages still load, but they take longer because the server is limiting the amount of data it can send to 10KB/Sec.

7. Exit Internet Explorer.

From the IISServer (return the server back to normal throttling for future exercises)

1. Start the Internet Service Manager in the Microsoft Internet Server group

2. Highlight the **IISServer Web service**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line)

4. Select the **Advanced** property page

5. De-select **Limit Network Use by all Internet Services on this computer**

6. Internet Service Manager warns you that this will effect all Internet Information Server services running on this computer, click **Yes**.

7. Click **OK** to save changed to the **Advanced** property page.

8. Exit Internet Service Manager.

Exercise #10: Logging connection information onto an Internet Information Server

Logging is a key part of any Internet publishing system. It gives the owner of the site the ability to track usage and determine some information about their site demographics. There are two ways to log connection information with Internet Information Server. The first is to the file system, the second is to Microsoft SQL Server (or to another ODBC database). In a very heavily accessed site, an administrator would mostly likely choose to use file system logging since it requires less system overhead and requires less storage space then SQL Server logging. In a light to moderate site, SQL Server logging provides the option of setting up automated reporting from any ODBC tool, like Microsoft Excel or Microsoft Access. It also allows multiple servers using Internet Information Server to use the same log database. In this exercise we will configure both types of logging.

Exercise #10A: Logging to the File System

From the IISServer

1. Start the Internet Service Manager in the Microsoft Internet Server group.

2. Highlight the **IISServer Web service.**

3. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line).

4. Select the **Logging** property page.
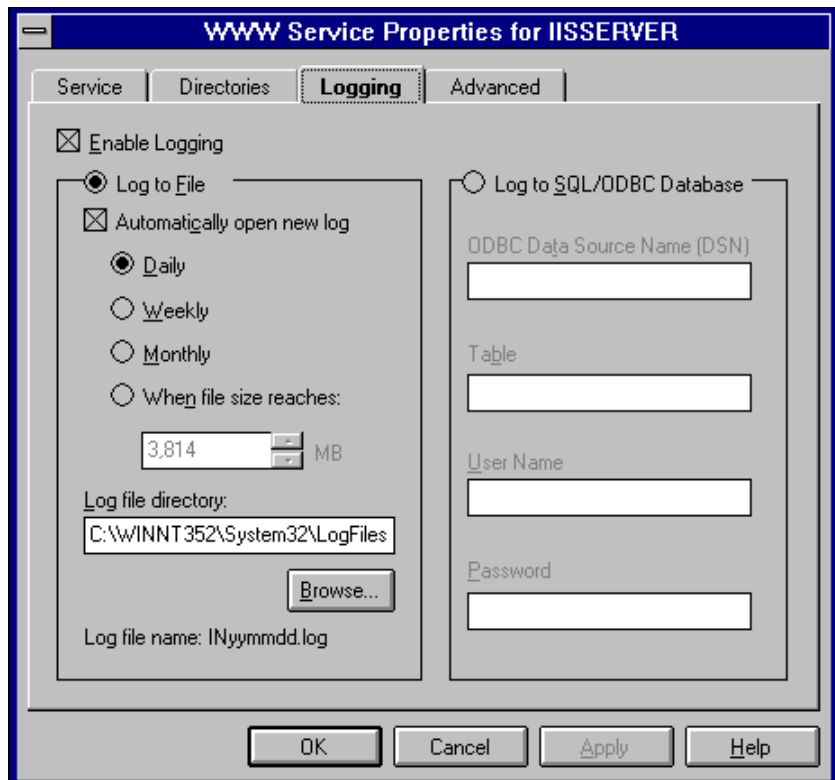
5. Internet Information Server automatically installs file system logging when **Enable Logging** is turned on and when **Automatically open new log—Daily** is checked.

6. Notice you can automatically open a new log daily, weekly, monthly or when the log reaches a certain size that the administrator defines.

