Editor’s Note: This article is the second in a two-part series that will help you upgrade your company’s NetWare 4.11 network to NetWare 5.1. The first article in this series appears in the October 2000 issue of NetWare Connection. (See “Stepping Up to NetWare 5.1: Preparing the NDS Tree for a Upgrade,” pp. 22–36. You can download this article from www.nwconnection.com/past.)

If you are upgrading your company’s NetWare 4.11 network to NetWare 5.1, the first step in performing the upgrade is to prepare your company’s NDS tree for an upgrade from NDS 6 to NDS eDirectory. (NDS 6 is the version of NDS that is included with NetWare 4.11, and NDS eDirectory is included with NetWare 5.1.) This article assumes that you have already prepared your company’s NDS tree for an upgrade and that you are ready to perform the next step, which is to actually perform the upgrade.

To help you successfully upgrade your company’s NetWare 4.11 network to NetWare 5.1, this article divides the upgrade process into nine tasks. These tasks are based on information provided by the same IT experts who generously shared their recommendations in the first article in this series:

• **Steven Flewallen, J.R. Brown, and Jared Jensen.** Flewallen, Brown, and Jensen are central administrators for Novell’s Information Services and Technology (IS&T) department, which was responsible for upgrading Novell’s production servers to NetWare 5.1.

• **Sean Neuman.** Neuman is a senior directory and systems engineer for NetVision and has performed hundreds of NetWare server upgrades for Novell customers. (NetVision specializes in directory management software and consulting services. For more information about NetVision, visit www.netvision.com.)

• **Stewart Christensen.** Christensen is a senior systems engineer for Novell and a former Novell consultant. He estimates that he has performed upgrades from NetWare 4.11 to NetWare 5.1 for fifteen Novell customers.

This article also includes information from “NDS 8 & NetWare 5 @ Novell” and “Implementing NetWare 5 @ Novell,” which are @Novell beigepapers published by Novell’s IS&T Global Technical Architecture Group. (@Novell beigepapers contain unofficial advice for installing and upgrading Novell products. You can download these beigepapers from www.tinypineapple.com/luddite/beigepapers.)

**A BRIEF REMINDER**

As mentioned in the first article, before you proceed with an upgrade from NetWare 4.11 to NetWare 5.1, you need to ensure the overall health of your company’s NDS tree. If you immediately upgrade the servers on your company’s network after you prepare the NDS tree for that upgrade, you won’t need to perform another health check. However, if you plan to wait a week or more between the time you prepare your company’s NDS tree for an upgrade and the time you perform that upgrade, you’ll need to perform a health check. (For step-by-step instructions on performing an NDS health check, see the “Task 2—Perform an NDS Health Check,” section, “Stepping Up to NetWare 5.1: Preparing the NDS Tree for a Upgrade,” Oct. 2000, p. 30. You can download this article from www.nwconnection.com.)

After you have performed this health check and know that your company’s NDS tree is healthy, you can proceed to Task 1 below.

**TASK 1—SELECT A SERVER TO UPGRADE**

The experts consulted for this article have conflicting opinions about which server you should upgrade first. Neuman, who...
regularly performs upgrades for businesses as part of NetVision’s consulting services, prefers to upgrade the master server of the root partition first.

In contrast, Flewallen, Brown, and Jensen, who work on Novell’s production servers, prefer to upgrade the least critical server on the network first. As you know, the master server of the root partition is generally the most, rather than the least, critical server on NetWare networks. “From my experience, we never do the masters first,” Flewallen asserts. On the contrary, Flewallen says master servers “usually go last.”

The Novell IS&T team has a good reason for preferring to upgrade the least critical server first: Novell runs all of its products—including new versions of the NetWare operating system—in a production environment before those products go out to customers. As a result, the IS&T team installed NetWare 5.1 beta code on Novell’s production servers.

The IS&T team reported problems with this beta code to Novell’s development team, which fixed the problems and then sent the IS&T team the improved product to try. “At times, we were getting a new build of NetWare 5.1 every day,” Flewallen says.

As you can imagine, the members of the IS&T team are experts at troubleshooting the problems this beta code caused on Novell servers. Even for these experts, however, troubleshooting problems on a master server would have been far more difficult than troubleshooting problems on other servers. Therein lies the reason that the IS&T team prefers not to upgrade master servers first—particularly the master server of the root partition.

