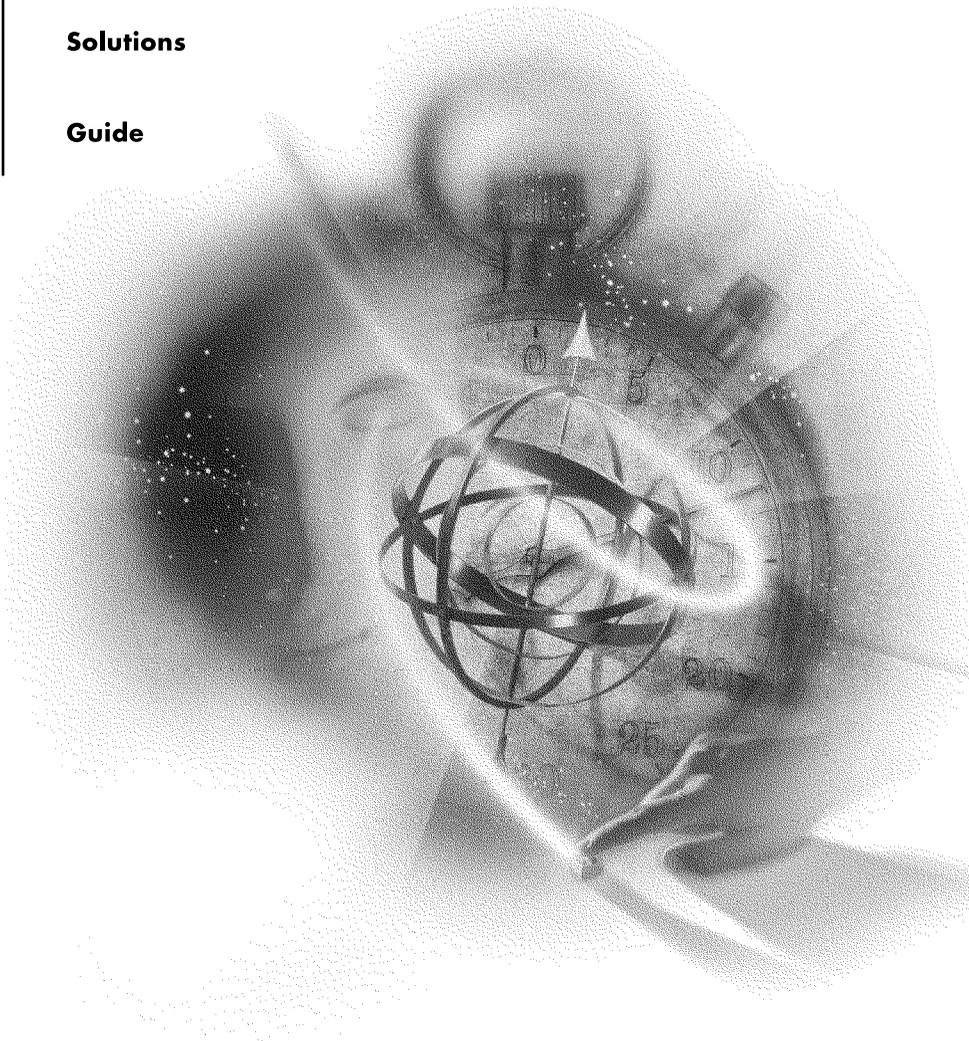**Administrator**

Solutions

Guide

NetWare® 5.1

NETWORKING SOFTWARE

Novell®

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Novell, Inc.
122 East 1700 South
Provo, UT 84606
U.S.A.

www.novell.com

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Contents

Understanding NetWare 5.1

NetWare® 5.1 builds on the success of NetWare 5 to create the ideal network operating system for Internet-enabled businesses. NetWare 5.1 turns a server-class PC into a high-performance Internet server, providing connectivity not only among personal computers, printers, and mass storage devices, but also through the Web, including the Internet and company intranets and extranets.

NetWare 5.1 is a complete Web-based solution, comprised of NetWare 5 and the latest Support Pack. It is also bundled with services for the Internet and Microsoft* Office 2000. These services are beneficial both for companies with and without an Internet presence.

Going beyond file and print, NetWare 5.1 provides a stable infrastructure. To this it adds NDS® and other management tools, and a Web server with all the Web-based tools and utilities, including Web publishing, application development, and office collaboration and productivity tools. It also includes powerful application services.

For users who want to leverage their NetWare sites and develop a corporate intranet presence, NetWare 5.1 is the ideal environment for creating intranets, corporate storefronts, and departmental applications by integrating users, groups, and services with NDS.

NetWare 5.1 offers the following advantages:

- A complete platform for deploying critical Web applications.
- Helps customers address business needs by combining the most reliable, manageable, and efficient networking platform with Web-enabled application solutions based on open standards.
- Reduces administrative tasks and networking costs.

- Lets customers manage the entire network effectively, delivering an average 69% savings in management and administrative costs over servers that are not directory based.

- Based on NetWare 5, the most stable operating system, NetWare 5.1 offers proven reliability, scalability, performance, and security. And it is backed by the largest support infrastructure in the world.

There are many products, utilities, and services offered in NetWare 5.1, but the main piece they all depend on is NetWare 5, which offers the following benefits:

- A reputation as the best file/print/directory/e-mail server available

- The ZENworks™ Starter Pack, which lets you configure, update, and maintain network workstations without leaving your desk

- NetWare over pure IP, plus the most innovative and powerful IP network management tools in the industry

- Novell® Storage Services (NSS), which simplifies file services and storage administration, improving file access speed and expanding server storage capacity—both file size and number of files

- Novell Distributed Print Services™ (NDPS®), which streamlines and simplifies network print services administration

What's in NetWare 5.1?

NetWare 5.1 includes the following components:

- Novell Distributed Print Services (NDPS)

- Lightweight Directory Access Protocol (LDAP)

- Novell Internet Access Server (NIAS)

- Storage Management Services (SMS)

- Catalog Services

- WAN Traffic Manager

- Public Key Infrastructure Services (PKIS)

- Novell Modular Authentication Service (NMAS)

- Novell International Cryptographic Infrastructure (NICI)

- Secure Sockets Layer (SSL)

- Domain Name System (DNS)
- Domain Host Control Protocol (DHCP)

NetWare 5.1 offers many utilities and features to complete its Web offering. These include:

- NetWare Enterprise Web Server
    - Novell Directory Services Web Management
    - Novell SQL Connector
    - Virtual directory support
    - Virtual server support
    - ~HomeDir support
    - Servlet Gateway 2.0
    - NSP + NDODB (support for ASP, ADO programs)
    - Cluster management (ability to manage groups of NetWare 5.1 servers running Web, news, virtual, and multiple Web server instances)
    - WebMon (Web server monitoring utility)
    - WebDAV NSAPI extension (for working with Microsoft Office 2000)
    - Novell Script
- NetWare FTP Server
- NetWare News Server
- NetWare Management Portal™
- NetWare Web Search Server
- NetWare MultiMedia Server
- Novell JVM 1.1.7b
- NDS 8 (Internet Directory Services)

Compliance with and inclusion of popular products and standards in NetWare 5.1 allow you to use your favorite tools to create solutions. The following third-party products are also included:

- Nombas JavaScript*

- ◆ Halcyon InstantASP
- ◆ WebSphere* Application Server
  - ◆ Instant DB (Java* RDBMS)
- ◆ WebSphere NSAPI plug-in
- ◆ Oracle8i
  - ◆ WebDB (Oracle* Web extensions)

These components share the common foundation of NetWare, and work together to enhance server-based resources. Figure 1 illustrates the main components included in NetWare 5.1.