7. Click **Cancel** to exit without making any changes.

8. Exit Internet Service Manager.

9. Start Notepad from the Accessories Group in Windows NT Server Program Manager.

10. From the **File** menu, select **Open.**

11. Change the **List Files of Type** filed to **All Files (*.*).**

12. ENTER the file name as *c:\winnt35\sytem32\logfiles* (where c:\winnt35 is your Windows NT Server root).

13. Highlight one of the **INyymmdd.log** (IN{Year, Month, Day}.log) files.

14. Click **OK.**

15. To see what the log entries are, start Internet Explorer from the Microsoft Internet Server program group.

16. Connect to URL **http://iisserver.**

17. Click on **A Tour** graphic.

18. Scroll down to the **Service Management** section and click the **Configuring logging** URL.
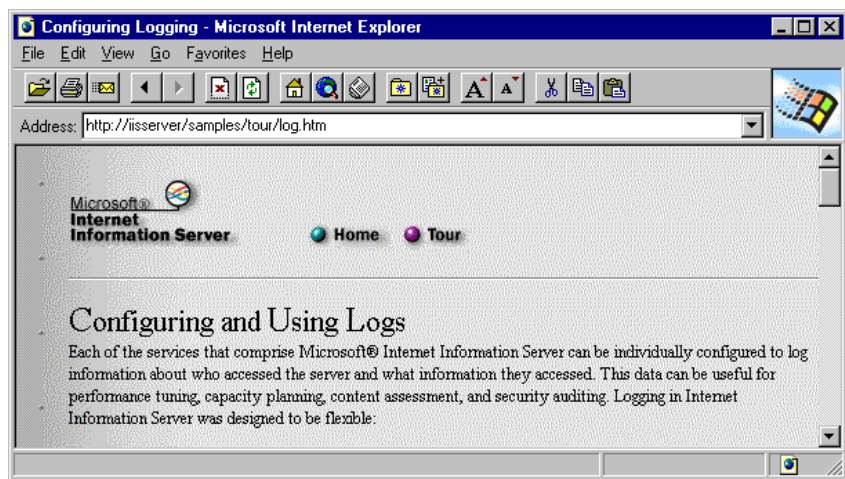
19. Scroll down to the **Log Contents** section for a field-by-field description of the log contents.

20. Switch to Notepad and exit.

Exercise #10B: Logging to SQL Server

From the IISServer

1. Make sure the SQL Server you are going to target is running. From the SQL Server program group run the SQL Service Manager.

2. If SQL Server is running the stoplight is green. If the light is red, double-click on the **green light** to start the server.

3. Exit SQL Service Manager.

4. From Internet Explorer (still running from Exercise #9A).

5. Return to the IIS home page by connecting to URL **http://iisserver.**

6. Click on the yellow Database icon next to the **Sample Pages and Application Ideas** graphic.

7. This page goes into detail about the database integration features of Internet Information Server. Scroll down to the third paragraph and click

the **here** hyperlink to create a ODBC DSN (Datasource Name for SQL Server).