Because you will be installing tried-and-true NetWare 5.1 code on your company’s servers rather than beta code, you are much less likely to experience problems with this installation. Nevertheless, as a precaution, the IS&T team does not recommend upgrading your company’s master servers first and instead suggests you begin with less critical servers.

Neuman concedes that if problems arise as the result of performing an upgrade, those problems are much more difficult to troubleshoot on the master server of the root partition than on less critical servers, and Christensen agrees. “You’re going to have more cleanup work if something goes wrong on the master [server]; let’s just put it that way,” he seconds.

Still, Neuman, who is proficient at troubleshooting problems on NetWare servers, prefers to upgrade the master server first because, as he points out, “The master [server] has to control the schema, and if the master [server] doesn’t have all the calls, how can it control different versions of NDS?” Furthermore, Neuman says that if you do not upgrade the master server of the root partition first, NDS may experience obituary errors, such as stuck obituaries.

Obituaries are attributes that track changes to the NDS database and schema as those changes are propagated through the NDS tree. When these changes have been propagated throughout the NDS tree, the obituaries that track the changes are purged from NDS.

A stuck obituary is an obituary that should have been purged but has not been. Some stuck obituaries—stuck obituaries on server and container objects, for example—can cause NDS synchronization errors.

Common Ground

What server do you upgrade first if you have neither the high level of expertise required to troubleshoot potential problems on the master server nor the expertise to deal with potential obituary problems? Fortunately, this question has a definitive answer: You should choose a server that contains a read-write replica of the root partition.

Neuman and Christensen explain that upgrading a read-write server in the root partition’s replica ring means that schema enhancements made to this server will be replicated out to the other servers in the NDS tree. Furthermore, you can troubleshoot problems on a read-write replica more easily than you can troubleshoot problems on a master server.

You should also make sure that the server you upgrade first is a permanent part of your company’s network. When you install the first NetWare 5.1 server, the installation program creates two NDS objects by default: a Security container object and, within that container object, an Organizational Certificate Authority (CA) object.

Novell Certificate Server uses these objects to enable secure data transmission for web-based software, such as...
Before you upgrade a NetWare 4.11 server to NetWare 5.1, you should check the server hardware against the list of NetWare 5.1 minimum hardware requirements listed below. To operate properly, the server hardware must meet or exceed these requirements:

- PC: server class
- Processor: Pentium II or above
- Video display adapter: VGA or higher resolution (SVGA recommended)
- Network boards: one or more
- CD drives: One (Bootable CD drives must support the El Torito specification.)
- DOS partition: 50 MB (minimum) with 35 MB (minimum) available space
- Disk space on volume SYS: 1.3 GB (minimum)
- Memory for standard NetWare products: 128 MB
- Memory for standard products and IBM WebSphere Application Server for NetWare: 256 MB (512 MB recommended)
- Memory for all products, including Oracle8: 512 MB

Novell also recommends that the server have one PS/2 or serial mouse.

Hardware for Minimalists

Before you upgrade your NetWare 4.11 server to NetWare 5.1, you need to know all about the hardware that comprises that server. For example, you need to know what type of CPU the server has, what kinds of storage and display adapters it uses, what slots these devices occupy, and the type of mouse that is attached to the server.

In addition, you need to know how much memory is available on that server. "Know what’s in there," Flewallen advises. If you don’t, you could experience some of the same upgrade problems that the IS&T team encountered when it upgraded Novell’s production servers to NetWare 5.1.

For example, the IS&T team encountered problems when it attempted to upgrade servers that included unsupported SCSI adapters. "That was a gotcha," Flewallen remembers. NetWare 5.1 requires updated device drivers, such as Host Adapter Module (HAM) and Custom Device Module (CDM) drivers. However, NetWare 5.1 does not include these updated drivers for unsupported hardware.

The IS&T team also experienced problems when it attempted to upgrade servers that did not meet minimum memory requirements. NetWare 5.1 uses virtual memory, which means that NetWare 5.1 temporarily stores application data on the SYS volume. Consequently, NetWare 5.1 requires more available disk space on the SYS volume than NetWare 4.11 requires. The IS&T team, Flewallen admits, attempted to upgrade some "really slow servers that didn’t have enough memory space on SYS." As a result, these servers didn’t work properly.