Figure 1   NetWare 5.1 Component Map
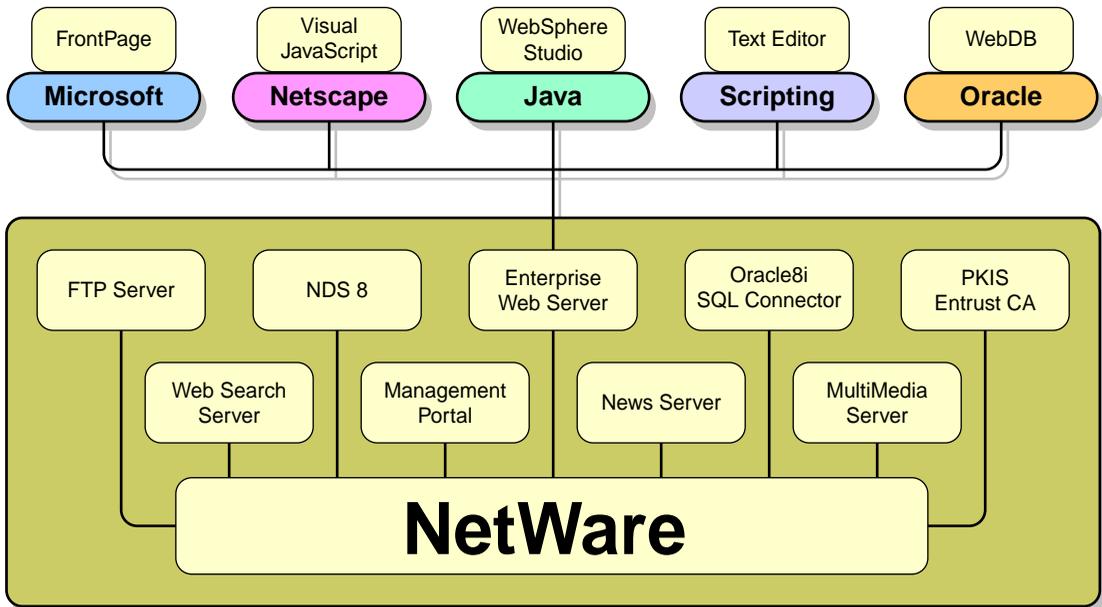
Changing the Way We Look at File Servers

NetWare 5.1 provides file, print, application, and directory services as well as many back-end services that support changing client applications. NetWare 5.1 includes the following benefits:

- ◆ Provides an open standards Web development platform

- Leverages the Microsoft client Web development tools and back-end services
- Provides a set of open standards collaborative services
- Provides a Java application server platform
- Includes Office 2000 publishing compatibility
- Offers built-in support for third-party authoring tools with FTP services integrated into the NetWare Enterprise Web Server and scripting components
- Provides improved Web development options with support for JSP, JDBC, ASP, ODBC, and Microsoft development tools
- Allows users to manage Web-based content and make it secure
- Enables integrators and Information Technology (IT) teams to more easily deploy vertical solutions integrated with popular development tools and standard languages
- Makes every NetWare server a repository for Web server content, making the it more valuable in an intranet environment

Benefits of NetWare 5.1

NetWare 5.1 addresses all of the needs of today's networks by providing not only a platform, but also an entire infrastructure upon which companies can build powerful networks. Solutions based on NetWare 5.1 can range from simple to complex, and provide basic networking services to complete Web-based applications.

The power behind NetWare 5.1 comes from its efficiency, performance, fault-tolerance, interoperability, compatibility, and manageability. And it provides a complete tool set for developers.

Getting Started

This guide assumes that you have already installed NetWare 5.1 and that the server is running. You also need to install the Novell Client™ software on your workstations to allow them to connect to the server. You should also create user accounts to enable each user to log in using his or her own name. For more information on installing and configuring NetWare 5.1 refer to Install a NetWare 5.1 Server in the NetWare 5.1 Installation Guide. For more information on installing and configuring the NetWare Client software refer to Install Novell Clients in the NetWare 5.1 Installation Guide.

1 Remote Server Management

There are a variety of management tools provided with NetWare®. The primary tool is NetWare Administrator, which is run from a workstation. However, the same functionality is also available from the server console using ConsoleOne®. Information on using NetWare Administrator is provided in NDS Object Administration. Information on using ConsoleOne is provided in the *ConsoleOne User Guide*.

NetWare 5.1 extends these management capabilities to the Web with NetWare Management Portal™. With the NetWare Management Portal, managing a NetWare network or server has never been easier. The only requirement for a network manager to access and manage a NetWare server is a Web connection.

NetWare 5.1 provides NetWare Web Manager as an interface for all its Web-based management tools. NetWare Web Manager provides limited management capabilities, while providing a gateway into Portal and other management applications.

NetWare Web Manager

NetWare Web Manager is a Web-based interface that contains the Java and JavaScript forms you use to configure your NetWare Enterprise Web Server and NetWare News Server. It acts as a navigation point to access all Web-manageable products included with NetWare 5.1. After performing a default server installation, NetWare Web Manager will provide links to the following Web-based management tools:

- NetWare Enterprise Web Server
- Novell® Directory Services® (NDS®)
- NetWare Management Portal

Additional links are provided as new products are installed. For example, after installing NetWare News Server and NetWare Web Manager, use your Web browser to navigate to NetWare Web Manager. You can then use the Web Manager forms to configure your servers. When you submit a form, NetWare Web Manager modifies various configuration files on your NetWare server for the server you are administering.

To access the NetWare Web Manager:

1 Open your Web browser.

2 In the address (URL) field, enter

`https://server's TCP/IP address:adminport`

For example,

`https://137.65.123.11:2200`

If the Enterprise Server is installed on your server (the default), you will have to add the port number of the Enterprise Server Administration server (default is 2200) at the end of the IP address. For example, if your Portal server's IP address is 137.65.123.11, you would enter **`137.65.123.11:2200`** in the Address field of your browser.

3 Enter the username and password you specified during the NetWare 5.1 server installation.

The NetWare Web Manager screen varies depending on which components you chose to install. The following figure shows some of the services you can manage from a single server.

Figure 2   NetWare Web Manager

For additional information about NetWare Web Manager, see NetWare Web Manager Basics in Managing NetWare Web Servers.

Using NetWare Management Portal

The NetWare Management Portal lets you manage all Novell server versions (3.*x*, 4.*x*, or 5.*x*) through a Web browser on a client workstation. This new tool allows you to manage your server from any location on your network where a Web browser is available. Portal allows the servers that don't support TCP/IP to be integrated with your corporate intranet.

The NetWare Management Portal allows network administrators to do the following:

- Mount and dismount volumes

- Access files on volumes and DOS partitions

- Manage server connections

- Configure SET parameters

- Monitor system resources

- View server console screens

- Browse the NDS tree and view NDS partitions

- Down or restart the server

- View the status and health of the server processes, resources, NLMs, and hardware devices

Accessing NetWare Management Portal

You can access the NetWare Management Portal two ways: directly or through NetWare Web Manager.