8. Type *Web SQL* in the **Datasource to create** field.

9. Type *iissql* in the **Server Name** field if using the optional second server, type *iisserver* if SQL Server is installed on the Internet Information Server machine.

```
┌─────────────────────────────────────────────────────────────┐
│ ─          Specify ODBC Datasource attributes          ▼ ▲ │
│ File  Edit  View  Go  Favorites  Help                        │
│ ┌──┬──┬──┐ ┌──┬──┐ ┌──┬──┐ ┌──┬──┐ ┌──┬──┐ ┌──┬──┬──┐        │
│ Address: http://iisserver/scripts/tools/dsnform.exe?SQL+Server  ±│
│                                                             ▲│
│   Create ODBC datasource on the Microsoft                    │
│   Internet Information Server                                 │
│                                                              │
│   Driver Name: SQL Server                                    │
│                                                              │
│   Datasource Name to Create:                                 │
│   ┌─────────────────────────────────┐                        │
│   │                                 │                        │
│   └─────────────────────────────────┘                        │
│                                                              │
│   Server Name:                                               │
│   ┌─────────────────────────────────┐                        │
│   │                                 │                        │
│   └─────────────────────────────────┘                        │
│                                                              │
│   Optional attributes to specify:                            │
│                                                              │
│   Attribute String (format: attribute=value[;attribute=value ...]): │
│   ┌─────────────────────────────────────────────────┐  ▲     │
│   │                                                 │        │
│   │                                                 │        │
│   │                                                 │  ▼     │
│   │ ←                                           → │        │
│   └─────────────────────────────────────────────────┘        │
│                                                              │
│   ┌────────────────┐ ┌──────────┐                           │
│   │ Create Datasource │ │ Clear Form │                       │
│   └────────────────┘ └──────────┘                      ▼    │
└─────────────────────────────────────────────────────────────┘
```
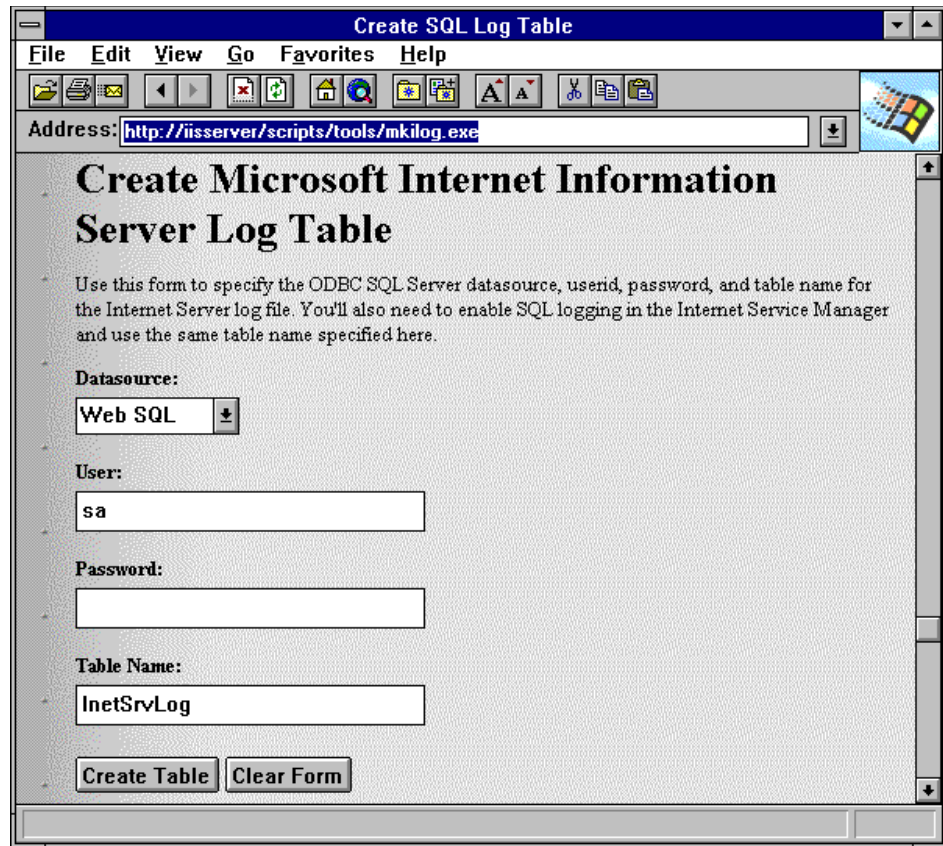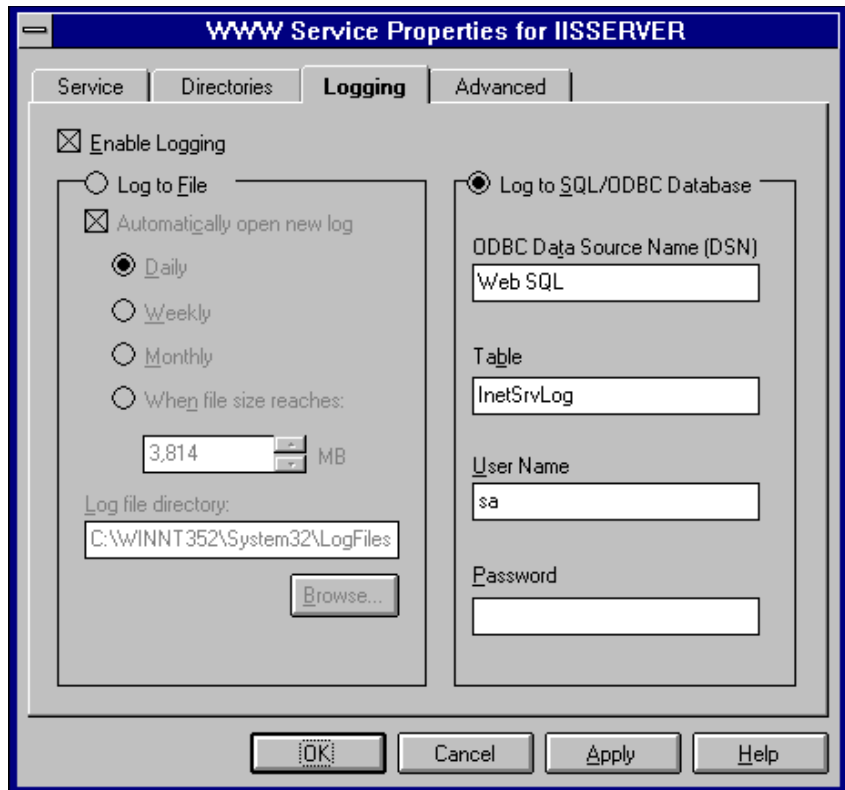
10. Scroll down the page and click **Create Datasource.** You should see a page that says **Datasource Creation Successful**.

11. Select the **Internet Information Server Home** at the top of the page to go back to the Internet Information Server home page.