To avoid these and other unpleasant problems, Flewallen recommends that you make a list of the hardware on a server and check that list against Novell’s minimum hardware requirements for NetWare 5.1. (For a list of NetWare 5.1 minimum hardware requirements, see “Hardware for Minimalists.”) In addition, you should check your list of server hardware against the devices that are certified for NetWare 5.1. (For information about devices that are NetWare Yes, Tested & Approved for NetWare 5.1, visit http://developer.novell.com/solutions/platformpage/netware51.htm.)

Renovate or Relocate

If the NetWare 4.11 server you plan to upgrade does not meet NetWare 5.1 minimum hardware requirements, you may be able to upgrade the server hardware to meet these requirements. This process could entail a lot or a little expense and effort, depending on how much and what kind of hardware you need to replace.

For example, if you need to replace everything from the server’s CPU on down, bringing the server hardware up to NetWare 5.1 minimum requirements could be costly and time consuming. On the other hand, if you need to replace only the server’s video display adapter, the amount of time and effort required could be negligible, depending on the display adapter you purchase and your mechanical aptitude.

In either case, you do have an alternative to upgrading the hardware on the NetWare 4.11 server: You can migrate data and services from this server to a new NetWare 5.1 server using Novell Upgrade Wizard 3.1.

Novell Upgrade Wizard 3.1 is a NetWare-to-NetWare migration utility that is included on the NetWare 5.1 operating system CD. (You can also download this utility from www.novell.com/download although it is listed as simply Upgrade Wizard 3.1.) You can use Novell Upgrade Wizard 3.1 from a Windows 98 or 95 workstation that is running Novell Client for Windows 95/98 3.2 or from a Windows NT workstation that is running Novell Client for Windows NT 4.7. (If you want to migrate a Windows NT server to NetWare 5.1, you can download...
NetWare Migration Wizard 4 from www.novell.com/download.)

To use Novell Upgrade Wizard 3.1, you must have an IPX connection between your workstation, the NetWare 4.11 server, and the NetWare 5.1 server. (The NetWare 4.11 server you want to migrate data from is called the source server. The NetWare 5.1 server you want to migrate data to is called the destination server.)

During the migration process, Novell Upgrade Wizard 3.1 copies files from volumes on the NetWare 4.11 server to volumes on the NetWare 5.1 server. “It does multiple passes on the data” until all of the data is copied to the NetWare 5.1 server, Flewallen explains.

At the end of this process, Novell Upgrade Wizard 3.1 migrates NDS, after which Novell Upgrade Wizard 3.1 shuts down the NetWare 4.11 server. Novell Upgrade Wizard 3.1 then renames the NetWare 5.1 server, giving this server the default IP gateway. The NetWare 5.1 installation program prompts you to enter the information required by the NetWare 5.1 installation program. See Figure 1 in “Using Novell Upgrade Wizard 3.1,” pp. 28–45.

In the Know

To successfully perform a server upgrade, you need to know more about the server you plan to upgrade than what hardware devices comprise that server. For example, you need to know the common name of the server and its context within the NDS tree.

In addition, you must know where this server’s licensing information is stored in NDS. Furthermore, if this server is available to the Internet, you must know the name and IP address of the Domain Naming System (DNS) server (your company’s or your ISP’s DNS server) that provides name resolution for this server.

You also need to know the NetWare 4.11 server’s IP address and IPX internal network number, its subnet mask, and its default IP gateway. The NetWare 5.1 installation program prompts you to enter all of this information during the upgrade process.

Even if you think you know this information, you may want to write it down because you won’t be able to access the server for this information once you begin the upgrade process. (The Novell beigepaper “Implementing NetWare 5 @ Novell” includes a handy form on which you can record some of this information. I’ve updated this form with the additional information required by the NetWare 5.1 installation program. See Figure 1 on p. 8.)

In addition, you should know what volumes are on the server you plan to upgrade because you need to make sure all these volumes are mounted before you begin the upgrade process. (To see which volumes are currently mounted on a server, type VOLUME at the server console.)