To open NetWare Management Portal directly:

1 Open your Web browser.

2 In the address (URL) field, enter

   http://*server's TCP/IP address:port number*

   For example,

   http://137.65.123.11:8008

   If the Enterprise Server is installed on your server (the default), you will have to add the NetWare Management Portal port number (the default is 8008) at the end of the IP address. For example, if your Portal server's IP address is 137.65.123.11, you would enter **137.65.123.11:8008** in the Address field of your browser.

3 Click Login.

4 Log in as Admin or an admin equivalent to have access to all the features and functions.

To open NetWare Management Portal through NetWare Web Manager, first access NetWare Web Manager as described above in Steps 1-2, then complete the following:

1 Click the button of the server you want to manage under NetWare Management Portal.

2 Click Login.

3 Log in as Admin or an admin equivalent to have access to all the features and functions.

After logging in to the Management Portal on a NetWare 5.1 server, you are presented with the server's name and version, revision, and the total up time. A traffic light health indicator shows the status of the server. The indicator is also a link to the Server Health page. The following figure shows NetWare Management Portal main screen with the user Admin logged in.

Figure 3   NetWare Management Portal

Full functionality of Portal's management capabilities requires a NetWare 5.1 server with Portal loaded. However, you can also access the file systems of non-Portal servers in your current tree. To do this you must load an additional module called NWRSA on those servers. However, with non-NetWare 5.1 servers, health monitoring or other administrative options are not available.

For more information on NetWare Management Portal see NetWare Management Portal in *NetWare Management Portal Utility Guide*.

ZENworks Starter Pack

ZENworks™ automates desktop management by using Novell Directory Services to provide application, workstation, and remote management. By automating various redundant administrative activities, ZENworks cuts costs by minimizing the time users and network administrators must devote to workstation management. Users are more productive and administrators are free to concentrate on more critical issues.

ZENworks provides the following benefits:

- Reduces total cost of network/desktop ownership
- Allows network administrators to creates and administer Windows* policies and profiles from a central location
- Creates hardware and software inventories centrally and automatically
- Configures printers from a central location
- Configures the Novell Client™ easily
- Simplifies the distribution, maintenance, and updating of applications on all Windows workstations across the network
- Provides remote help desk utilities to resolve software-related problems
- Allows network administrators to assess year 2000 risks and provides virus protection

Using ZENworks

ZENworks ships on a separate CD-ROM, which, when inserted in a workstation, will autostart and launch the setup utility. It displays options for installing the server components as well as the client piece for the supported platforms.

The ZENworks Starter Pack, which is a subset of the full-featured product, contains application and workstation management functionality.

Application Management: Provides customized software distribution that reduces costs and simplifies administration by automatically distributing and customizing software for each user. It also ensures that users have the software tools they need to do business.

Workstation Management: Provides directory-enabled desktop management, which ensures that users can roam from one network location to another while securely maintaining their familiar, personalized desktop interface and having access to printers and the applications they require.

For additional information about the ZENworks Starter Pack, see Understanding the ZENworks Starter Pack in *ZENworks Starter Pack*.

2 Web Solutions

Almost all of the tools, utilities, and features offered in NetWare 5.1 utilize the Web to make them more accessible and to improve their functionality. NetWare 5.1 includes everything to enable you to create a powerful, flexible Web presence.

Benefits of the Web

There is no better medium or infrastructure in place to enable, enhance, and encourage open communications than the Web. What e-mail has done for person-to-person communication, the Web does for person-to-department, department-to-department, company-to-person, company-to-company communication, and so on.

You can create a Web to enhance departmental communication, or you can create a Web that spans your location or company. You can also provide spaces for your customers, suppliers, vendors, consultants, or any other entities outside your company who would benefit by having access to specified areas on your Web. In addition, you can publish information on the Internet so that the world can see it and contribute to it.

The following are the different types of Webs from which you can publish information:

- ◆ The most popular of all Webs is the World Wide Web, available through the Internet. Hosting a Web server with Internet access requires a persistent Internet connection. In this environment, information published to the Web server will be accessible by anyone with a browser. Most companies host Internet Web sites to publish information about their products or services and to provide a point of contact with customers.

A firewall is required to provide security for Web servers with Internet connections. A firewall prevents users on the Internet from accessing a company's network-based resources.

◆ Many companies also host their own private intranets. The target audience of an intranet is the employees. An intranet is the ideal environment for employees and departments to publish information that can benefit others in the company.

A company can host both Internet and intranet Web sites. Employees inside the company can access both, while people outside the company can't get through the firewall to access the intranet.

◆ An extranet is a combination of public and private Web sites. Extranets are usually created among companies to expedite communication and cooperation. For example, a company that relies on a vendor to fill its orders could create an extranet to allow the vendor to access customer orders. This way, the vendor could automatically fill orders without having to wait for user intervention.

Creating a Web-Enabled Network

To create a Web-enabled network with NetWare 5.1, you'll need to complete the following tasks, which are discussed in greater detail later in the chapter:

◆ Install the NetWare Enterprise Web Server.

This is installed by default during the NetWare 5.1 installation. If you deselected this product during the installation, it can be installed at any time using ConsoleOne™ or NWCONFIG.

◆ Create a Web site.

You can create an internal Web site (an intranet) for the users on your network. This is easy to do once you have the Enterprise Web Server installed and running. And it's easy for users on your network to access it, while access from outside the company is restricted. You can also follow the same procedure to create a Web site on the Internet.

◆ Create multiple Web servers.

The Enterprise Web Server can host multiple Web servers, including hardware and software virtual servers, making it easy to publish as many Web sites as needed from a single NetWare 5.1 server.

◆ Create personal Web sites.

You can specify which users on your network can have their own Web pages. These can be used for any purpose, such as allowing users to publish frequently-requested information or files that might be beneficial to others.

◆ Secure your Web site.

Upon installing the NetWare Enterprise Web Server, access is not limited, so everyone with access to the network can access and view your Web site. You can control access and impose restrictions using NDS® or LDAP.

◆ Provide additional Web-based services.

NetWare 5.1 includes all the services you will need to provide a complete, Web-enabled environment on your network. You can add each service as the need arises, or just pick the ones that apply to your environment.

◆ Set up the NetWare FTP Server.

The NetWare FTP Server enables file transfers to and from NetWare server volumes, or for downloading files from Web sites hosted on your NetWare 5.1 server.

◆ Set up the NetWare Web Search Server.

Many companies wind up hosting multiple Web sites from different departments. However, locating company-wide information requires searching each department Web site individually. The NetWare Web Search Server allows you to search your entire Web presence at once.

◆ Create a news server.

There's no better way for users to collaborate and share information than with NetWare News Server. There are many news groups available on the Internet today covering many topics of interest. You can create and host your own news groups to encourage collaboration among all employees, or use the News Server to receive information from your clients or customers.

◆ Create a multimedia server.

Some information is best represented in audio or visual formats. Multimedia and audio formats, which are commonplace on the Internet, are now possible using the NetWare MultiMedia Server.

Using the NetWare Enterprise Web Server

The first step to creating a Web environment is to install the NetWare Enterprise Web Server, which allows you to configure your NetWare server as a Web server. The Enterprise Web Server provides all the functionality necessary for companies, both small and large, to build Web solutions. It offers security and authentication using NDS or LDAP, as well as supports additional certification servers and security standards. NetWare Enterprise Web Server also serves as the host for the IBM* WebSphere Application Server, which is a portable environment for deploying and managing Java applications on NetWare.