12. Click the **A Tour** graphic

13. Scroll down to the **Service Management** section and click the **Configuring logging** URL.

14. Scroll down to the Logging to SQL Server section and follow the hyperlink **here** to create the SQL Server database for logging.

15. Leave all the fields as their default (Datasource—Web SQL, User—SA, Password—{blank}, Table Name—InetSrvLog)

Create SQL Log Table

File   Edit   View   Go   Favorites   Help

Address: http://iisserver/scripts/tools/mkilog.exe

Create Microsoft Internet Information Server Log Table

Use this form to specify the ODBC SQL Server datasource, userid, password, and table name for the Internet Server log file. You'll also need to enable SQL logging in the Internet Service Manager and use the same table name specified here.

Datasource:

Web SQL

User:

sa

Password:

Table Name:

InetSrvLog

[Create Table] [Clear Form]

16. Click **Create Table**, you will see **Log table creation successful.**

17. Exit Internet Explorer.

18. Start the Internet Service Manager in the Microsoft Internet Server group.

19. Highlight the **IISServer Web service.**

20. From the **Properties** menu, select **Service** properties to access the **Web** properties sheets (you can also double-click on the IISServer name on the Web line).

21. Select the **Logging** property page.

22. Select **Log to SQL/ODBC Database** to enable SQL Logging.

23. Type *Web SQL* in the **ODBC Datasource Name (DSN)** field.

24. Type *InetSrvLog* in the **Table** field.

25. Type *sa* in the **User Name** field.

26. Leave the **Password** field blank.

WWW Service Properties for IISSERVER

| Service | Directories | **Logging** | Advanced |

☒ Enable Logging

○ Log to File
  ☒ Automatically open new log
  ● Daily
  ○ Weekly
  ○ Monthly
  ○ When file size reaches:
    3,814 ▲▼ MB

Log file directory:
C:\WINNT352\System32\LogFiles
  Browse...

● Log to SQL/ODBC Database

ODBC Data Source Name (DSN)
Web SQL

Table
InetSrvLog

User Name
sa

Password
[   ]

OK   Cancel   Apply   Help

27. Click **OK**—Internet Information Server is now configured to Log directly to SQL Server.

28. Exit Internet Service Manager.

From a Windows 95-based machine

1. Start Internet Explorer.

2. Connect to URL **http://iisserver.** You may need to Refresh (F5) the Internet Information Server sample home page if the client has cached that page.

3. Browse several areas on the server to generate log entries.

4. Exit Internet Explorer.

From the IISServer

1. From the SQL Server program Group in the Windows NT Server Program Manager start ISQL/w.

2. In the **Connect** dialog box ENTER *iissql* (or *iisserver* depending on where SQL Server is running) in the **Server** field, accept the default logon account of **sa** with no password, click **Connect.**

3. In the **Query** windows type *select * from inetsrvlog.*

4. From the **Query** menu, select **Execute.**

5. The Results Windows will become active and the log entries generated by the previous step will be listed. You can scroll right to see all the fields in the log.

6. Exit ISQL/w.

Note You can use any ODBC Tool, like Microsoft Excel or Microsoft Ac-

Lab #4: Enables a new generation of Web applications (10 - 20 minutes to complete).

cess, to view the SQL Server log files or create an automated reporting of the log. Because the ODBC datasource can be remote, you can also have multiple Internet Information Server reports sent to one SQL Server log for centralized log reporting.

This set of exercises focuses on using the samples that are included with the Internet Information Server default home page and sample files. We will look at the Internet Database Connector examples, the guest book application and the two ISAPI program examples included. The sample database queries are using the sample SQL Server database PUBS which is already populated with data. For more information about ISAPI development visit the Microsoft Internet Development Toolbox on the Microsoft home page at: **http://www.microsoft.com/intdev**.

Exercise #1: Using the Internet Database Connector Query Examples

A significant amount of corporate information today is stored in databases. With more and more companies using the Web to communicate with their customers and remote employees it is critical to have a link between those corporate databases and the Web. The Internet Database Connector provides this critical link between the Web and structured data. In these examples, we use the Internet Database Connector to publish sales information on the Web, but you could just as easily publish dynamic Web pages using this same tool.