TASK 3—PERFORM A COMPLETE BACKUP

Although the NetWare 5.1 installation program includes an essentially fail-safe upgrade process, you know the importance of performing a complete server backup before you begin the upgrade process. Most of the upgrades “have been clean,” Neuman explains, “but if the install goes haywire, you may need to restore the server and try it again.”

Back up all of the information and data, including NDS, on the server you plan to upgrade, Flewallen seconds. “Anytime you do an upgrade, it’s always a good idea to have a backup of the whole server.”

TASK 4—REMARK OUT THIRD-PARTY APPLICATIONS IN THE SERVER’S AUTOEXEC.NCF FILE

During the upgrade process, the NetWare 5.1 installation program dismounts and remounts server volumes and reboots the server. As a result, some third-party applications may lose access to the files they need, and this can sometimes cause problems with the upgrade.

You may also experience post-upgrade problems with third-party applications that are not Novell. Yes, Tested & Approved to run on NetWare 5.1. To avoid these potential problems, Flewallen suggests that you remark out third-party applications that boot automatically when the server boots.

DID YOU KNOW?

Did you know that Novell offers Certified Directory Engineer training and certification if you want to learn how to troubleshoot NDS eDirectory? Novell’s Certified Directory Engineer training and certification can also give you the expertise required to use the various NetWare 5.1 upgrade methods, such as the NetWare Accelerated Upgrade utility method described in this article. For more information about Novell Certified Directory Engineer training and certification, visit Novell Education’s website at http://education.novell.com/cde.
Have It Your Way

Never let it be said that upgrading to NetWare 5.1 is a one-size-fits-all process. In fact, you have a plethora of choices when you are completing an upgrade to NetWare 5.1. For example, you can select one or more of the following methods to upgrade your company’s NetWare 4.11 network to NetWare 5.1:

CD UPGRADE
To perform a CD upgrade, you insert the NetWare 5.1 Operating System CD into the CD-ROM drive of the server you want to upgrade. To begin the upgrade process, you launch the NetWare 5.1 installation program and select the Upgrade option.

NETWORK UPGRADE
To perform a network upgrade, you copy the files from the NetWare 5.1 Operating System CD to a network drive, from which you can use the NetWare 5.1 installation program to upgrade servers on your company’s network. To perform a network upgrade from a NetWare 4.11 server, you need to install Novell Client for DOS and Windows 3.1x on that server. This software, which is included on the NetWare 5.1 Novell Client Software CD, is required to establish a connection between the server you plan to upgrade and the network drive that contains the NetWare 5.1 files.

NETWARE ACCELERATED UPGRADE UTILITY
The NetWare Accelerated Upgrade utility enables you to upgrade a large number of servers in a short amount of time. How large? According to Steven Flewallen, a central administrator for Novell’s Information Services and Technology (IS&T) department, the Novell IS&T department used this utility to upgrade “150 servers a night with only three or four people.”

The NetWare Accelerated Upgrade utility isn’t for everyone, however. This utility lacks safety features—such as back-out procedures that can restore the NetWare 4.11 server’s trustee assignments if the upgrade fails. You should use this utility only if you are skilled at troubleshooting and installing NetWare networks.

The NetWare Accelerated Upgrade utility is located at the root of the NetWare 5.1 Operating System CD. You can use this utility in several ways: For example, you can copy the files on the NetWare 5.1 Operating System CD into a staging server.

You can then insert the NetWare 5.1 Operating System CD into the CD-ROM drive of a Windows NT, 98, or 95 workstation and log in to the network. Next, you run the NetWare Accelerated Upgrade utility (by clicking the ACCUPG.EXE file located at the root of the CD). The NetWare Accelerated Upgrade utility prompts you to log in to the staging server and to the server you want to upgrade, which is called the target server.

The NetWare Accelerated Upgrade utility then establishes a server-to-server connection between the staging server and the target server. Using this connection, the NetWare Accelerated Upgrade utility compares NetWare 4.11 files on the target server with NetWare 5.1 files on the staging server. Based on this comparison, the NetWare Accelerated Upgrade utility selects NetWare 5.1 files from the staging server to copy onto the NetWare 4.11 server.