The NetWare Enterprise Web Server allows Web developers to select development tools with which to create Web-based applications on the NetWare platform. Likewise, developers can also choose which databases they will use to connect with the Enterprise Web Server. Oracle8i with its WebDB is included with NetWare 5.1.

To verify whether NetWare Enterprise Web Server is installed, use NWCONFIG or the server GUI to view the installed products. If it is not installed, you can install it using either tool. Refer to NetWare Enterprise Web Server in the *NetWare 5.1 Installation Guide*.

Configuring the NetWare Enterprise Web Server

The NetWare Enterprise Web Server includes a Web-based management utility, called Server Manager, where you can view and modify Enterprise Web Server configuration information. This utility is most easily accessed from NetWare Web Manager.

To access the NetWare Web Manager, you can use any browser that supports frames and JavaScript to configure your servers.

1 Access the NetWare Web Manager by opening a browser and selecting the following URL:

   https://*servername:port number*/

2 Log in as Admin or equivalent.

3 Click OK.

   This loads the NetWare Web Manager.

4 Under NetWare Enterprise Web Server, click the button of the server you want to manage.

5 Log in as Admin or equivalent.

6 Click OK.

This loads the NetWare Enterprise Web Server Server Manager utility. Using Server Manager you can customize the configuration of your Web server. The following figure shows a Server Manager screen used for configuring additional document directories.

Figure 4   The Server Manager Utility
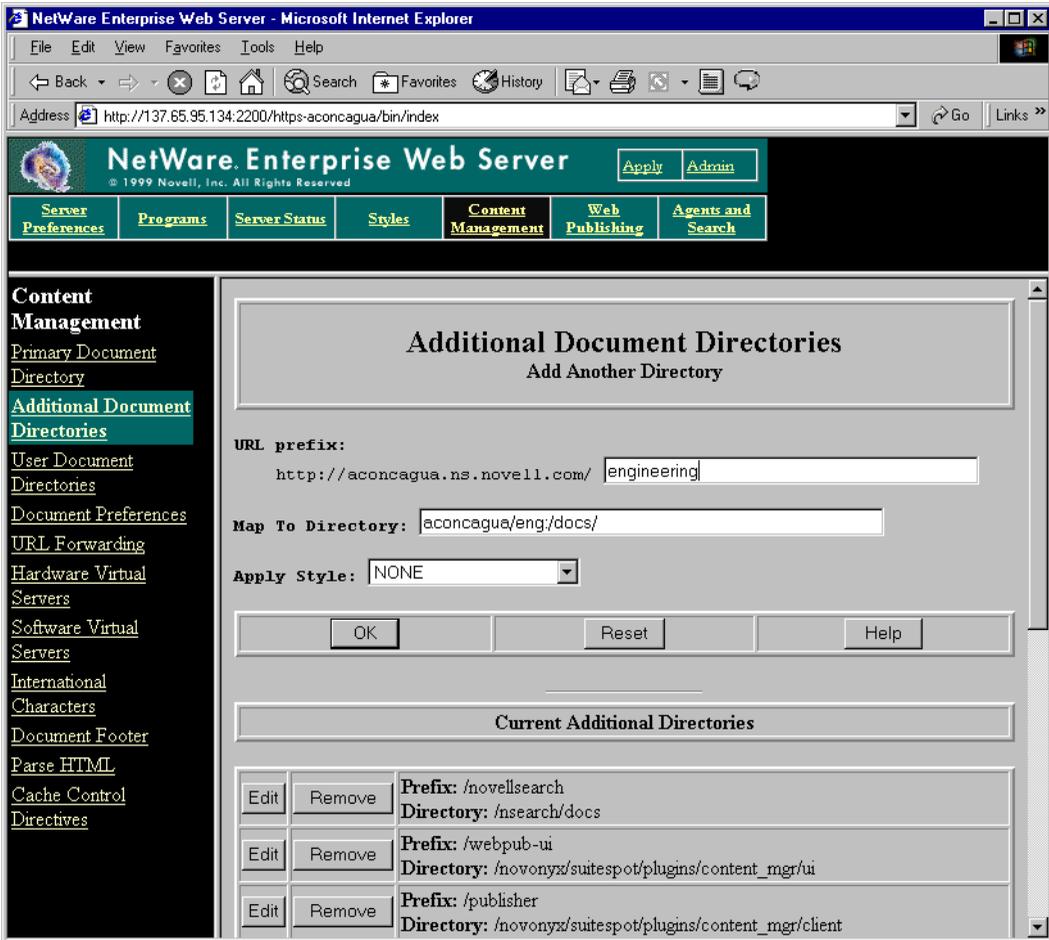
The first item to verify is the location of the document directory by clicking Content Management > Primary Document Directory. This directory contains

a sample Web site. You can modify or replace this site with your own content, or you can specify a different location for new or existing content of your own.

Creating Your Own Web Site

You can use any HTML editor to create a Web site, although most functional corporate Web sites are created by professional designers. But depending on your needs and resources, your implementation tool can range from any of the readily available Web site creation programs (some of which are free) to a team of programmers. Another avenue is to outsource the creation of your Web site.

Creating personal and departmental Web sites can be simple, requiring only minutes to assemble. Two tools for Web site creation are included with the Microsoft and Netscape* browsers: Microsoft FrontPage* Express and Netscape Composer*.

When you create your home page, save the file as INDEX.HTM or .HTML and that file will automatically appear when your Web site is accessed. You can then create links to other pages and graphics with any filenames.

Hosting Multiple Web Servers

You can configure your NetWare 5.1 server to host multiple Web servers. This way, a single NetWare 5.1 server running NetWare Enterprise Web Server can host all the Web server needs of your company, or an Internet Service Provider (ISP) can host Web sites for its customers. This makes it easy to allow each department to create their own Web site without requiring that they each have a server.

There are two types of Web servers you can host on your NetWare server:

- Hardware virtual servers
- Software virtual servers

Each type has its strengths and weaknesses; you should choose the one that's right for your situation.

For more information, see Setting Up Hardware Virtual Servers and Setting Up Software Virtual Servers in the *NetWare Enterprise Web Server Administration Guide*.

Setting Up Hardware Virtual Servers

A hardware virtual server lets your server respond to multiple IP addresses without your having to install multiple servers. With hardware virtual servers, you map multiple IP addresses to multiple document roots. For example, if you have two IP addresses, you could map the first IP address to one document root and the second IP address to another document root.

While hardware virtual servers take fewer system resources than multiple instances of the server, they must share the same configuration information. For example, if one hardware virtual server has enabled security features or Web publishing, they all must have the features enabled.

To set up hardware virtual servers:

1 Load and bundle all IP addresses.

2 Execute the following command on the server console:

   add secondary IPaddress *IP address*

3 Add the above command to the AUTOEXEC.NCF file after the load and bind statements or after INITSYS.NCF, if INETCFG is being used to configure the server.

4 Click Enterprise Web Server *server name* > Content Management > Hardware Virtual Servers.

5 In the IP Address field, type the secondary IP address.

6 In the Document Root field, type the document root, for example, SYS:NOVONYX/SUITESPOT/DOCS.

7 Click OK > Save and Apply.

8 Repeat the previous steps for each hardware virtual server.

Setting Up Software Virtual Servers

A software virtual server is a way to host several Web sites on one computer without needing to have more than one IP address on the computer. For example, you can set up your system so that both www.novell.com and www.netscape.com resolve to 192.3.4.5, then set up software virtual servers to handle both domain names. The server can respond differently to requests depending upon the URL, even though the server only has one IP address.