The Internet Database Connector examples require that the SQL Server installation has been completed and that Lab #3, Exercise #9B has been completed (setting up the ODBC datasource).
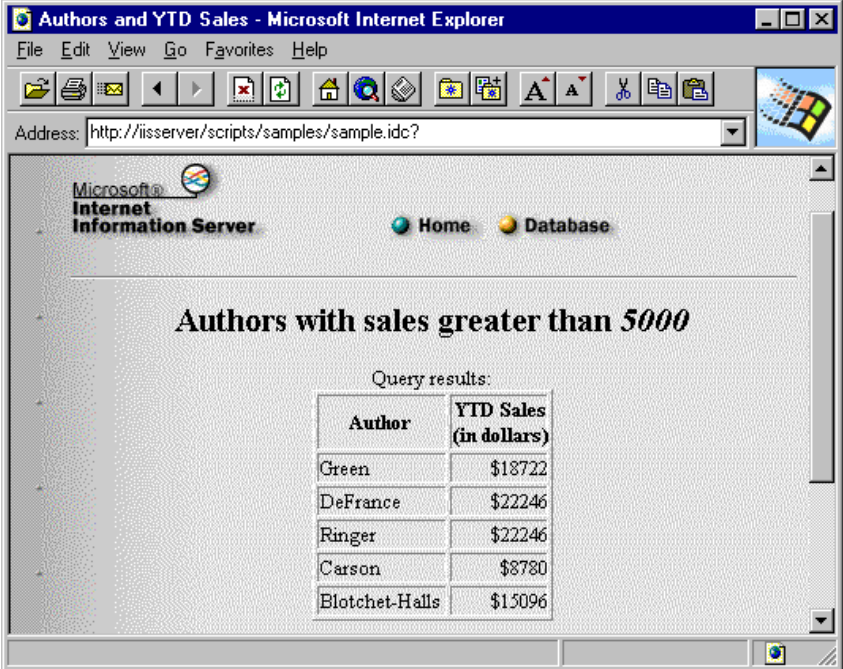
From IISSQL or the IISServer (depending upon which server you installed SQL Server)

1. Make sure the SQL Server you are going to target is running. From the SQL Server program group run the SQL Service Manager to see if the Service is running (a green light).

From a Windows 95-based machine

1. Start Internet Explorer.

2. Connect to URL **http://iisserver.**

3. Click on the yellow Database icon next to the **Sample Pages and Application Ideas** graphic.

4. This page goes into detail about the database integration features of Internet Information Server. Scroll down to the **Other Database Examples** heading.

5. Select the **Query** driven by form URL.

6. In the form field ENTER *YTD sales amount* accept the default **5000** and click **Run Query.**

7. Notice the result set is stored in a HTML Table, and that the Internet Database Connector uses HTML for its output templates so that any HTML feature can be utilized.

8. Go back one page to the **Query** driven by a form page.

9. In the form field ENTER *YTD sales amount* then ENTER *1000* and click **Run Query.**

10. Notice this time you get a different result set because the input variable was changed.

11. This is a simple Internet Database Connector query using HTML forms to get user input (Sales = 5000). The three files that control this query are listed below.
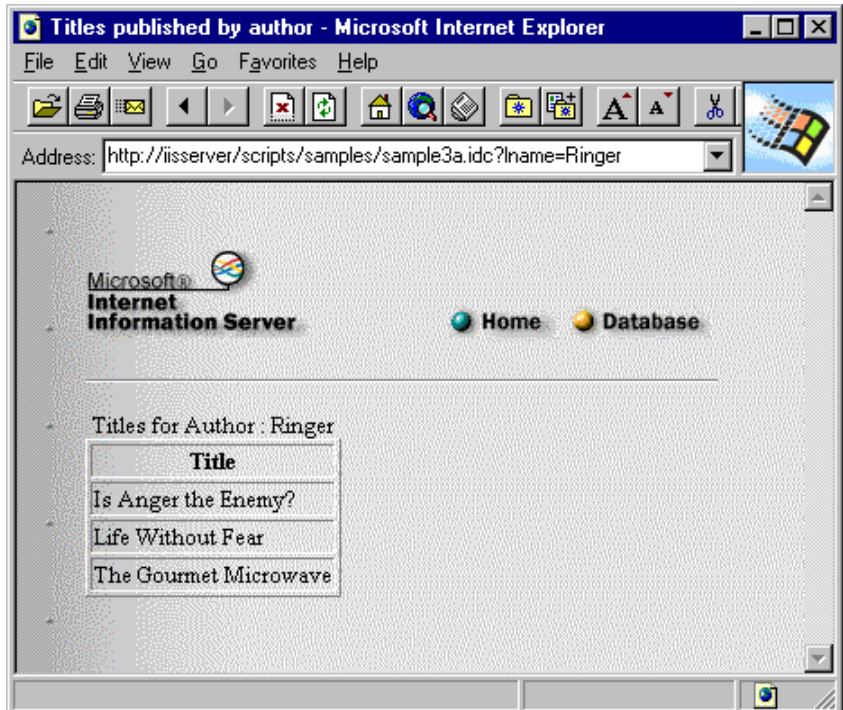
File Type	File Name	File Location
Input HTML page	dbsamp2.htm	c:\samples\dbsamp
ODBC Query/Control form	sample2.idc	c:\inetsrv\scripts
Output HTML page	sample.htx	c:\inetsrv\scripts