You can also use the NetWare Accelerated Upgrade utility without a staging server. To do this, you insert the NetWare 5.1 Operating System CD into the CD-ROM drive of the server you plan to upgrade and launch the NetWare Accelerated Upgrade utility from that server’s console.

The NetWare Accelerated Upgrade utility does not install NetWare 5.1 licensing, nor does it install NetWare 5.1 products—such as NetWare Enterprise Web Server. Rather, the NetWare Accelerated Upgrade utility upgrades only NetWare operating system files.

You must install NetWare 5.1 licenses after the upgrade process is completed. You can also install additional NetWare products separately after this process is completed. (For more information about using the NetWare Accelerated Upgrade utility and the upgrade methods listed below, see “Other Installation Options” on the NetWare 5.1 Documentation CD. You can also access this information by visiting www.novell.com/documentation and clicking NetWare 5.1.)

RESPONSE-FILE UPGRADE
You can also speed up the process of upgrading servers by using response files to automate the upgrade process. Response files are text files that contain predefined keys and sections. A key defines a particular item of data.

For example, in the following line of response-file text, Tree Name is a key. Tree Name = Novell. As this example shows, you can associate a specific piece of data (in this case, the name of a particular NDS tree—Novell) with each key.

A section defines a particular grouping of keys, which corresponds to portions of the NetWare 5.1 installation program. For example, [NWI:NDS] is the section that corresponds to the NetWare 5.1 installation screen that prompts you for NDS information.

You can use the section and key in the examples above to create a response file that the NetWare 5.1 installation program can use to automatically provide the name of your company’s NDS tree. (Normally, the installation program prompts you to provide this information.)

Response files are particularly useful if the server hardware on your company’s network is uniform. The NetWare 5.1 installation program normally prompts you to accept hardware defaults, which represent the server hardware the installation program detects. If your company’s server hardware is uniform, you can create a response file that automates this process. (For more information about using the response file method, see “Other Installation Options” on the NetWare 5.1 Documentation CD.)

NETWARE INSTALLATION SCRIPTS METHOD
You can use NetWare installation scripts to alter or extend the way the NetWare 5.1 installation program performs the upgrade process. NetWare installation scripts are programming files that use the NetWare 5.1 NWCONFIG utility, which interprets and executes these files during the installation process.

For example, you can create a NetWare installation script that enables the NetWare 5.1 installation program to copy hardware drivers from a floppy diskette rather than from the NetWare 5.1 Operating System CD. You can also create a NetWare installation script that automatically installs additional NetWare 5.1 products, such as NetWare FTP server, at the end of the regular installation process. (For more information about NetWare installation script files, see “Other Installation Options” on the NetWare 5.1 Documentation CD.)

FEATURE Stepping Up to NetWare 5.1
By remarking out third-party applications, Flewallen explains, you free the NetWare 5.1 installation program from having “to worry about loading up [these applications].” You simply edit the server’s AUTOEXEC.NCF file by putting a pound sign in front of each command that causes a third-party application—such as a virus-scanning application—to boot when the server boots.

After you have remarked out the third-party applications in this file, you must close the AUTOEXEC.NCF file. The NetWare 5.1 installation program needs to access this file during the upgrade process. The installation program cannot access the file if it is open.

**TASK 5—PERFORM THE UPGRADE**

You have several options for completing Task 5: You can copy NetWare 5.1 installation files to a network drive and then access these files to upgrade the NetWare 4.11 servers on your company’s network. You can also simply insert the NetWare 5.1 Operating System CD into the CD-ROM drive of the server you plan to upgrade.

As a rule, completing Task 5 involves using the NetWare 5.1 installation program, which is included in the NetWare 5.1 Operating System CD. One exception stands: If you use the NetWare 4.11 operating system, you can upgrade NetWare 5.1 and 4 servers to NetWare 5.1 from a workstation. (For more information about using the NetWare 5.1 Operating System CD to upgrade NetWare 4.11 to NetWare 5.1, see “Have it Your Way” on p. 14.)

If you plan to perform a server upgrade using either the network drive or CD-ROM method, you access the NetWare 5.1 installation program directly. When you launch this program, it presents you with two options for installing NetWare 5.1 files and services on a server:

- **Upgrade**
- **New Server**

The Upgrade option, which is the default option, detects and retains information from the server you plan to upgrade. For example, this option detects trustee rights to files and preserves those rights. The New Server option, on the other hand, does not retain this information.