For example, an Internet service provider (ISP) can install a Web server and then set up a software virtual server for each of its customers (for example, customers aaa, bbb, and ccc) so that each customer can have an individual domain name.

To do this, the ISP should first configure Domain Name System (DNS) to recognize that a customer's URL, www.aaa.com, resolves to the ISP's IP address. The ISP can then create a subdirectory for each company (aaa, bbb, and ccc) in the document root. These subdirectories contain the files for that company, including the home page, aaa/home.html. Next, the ISP should set up software virtual servers. The URL host would be www.aaa.com and the homepage would be aaa/home.html. The ISP would do this for all the companies.

To set up a software virtual server:

1 Access the NetWare Web Manager > Click Enterprise Web Server *server name* > Content Management > Software Virtual Servers.

2 Create a directory under the DOCS directory, for example, SYS:NOVONYX\SUITESPOT\DOCS\TEST.

3 In the URL Host field, type the URL host whose custom home page you want to set up, for example **test/**.

4 In the Homepage field, type the path to the home page you want to use for this virtual server, for example INDEX.HTML.

If you type a full path, the server uses that specific document. If you type a partial path, the server interprets it as relative to your primary document directory.

5 Click OK > Save and Apply.

6 If you want to modify preferences on the default homepage, click Edit the Default Home Page at the top of the form.

Accessing Your Web Site

You can access your newly created Web site with its sample data by entering the IP address or the server name from a browser, for example

http://*server IP address*

or

http://*servername*

This will take you directly to the sample Web site included with the Enterprise Web Server.

Adding Content to Your Web Site

NetWare Enterprise Web Server has a document root or primary document directory. This allows you to copy only the files that you want users to access.

To set your server's primary document directory:

1 Access the NetWare Web Manager as described above.

2 Click NetWare Enterprise Web Server *server name* > Content Management > Primary Document Directory.

3 In the Primary Directory field, type the full pathname of the directory that you want to make the primary document directory.

4 Click OK.

5 Click Save and Apply.

You can also create additional document directories, which is a good idea when departments want to publish their own content to the company Web site, but you don't want to grant them control of the primary document root.

To add additional document directories:

1 Click Enterprise Web Server *server name* > Content Management > Additional Document Directories.

2 In the URL Prefix field, type the URL prefix or keyword you want to use to represent the path.

For example, the URL prefix could be **docs**.

3 In the Map to Directory field, type the absolute path of the directory you want the URL prefix to map to.

The command syntax is *vol:\directory\subdirectory*.

You can select a configuration style to apply to this directory's configuration.

4 Click OK.

This is the same prodecure to follow whether you're creating a company Internet site, company intranet site, departmental site, or even a personal site. What differentiates between each type is whether the Web site is placed on the Internet outside the firewall or on the intranet inside the firewall. Departmental Web sites are typically a software virtual server, as described above, in which personal Web sites are easily created by each user.

Creating Personal Web Sites

Users on your network can also create their own personal Web sites. This requires no administrative interaction. The only requirement is that you create a home directory when you create each user object. If not, you can go back and add this.

To create a personal Web page, a user must do the following:

1 Create a PUBLIC_HTML directory in your personal directory.

2 Copy or create a Web page and place the INDEX.HTML file in this directory.

3 Access the Web site by entering the following in your browser:

http://*server name*/~*user name*

or

http://*IP address*/~*user name*

Setting Up User Publishing

A Web site on the Internet is typically the place for you to publish information you want visitors to read. However, a Web site on an intranet is most effective if employees can participate and share information with others. This makes it possible for users to communicate within a department, for departments to share information with other departments, and for company leaders to communicate with the entire company.

NetWare Enterprise Web Server clients can use the Netscape Web Publisher to collaborate on projects by directly accessing, editing, and managing files on remote servers. Web Publisher lets you manage, edit, and publish files, as well as providing document version control, agent services, access control, and link management.

Turning on Web Publishing

Web Publishing is, by default, turned on. To change its setting:

1 Access the NetWare Web Manager > Click Enterprise Web Server *server name* > Web Publishing > Web Publishing State.

2 To turn Web Publishing off, select Off. To turn it on, select On.

3 Click OK.

You will need to make sure to give users and groups the appropriate rights, using NDS or LDAP, to publish information to your Web site. If you only want certain users to view your Web site, grant them Read and Filescan rights. If you want them to view and publish to the Web site, grant them Read, Write, Filescan, Modify, and Create rights.

Securing Your Web Site

Information published on a Web site can be viewed by anyone, so sensitive information should be guarded. Most Web sites on the Internet are designed for general access, but a company intranet is an ideal environment for Web site security. Likewise, extranets also demand tight security controls.

The Web sites created above are, by default, unsecure. Anyone with access to the network can access those sites. You must implement security to restrict access. You can control access to the entire server or to parts of the server, such as directories, files, or file types.

NetWare Enterprise Web Server can be configured to use either NDS or local or remote Lightweight Directory Access Protocol (LDAP). With native NDS, you manage access control through the NetWare file system trustees. With LDAP, you manage access control through the NetWare 5.1 access controls.

Controlling Access to your Web Site

You can control access to your Web site in a variety of ways. For example, you can use NDS to restrict access by files, or you can implement LDAP to restrict access according to IP address.

For more information on access control, see Controlling Access to Your Server in the *NetWare Enterprise Web Server Administration Guide*.

Controlling Web Access with NDS

NDS allows you to restrict access to files, but it does not allow you to restrict access based on IP address or other criteria. If access must be restricted based on IP address or other parameters, you must either change modes and use LDAP or find an alternative method to restrict access, such as a firewall.

Web access control with NDS is exercised using NetWare Administrator or ConsoleOne. It is accomplished by restricting access to files just as with traditional files stored on the file server. For more information on using NDS to restrict access, see Controlling Access with NDS in the *NetWare Enterprise Web Server Administration Guide*.

Controlling Web Access with LDAP

With LDAP, you can determine who can access the server using two attributes:

- User-Group: This requires users to enter a username and password before accessing the server, or the server can use client authentication by checking an LDAP directory for a security certificate before giving access to a file or set of files on your Web site.

- Host-IP: Requires the user to view your Web site from a specific computer, where the server recognizes the computer by either its host name or its IP address.

For more information on using LDAP to restrict access, see Controlling Access Using NetWare Web Access Controls in the *NetWare Enterprise Web Server Administration Guide*.

NetWare Enterprise Web Server defaults to use NDS. However, you can change this from the General Administration page by clicking Global Settings > Configure Directory Services.

Additional Web-Based Services

NetWare 5.1 goes beyond simply providing a Web server and includes all the functionality for hosting a complete Web environment. This includes the ability to create multiple Web sites—for the Internet, for the intranet, for departments, and for users.

Additional Web-based services you can provide include FTP, search, collaboration, and support for multimedia content.

Using the NetWare FTP Server

The NetWare FTP Server provides File Transfer Protocol (FTP) service for transferring files to and from NetWare volumes. You can use the FTP command from a workstation with FTP access to log in to an NDS tree. You can also perform file transfers from any FTP client by using the FTP Server to log into the NDS tree. After logging into an NDS tree, you can navigate to other NetWare servers (in the same NDS tree) that may not be running FTP service.