From a Windows 95-based machine

1. From Internet Explorer return to the the IISServer home page **http://iis-server.**

2. Click on the yellow Database icon next to the **Sample Pages and Application Ideas** graphic.

3. Scroll down to the **Other Database Examples** heading.

4. Select the **Query** returning data as hyperlinks URL.

5. In the form field ENTER *YTD sales amount* ENTER *5000* and click **Run Query.**
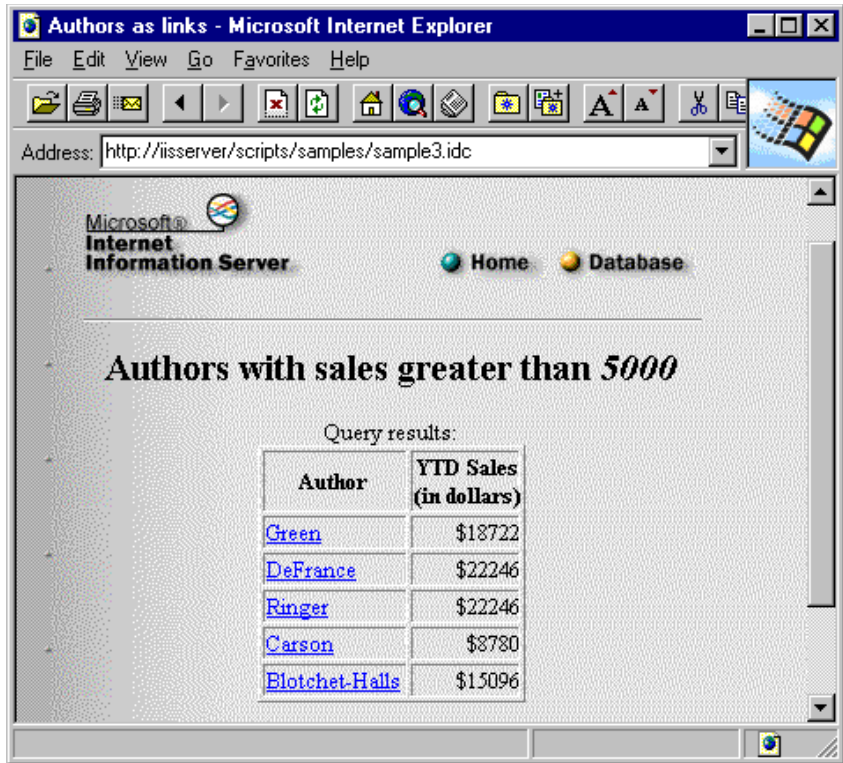
6. Notice that the query results are very similar to the previous example, except that the **Author** field is now a hyperlink that will run another query for additional data.

7. Select the **Author *Ringer***, which is a URL.

8. The **Ringer** URL runs a subsequent query designed to provide additional drill-down information.

9. This is a simple query using HTML forms to get user input (Sales = 5000) and nesting a query in the result set for addition information. The nested query is based on a key field derived from the returned values from the previous query. The five files that control these queries are listed below.

File Type	File Name	File Location
Input HTML page	dbsamp3.htm	c:\samples\dbsamp
ODBC Query/Control form for first query	sample3.idc	c:\inetsrv\scripts
Output HTML page for first query	sample3.htx	c:\inetsrv\scripts
OBDC Query/Control form for nested query	sample3a.idc	c:\inetsrv\scripts
Output HTML page for nested query	sample3a.htx	c:\inetsrv\scripts

Exercise #2: Using the Internet Database Connector Guest Book example
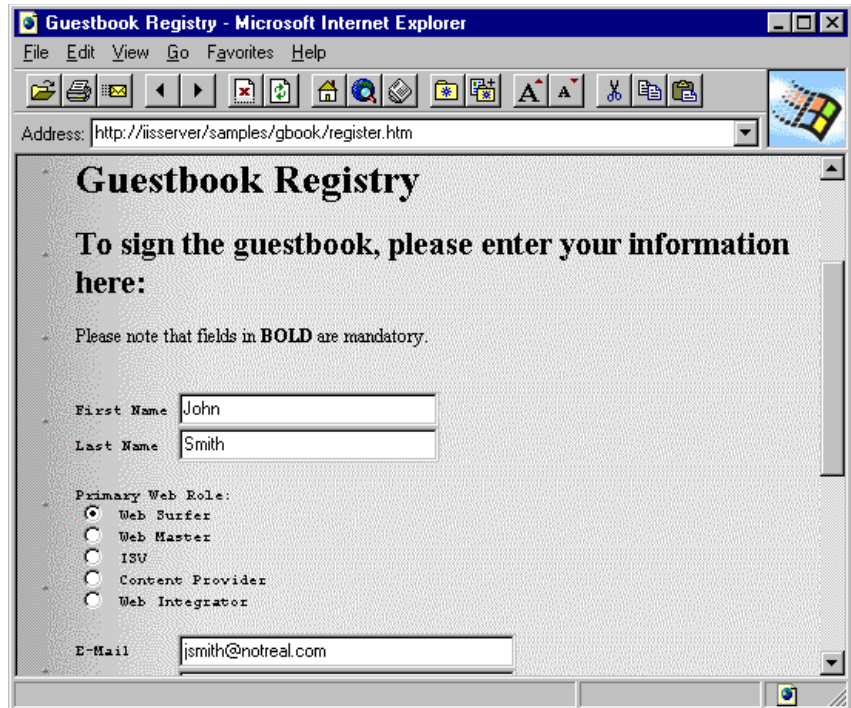
Publishing information from databases to the Web is a typical database application, and is accomplished by accepting information from a user of your site and storing it in a database in another. The Internet Database Connector allows you to easily create applications that can gather valuable information from users of your site and storing that information in a database.

The Internet Database Connector examples require that the SQL Server installation has been completed and that Lab #3, Exercise #10B has been completed (setting up the ODBC datasource).

From a Windows 95-based machine

1. From Internet Explorer return to the the IISServer home page **http://iis-server.**

2. Click on the yellow Database icon next to the **Sample Pages and Application Idea** graphic.

3. Scroll down to the **Sample Guestbook Application** heading.

4. You must create a table in the SQL Server database to store the Guestbook information. Select the **Create a Table** URL in the second paragraph to create the table.

5. The **Table "Guests" created successfully** HTML page is displayed.

6. Click on the yellow Database icon at the top of the page.

7. Scroll down to the **Sample Guestbook Application** heading.

8. You can now **Use the Guestbook** by selecting this URL from the third paragraph.

9. Fill in the **Guestbook** with your Name (first and last), your Web Role, your E-Mail, Web site, and additional comments.

10. Click **Submit Entry** to store this information in the **Guestbook**.

11. With this sample application you can also **View** all the records that are in the **Guestbook** and also **Query** all the records for stored attributes.

12. All the HTML forms for this application are in the *c:\samples\gbook* directory and the ODBC Query/Control form and the Output HTML pages are in the *c:\inetsrv\scripts* directory.

Exercise #3: Using the Internet Server API (ISAPI) sample applications

Web servers do not provide all the features that WebMasters need to develop high-impact Internet sites. The Web servers that will ultimately succeed are servers that can be extended by Independent Software Vendors and corporate developers. Internet Information Server includes the Internet Server API for doing just that. ISAPI is widely supported by many ISVs, Web server vendors, and corporate developers, thus ensuring a large selection of Internet server applications for customizing your site. Here are two small examples of ISAPI applications:

1. From Internet Explorer return to the IISServer home page at **http://iis-server.**

2. Click on the blue Programming icon next to the **Sample Pages and Application Ideas** graphic.

Appendix A:

3. This page has two simple examples of ISAPI applications. A text searching application and a favorite sites bulletin board. Run through each example application to get a basic feel for the different types of applications that can be built using ISAPI.

4. Many third-party ISVs, in addition to Microsoft, are building high-end server applications that integrate with Internet Information Server through ISAPI. For more information about how to use Internet Information Server as a development platform check out the Microsoft Web site at: **http://www.microsoft.com/intdev.**

Installing the Windows NT Server 3.51 Service Pack 3

From the IISServer

1. Insert the Internet Information Server compact disc into the CD -ROM drive on the IISServer.

2. Run the Windows File Manager and focus on the IISServer CD-ROM drive.

3. From the root of the CD-ROM change directories to the *cdrom:\WINNT351.QFE\platform* directory, where **platform** is the hardware platform you are installing on for the following: I386 for Intel-compatible machines, ALPHA for Digital Alpha-based machines, MIPS® for machines with R4x00 processors, and PPC for PowerPC™-based machines.

4. Run **update.exe** from the the platform directory that applies to your computer.

5. Click **OK** to install the English version of the Service Pack. Click **Restart Computer** to reboot the machine and finish the Service Pack Installation.