FTP servers provide fast Internet download capabilities and are known most for their ability to download files that are linked to a Web-based URL.

Another common use for FTP is using its Internet access to provide collaboration between organizations or companies. For example, Company A could use FTP to provide a shared rights area with Company B, while maintaining rights via IP addresses. A set of addresses would be assigned to a given area and only those addresses would have access to that area. This goes one step further than user authentication, since you can restrict access on a user's location as well.

The most common use for FTP today is the automated archival ability. Its strengths are that it is fast, lightweight, and archives can be scripted by many FTP clients. The main purpose is to move data from the live environment over to an archive environment where it is less expensive to store. Types of information being archived range from Human Resources information to product code backups. With the emergence and growth of the Web environment, FTP has been the main medium for backing up large Web contents or moving content from a staging server to a production environment.

Information on using FTP to transfer files can be found in the Using FTP to Transfer Files to Your Web Server in the *User Solutions Guide*.

Starting FTP

The FTP server can be loaded from the NetWare console using the command **ftpd**.

Users can start the FTP session from a workstation running FTP client software using the command **ftp** *server_name*.

Using the NetWare Web Search Server

With the NetWare Web Search Server you can create an enterprise-wide index of all the information on your intranet. You can organize information spanning multiple servers and file types into a knowledge base. Using a single interface accessible from any Web browser, corporate users can access online information whether it exists in HTML, Word, Excel*, WordPerfect*, or another format.

With NetWare Web Search, you can do the following:

- ◆ Search across multi-language data collections from a single interface.
- ◆ Print large collections of dispersed but related files as a single, coherently organized document.

- Customize the look and feel of search and print results, and error and response messages for each language (or collectively).

- Select the information categories, products, chapters, and languages in which to conduct a search, even down to the file level.

- Integrate linguistic technology modules such as Natural Language Interface and Morphology.

- Integrate with a profiling engine.

- Integrate with the upcoming Novell single sign-on initiative. NetWare Web Search runs from a super-thin Java client which downloads quickly and still allows clients to conduct searches in all languages.

Many departments within companies have their own Web servers allowing them to publish information for their own use and for other groups within their company. There is currently no way to search all of those departmental sites at once. Currently, you would need to visit each site and either browse it, or if search is available, search the site.

The NetWare Web Search Server searches all of these departmental Web servers and makes all of the content searchable from one central location. This allows you to go to one site and search everything published within the company. It also allows network administrators to maintain a corporate intranet that publishes official company information, while simultaneously allowing each department to publish internal information in their own way.

Creating a search solution using NetWare Web Search involves three essential tasks:

- Defining the location of the files and documents (called a collection) you want included when a user performs a search.

- Building an index for each collection.

- Using the default templates, which are simple HTML pages containing Web Search variables, or creating your own custom templates.

By viewing the HTML source of the search page, you can see how the variables are used to search the index and then create your own custom search templates by rearranging or adding additional variables.

For more information see Introducing NetWare Web Search Server in *NetWare Web Search*.

Searching with the NetWare Web Search Server

The NetWare Web Search Server is not installed by default, so either select it during your additional server installation or install it afterwards. If you chose to install NetWare Web Search during NetWare 5.1 setup, all of the content in the /DOC root of your NetWare Enterprise Web Server was automatically indexed by Web Search.

To test NetWare Web Search:

1 In your Web browser's URL field, enter the domain name or IP address of your Enterprise Web Server followed by /novellsearch, for example **http://www.mycompany.com/novellsearch**.

2 When the default search form appears, enter a word or phrase.

3 Click Search.

For more information on using and customizing the NetWare Web Search Server see the *NetWare Enterprise Web Server Administration Guide*.

Using the NetWare News Server

By allowing you to utilize threaded discussion groups and access external news groups, the News Server lets you leverage the knowledge of internal and external collaborative communities. Integration with Office 2000 productivity applications also provides access to much larger collaborative communities such as use.net.

By using the News Server for discussion groups, the people in your company can easily share information both within the company and across the Internet.

For example, if administrators want users to share information through news groups, they would install the News Server. During installation, the administrator configures the server to use LDAP to access the user accounts within NDS. Users have been previously created within NDS. Using the Web-based administration interface, the administrator creates new news groups on the server and provides access to specific users or groups of users.

Users access the News Server through a standard news reader, such as Microsoft Outlook Express. They begin by configuring their reader with the address of the server and their username and password. This username and password are the same as that defined in NDS. The user then connects to the server and browses the list of news groups that have been defined on the server. They select a specific news group of interest and view the list of messages that have been posted to the group. Users may post new messages

to the news group. Once posted by a user, the server assures that the message is listed and available within the news group for other users to read. For more information on configuring user access to newsgroups, see Accessing the NetWare News Server in the *User Solutions Guide*.

News Server access can be configured several ways. The simplest is as a single server for internal users. In this configuration, a corporate NDS tree containing all corporate users already exists. The administrator installs the product and configures it to access the NDS tree. The administrator creates news groups and assigns access to users or groups. The users, using standard news readers, access the news groups and read/post messages.

You may also allow internal users to access an external news feed. This configuration is identical to the previous except that the administrator configures the News Server to access news feeds from external servers. These external news feeds are then accessible to the internal users as standard news groups. Another option is for a company to create its own news server and allow its customers to share and exchange information. There might also be internal users who read and post messages to the news groups or answer customer questions. Larger corporations with multiple divisions can also operate separate news servers while allowing their users to share information across divisional boundaries.

For more information, see the *NetWare News Server Administration Guide*.

Setting Up the NetWare News Server

To set up NetWare News Server, complete the following steps:

1 During the NetWare 5.1 install, select Install NetWare Web Services.

2 After completing the NetWare 5.1 install, access the NetWare Web Manager by typing the following in a browser:

https://server IP address:adminport

where *Adminport* is the port number you specified during install for the NetWare Web Manager.

3 Click Global Settings > Configure Directory Service.

The Configure Directory Service form identifies which directory service and context the NetWare News Server will use. NDS is the default. (The following steps apply to NDS.)

If your users or group are in a subcontext of the context listed on this form, they must specify this additional context when authenticating to the discussion group.

4 To create a discussion group, from the General Administration form, click the News Server *server name* button > Discussion Groups > Manage Discussion Groups > OK > New.

The following screen will appear. The Discussion Group Manager allows you to add and modify discussion groups on your news server.

Figure 5   The Discussion Group Manager
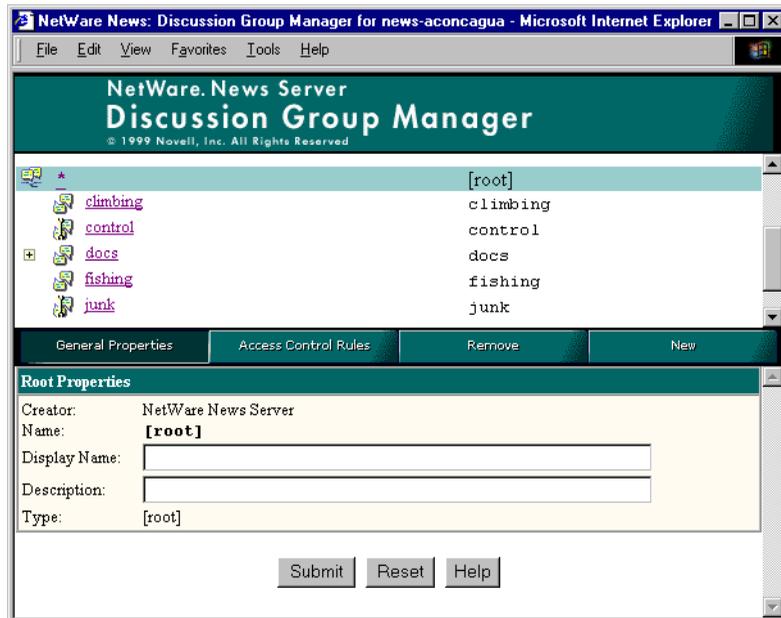
5 To grant access to the discussion group, in NetWare Administrator, give the user or group rights to the discussion group directory.

The discussion group directory is located in the spool directory. The spool directory location is listed in the Technical Settings form (from the News Server interface, click Server Preferences > Technical Settings). The default is NOVONYX\SUITESPOT\NEWS-*server name*\SPOOL.

6 Check the rights that you want the user or group to have.

To specify the reader role for a user or group, check File Scan and Read. To specify the poster role for a user or group, check File Scan, Read, Create, and Write.

For more information about setting up NetWare News Server, refer to Setting Up Your Server in the *NetWare News Server Administration Guide*.

Using the NetWare MultiMedia Server

You may need to present audio and video presentations to users on your network. These presentations may include audio clips from a speech given by your CEO or video training of a new procedure. NetWare 5.1 includes the NetWare MultiMedia Server to make presenting these formats easy. If you have the multimedia files, the NetWare Web Server can publish them to your Internet or intranet Web sites.

The NetWare MultiMedia Server enables multimedia features on a NetWare server. Clients need RealPlayer G2 from RealNetworks, Inc. (http://www.realnetworks.com) to play the multimedia files on their workstations.

Real Time Streaming Protocol (RTSP) is a client-server multimedia presentation control protocol designed to address the needs for efficient delivery of streamed multimedia over IP networks, and the NetWare MultiMedia Server supports RTSP (RFC 2326) for streaming audio and video on the network.

By serving multimedia streams with HTTP and RTSP to the RealPlayer, the NetWare Multimedia Server can be used for network-based training. This allows company Internet and intranets to provide training for staff on products and services.

The NetWare MultiMedia Server supports the following protocols and file types:

- ◆ HTTP
- ◆ RTSP
- ◆ .RM files
- ◆ .WAV files
- ◆ .MPG files

Information on playing multimedia files can be found in Participating in Audio and Visual Network Broadcasts in the *User Solutions Guide*.

3 NDS eDirectory

NDS™ eDirectory™ is the latest directory service offering from Novell. NDS eDirectory is the latest revision of NDS 8 and includes new Internet capabilities, which make it a perfect match for NetWare® 5.1. NDS 8 is installed by default during the NetWare 5.1 installation process; however, you can also choose to install NDS 7.3, which includes all the power of NDS without Internet support.

It is best to decide which version fits your needs before installing the server. You can upgrade to NDS eDirectory from previous NDS versions, but you cannot downgrade versions. We recommend installing NDS eDirectory which is accomplished by selecting the NDS 8 option, unless you have a compelling reason not to.

Using NDS eDirectory

Companies are widely adopting NDS as a directory for managing users, servers, and all their networked hardware and applications. In addition, Novell and other companies are creating new applications that utilize NDS. NDS has emerged as the leader in directory-based LAN management, and that role is expanding with NDS eDirectory.

The advent of Lightweight Directory Access Protocol (LDAP) v3 and the recognition of LDAP as a directory-interface standard have also enhanced the development of NDS eDirectory.

NDS eDirectory offers the following features:

- Increased capacity. NDS can contain millions of objects in a single tree.

- Increased performance for directory reads, writes, and searches.

- ConsoleOne™ management.

- Increased LDAP performance.

- An improved DSREPAIR utility.

- A new BULKLOAD utility for adding, modifying, and deleting NDS objects in a batch process.

- Extended naming support, including "dc=" naming and uniqueID.

- In-place upgrade of the existing NDS database.

Utilities for Managing NDS Objects

ConsoleOne is provided with NDS to manage NDS objects and the NetWare file systems. You can also use NetWare Administrator to manage these same objects. ConsoleOne provides most of the functionality of NetWare Administrator, but you still need NetWare Administrator to perform certain management functions. NDS Manager™ provides management of NDS partitions and replicas.

ConsoleOne

ConsoleOne is a Java management utility that runs on a NetWare server or any Java Virtual Machine (JVM), including Microsoft Windows or your Web browser.

You can set up ConsoleOne on a workstation running the NetWare 5 (or newer) client by mapping a drive to and running SYS:\PUBLIC\MGMT\CONSOLEONE\1.2\INSTALL\SETUP.EXE.

ConsoleOne now allows you to do the following:

- Search or customize views. You can search or filter the contents of the right pane based on object name and type. If the right pane contains NDS objects, you can also search based on specific property values. You can set any container at the top of the left pane.

- Configure LDAP services. You can configure LDAP v3 services on individual NetWare servers and control how LDAP-based access to NDS works for different groups of users.

- Manage all NDS objects. You can create, move, rename, delete, and modify any type of object defined in the schema of your NDS tree. Custom property pages are available on most object types, and a generic Other page lists any leftover properties. You can modify multiple objects of the same type simultaneously.

- Extend the NDS schema. You can extend the NDS schema to allow the addition of new types of objects and properties to your NDS tree. This includes the ability to create auxiliary classes.

- Set up user accounts by template. You can create a template for setting up new user accounts. The template can supply initial values for most properties of the User object, including a home directory.

- Control NDS rights inheritance. You can control whether NDS rights assignments are inheritable to lower levels in the tree, even for specific properties such as login passwords.

- Manage NetWare file services. You can manage the file system on individual NetWare volumes. You can create, move, copy, delete, and modify attributes of individual files and folders, including rights assignments and owners. You can view and change volume statistics and control disk space allocations by user or by folder.

ConsoleOne includes the LDAP snap-in for managing your LDAP configuration. It also contains snap-ins for file management, object management, and schema management. For managing other features, such as PKI, use NetWare Administrator.

NetWare Administrator and NDS Manager

NDS Manager (NDSMGR32.EXE) is still the utility used for managing partitions and replicas. You can also use NetWare Administrator (NWADMN32.EXE) to manage NDS objects. However, NetWare Administrator has the following limitations:

- The object selector dialog box, the group membership list, and the trustees of an object list are limited by available RAM on the workstation.

- The viewing and searching of large data sets (50,000 or more) is slow because NetWare Administrator does not take advantage of the NDS scalability.

- Schema Manager in NDS Manager does not support the creation of auxiliary classes.

For more information about managing NDS eDirectory™, see Managing Common Components in the *NDS eDirectory Administration Guide*.

LDAP

LDAP is an Internet protocol for accessing directory information such as user and host data. LDAP is emerging as the standard protocol for accessing directory information over the Internet, and it is expected that LDAP client software will soon become a standard feature of Internet browsers. Novell's LDAP Services for NDS allows LDAP clients to access the information stored in NDS.

Novell® LDAP Services for NDS is a server application that allows you to set up and configure an LDAP service for your network. You can set up and manage your Novell LDAP server and control the access you want to give to LDAP clients through NDS.