Internet Information Server Components

Internet Information Server is made up of several components for Internet publishing on Windows NT Server. These components break down into several categories including: services, clients, administration, database connectivity, and encrypted communication. The specific components are listed below:

Component	Purpose	Description
World Wide Web Service	Hypertext document publishing, integration with BackOffice and Web application solutions	High performance multi-media document publishing and application development platform for Windows NT Server
FTP Service	File Transfer Protocol (FTP) server for binary or ASCII file transfers	High performance FTP service for Windows NT Server
Gopher Service	Distributed Gopher space server	High performance Gopher server for Windows NT Server
Internet Database Connector	ODBC Database gateway for the World Wide Web service	Flexible Web/Database integration through ODBC for developing organizational information applications
Secure Sockets Layer	Client/server private communication	Encrypted communication between server and client

Component	Purpose	Description
Internet se... Manager	S... ...ministration	Remote, secure administration of all Internet Information Server services
Browsers	Hypertext clients for Windows 3.x, Windows for Workgroups 3.x, Windows NT, and Windows 95 HTML browsers	Internet clients for all Windows platforms support HTML 3.0, plus additional markups on Windows 95

Appendix: B

Product Comparison

The following is a comparative listing of features between Microsoft Internet Information Server and other Internet World Wide Web servers for Windows NT Server. This comparison is based on an interpretation of the information published by each vendor on the latest implementations of their products.

Key to the Symbols:

- ■ The full functionality is included within the product
- □ The functionality is an extra-cost option or only partially implemented
     A [blank] indicates there is no comparable feature

When appropriate, additional information is provided in the footnotes.

	Microsoft Internet Information Server 1.0	Netscape Netsite Commerce 1.1
Architecture		
Internet Services		
World Wide Web	■	■
FTP Service	■	
Gopher Service	■	
Includes browsers for Windows 3.1, Windows for Workgroups, Windows 95, and Windows NT	■	□[4]
Performance		
Runs as a Windows NT service	■	■
Runs as an application		
Runs on all Windows NT Server Platforms (x86, Pentium®, MIPS, Alpha, PowerPC)	■	□[5]

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[4] License for one browser for administration only

[5] Intel, Alpha only

	Microsoft Internet Information Server 1.0	Netscape Netsite Commerce 1.1
Tight integration with Windows NT Server for performance optimization	■	
Security		
Basic password authentication (clear text)	■	■
User accounts integration with Windows NT user accounts	■	
Windows NT Challenge/Response password authentication (encrypted)	■	

	Microsoft Internet Information Server 1.0	Netscape Netsite Commerce 1.1
Windows NT Challenge/Response password authentication (encrypted)	■	
Windows NT Server account and permissions assignment for anonymous login accounts	■	□[6]
Secure Sockets Layer support	■	□[7]
Security—grant or deny access to Web service based on IP address	■	■
Security—page level security integrated into Windows NT Access Control Lists (ACLs)	■	
Anonymous log on can be disabled	■	
Logging		
Logging to ODBC datasource	■	
Logging to text file	■	■
Auto log closing and starting new log based on time interval	■	
Auto log closing and starting new log based on log size	■	
Log analysis tool		■
Extensibility		

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[6] Must be an administrative account, by default Netscape uses LocalSystem

[7] Commerce Server only

	Microsoft Internet Information Server 1.0	Netscape Netsite Commerce 1.1
Extensible through Internet Server API	■	□[8]
Extensible through Common Gateway Interface (CGI)	■	■
Database integration through ODBC (Internet Database Connector)	■	
ODBC Drivers for SQL Server	■	
Advanced World Wide Web Server Features		
Remote administration	■	□[9]
Secure remote administration	■	□[10]
Performance monitoring integrated into Windows NT Performance Monitor	■[11]	
SNMP agent included	■	
Virtual Servers supported	■	
Enable or disable directory indexing	■	■
Image Map supported (both NCSA and CERN formats)	■	□[12]
Configurable connection—connection time-out	■	
Maximum connections configurable	■	
Web home root configurable	■	■
Multiple virtual Web roots	■	■
Virtual roots supported over the network (UNC)	■	
Virtual roots can be read-only or execute-only	■	
Default page configurable	■	■
Script extensions can be mapped to script executable	■	
Web page creation wizard		
Graphical URL link viewer		

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[8] Netscape supports NSAPI, not ISAPI

[9] With a browser only

[10] Only if SSL is on the client and the server

[11] 77 counters across all services

[12] NCSA format only

	Microsoft Internet Information Server 1.0	Netscape Netsite Commerce 1.1
HTML includes files	∎	
Index utility included		