Implementing LDAP

Because an LDAP server can browse the entire NDS tree, you currently need to install only one LDAP server per geographic location. However, if you must use two different LDAP catalogs, you must install two LDAP servers because each LDAP server uses at most one catalog. Keep in mind that LDAP catalogs can consume large amounts of disk space.

An LDAP catalog is a flat file database that contains selected NDS database information. It is stored as a stream attribute on an NDS object and provides rapid access to the selected directory data. Searching a catalog instead of an entire directory especially speeds searches in networks where some NDS objects are only accessible across a WAN link. Searching across those links takes time and network bandwidth. A catalog also speeds searches because it contains only an indexed subset of data.

You must also configure Secure Sockets Layer (SSL) and create a new LDAP Group object. For more information on configuring LDAP see Configuring the LDAP Server Object in the *NDS eDirectory Administration Guide*.

4 Application Servers

NetWare® 5.1 includes applications which allow you to create powerful Web-based solutions for your customers and users. This application development environment includes Oracle8i and NetWare Enterprise Web Server, with additional add-ons like Novell® BorderManager™, SQL Integrator, and Host Integration Solution.

Creating an E-Commerce Solution with WebSphere

The IBM WebSphere Application Server is a complete Web application platform for the development, deployment, and management of Web applications. Integration with NetWare 5 and NDS® provides a reliable, scalable, and high performance foundation for the IBM Websphere Application Server.

IBM WebSphere for NetWare provides a portable environment to deploy and manage Java applications on NetWare.WebSphere supports open-industry standards, so you can integrate WebSphere with your current network to build, run, and manage e-commerce applications on the NetWare platform.

Setting up WebSphere

The first step to installing WebSphere is making sure that you meet the hardware and software requirements. These requirements are detailed in the *Novell Developer's Solution Guide*.

WebSphere is not installed by default during the NetWare 5.1 installation, although you can choose to have it installed at that time. It can be installed easily at any time from the ConsoleOne interface or from NWCONFIG by selecting Add to the Already Installed Products. Click Browse to select the source. The NetWare 5.1 CD must be inserted and mounted as a volume, or

otherwise accessible through the network. The screen will display the available products, including WebSphere.

Once the WebSphere installation begins, you will be prompted to select which WebSphere components to install with it. You must also specify security and database options. Refer to the *Novell Developer's Solution Guide* for complete information on performing the installation.

Once installed you must start the Administrative Server by entering the following command from the server console:

STARTUPSERVER

You must now start the Administrative Console by entering the following command from the server console:

ADMINCLIENT

You can also start the Administrative Console by clicking Novell > WebSphere > administrators console. Then click Topology > select Default Server > click Start.

To verify that WebSphere is installed and configured correctly, enter the following URL in your browser address field:

http://*server name*/servlet/snoop

This servlet should echo back information about the HTTP request sent by the client and the initialization parameters of the servlet.

With WebSphere installed and configured, you're now ready to begin creating your e-business solution. Work with your Web administrator, contractor, or solution partner to create the Web environment for your needs. For more information on developing applications with WebSphere, see the *Novell Developer's Solution Guide*.

Building Corporate Applications with Oracle8i

NetWare 5.1 wouldn't be complete without a powerful database solution, and it satisfies this need with Oracle8i. Oracle8i is a scalable, high-performance database designed for creating Internet solutions. It is optimized to run on the NetWare platform.

Oracle8i supports Java in all tiers, including a Java VM within the Oracle8i server. Oracle8i also introduces powerful new functionality for online transaction processing (OLTP) and data warehousing applications.

Additionally, Oracle8i includes enhancements in nearly all other areas of the Oracle Data Server improving overall quality, availability, performance, manageability, multi-media datatype support, and replication.

Implementing Oracle8i

Oracle8i and Oracle WebDB are included with NetWare 5.1 on their own CD set. Installation of Oracle8i is accomplished from the server. Insert the Oracle8i for NetWare 5.1 CD in the server's drive—it should automatically mount as volume O8iNW.

There are two ways to perform the installation: using the Oracle server Java GUI or the NetWare installation utility. To start the Oracle8i server Java GUI installer enter the following from the server command prompt:

`O8iNW:\OraSetup`

To use the NetWare installation utility, you must load NWCONFIG from the server console > select Product Options > select Install a Product Not Listed > press F3 > enter the following path:

`O8iNW:\NETWARE\INSTALL`

Follow the on-screen instructions to complete the installation. See the Oracle documentation for more information on installing Oracle8i. This can be found on the Oracle for NetWare 5.1 CD.

Once the installation is complete, you must load the Oracle NLMs. Do this from the server command prompt by entering

`oraload`

You can now start the Oracle database by entering the following command from the server command prompt:

`orastart`

You should add these two commands to the AUTOEXEC.NCF file to load and start Oracle automatically when the server is restarted.

To shut down the database use the following command:

`orastop`

Installing the Oracle Client

Working with Oracle requires a client component that must be installed on your workstation. The client files are located on the Oracle8i Client for NetWare 5.1 CD. The CD will autostart on your Windows workstation, presenting a menu where you can install the client. For more information on installing the Oracle client see the Oracle8i documentation on the Oracle for NetWare 5.1 CD.

Oracle WebDB

WebDB is an HTML-based development tool for building HTML Web pages with content based on data stored in an Oracle database. Using a browser-based interface, Web pages can be created containing reports, charts, calendars, menus, and forms. WebDB provides wizards for step by step guidance through the process of creating these components.

WebDB also provides a wizard to create a Web site within the Oracle database and assign a site administrator to control development of the site. The Web site administrator in turn assigns owners who are responsible for providing content to the site. Content can include Web pages containing WebDB components, links to other URLs, and files uploaded to the Web site.

Once a site is created, it is maintained using options within the site itself. Content owners and end users never have to see the WebDB user interface. For example, the look and feel of the site can be updated using options provided within the site. End users perform searches of the site's content using options within the site.

For more information, see Oracle WebDB Release 2.0: Getting Started - Installation and Tutorial on the Oracle for NetWare 5.1 CD.

Setting up WebDB

After installing WebDB, several tasks typically should be completed before users begin creating WebDB components or sites:

1. Configure the HTTP Listener.

2. Create WebDB user accounts.

3. Assign WebDB roles.

4. Create component and object schemas.

5. Grant object privileges to component schemas.

6. Provide WebDB-specific build and browse privileges to developers.

7. Create shared components in addition to the default set provided by WebDB.

The documentation on the *Oracle for NetWare 5.1* CD will guide you or your DBA through the steps of implementing a solution with Oracle 8i. Work with your Web administrator, contractor, or solution partner to create the Web environment for your needs. You can also install the documentation on your workstation while installing the Oracle client software. For more information on developing applications with Oracle8i, see the *Novell Developer's Solution Guide*.

Novell JVM for NetWare

The Novell JVM for NetWare allows Java applications to run on a NetWare server, turning general Java applications into tailored commands.

Use Novell JVM for NetWare to enhance your intranet applications and e-commerce sites by running servlets, JavaBeans*, JavaServer* Pages, and other Java development components on a NetWare server.

To set up Novell JVM for NetWare:

1 Install a NetWare 5.1 server.

2 Load the Novell JVM for NetWare.

If you want to load only Novell JVM for NetWare, enter **load java**.

or

If you want to load both Novell JVM for NetWare and NetWare ServerTop, enter **startx**.

For more information on Novell JVM for NetWare, see the *Novell Developer's Solution Guide*.

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