Obviously, you should accept the Upgrade option if you don’t want to lose information (such as the information on the SYS volume) on your company’s NetWare 4.11 server. When you accept this option, the NetWare 5.1 installation program begins the process of performing the server upgrade, including copying NetWare 5.1 files onto the NetWare 4.11 server.

The NetWare 5.1 installation program automatically installs the NWCONFIG utility.

The NetWare 5.1 installation program also prompts you to either supply or verify the server information that you gathered while completing Task 2. For example, the NetWare 5.1 installation program prompts you to enter the name of the server you are upgrading.

Because the NetWare 5.1 installation program detects hardware and software that is already running on the server, Flewallen advises that you accept default selections in most cases. “I’ve usually gone with defaults,” Flewallen explains. (You can find step-by-step instructions that explain the information you must supply or verify in the NetWare 5.1 Installation Guide.)

**Tis Better To “et” Than Not To “et”**

The NetWare 5.1 installation program also prompts you to specify the version of NDS that you want to install as part of the upgrade: NDS 7 or NDS eDirectory. NDS eDirectory is the default choice, and providing that you have prepared your company’s NDS tree for an upgrade to NDS eDirectory, it is also the best choice.

As you know, NDS eDirectory is the directory that Novell designed specifically to help manage the Net services software that can help you take advantage of e-business technologies. In fact, if you install NDS 7, you may not be able to install Net services software that uses NDS eDirectory. For example, you can’t install IBM WebSphere Application Server 3.0 for NetWare, which ships with NetWare 5.1.

If you have not prepared your company’s NDS tree for an upgrade to NDS eDirectory, however, you must select NDS 7. “When you install NDS 7, you don’t need” to prepare the NDS tree first, Christensen explains. On the other hand, to install NDS eDirectory, you absolutely must prepare the NDS tree in advance. (If you haven’t prepared your company’s NDS tree for an upgrade and therefore must select NDS 7, you can use the NWCONFIG utility to upgrade NDS 7 to NDS eDirectory after the NetWare 5.1 installation process is completed. The NetWare 5.1 installation program automatically installs the NWCONFIG utility.)

**Mix It Up**

The NetWare 5.1 installation program also asks you to specify the networking protocol(s) you want to use on your company’s network. You can select one or both of the following protocols:

- **IP**
- **IPX**

In most cases, you should select both IP and IPX. Most of the time, the ultimate goal of upgrading to NetWare 5.1 is to have a network that is capable of supporting e-business technologies. If this is true in your case, you undoubtedly want this network to use IP, the networking protocol e-business technologies use.

However, NetWare 4.11 depends on IPX. “NetWare 4.11 does NetWare Core Protocols all over IPX,” Flewallen explains. Furthermore, NetWare 4.11 supports applications that use IPX. In other words, Flewallen says, “You definitely want to use IPX.”

NetWare 5.1 enables you to maintain support for IPX-dependent applications if you select IP only. However, selecting IP only can complicate the process of upgrading the servers on your company’s network. When you select IP only, the NetWare 5.1 installation program enables the Compatibility Mode Driver (CMD) by default. The CMD provides support for IPX applications by encapsulating IPX packets in IP. These encapsulated packets are called CMD packets.

Selecting IP with CMD enabled has one major disadvantage: For a NetWare 5.1 server to communicate with a NetWare 4.11 server via CMD packets, you must first place a CMD migration agent between those servers. A CMD migration agent is a special configuration of CMD that acts as a gateway between IP network segments and IPX network segments. Without a migration agent, a NetWare 5.1 server with CMD
enabled cannot communicate with a NetWare 4.11 server. In other words, if you select IP only, you must carefully plan your upgrade process to ensure that all of the servers on the network can maintain communications with one another during the upgrade process.

Fortunately, as you know, selecting a network protocol isn’t an either-or proposition. You can select both IP and IPX. When you select both IP and IPX, NetWare 5.1 servers use dual protocol stacks to provide simultaneous support for both of these protocols.

The main advantage of selecting both IP and IPX is simplicity: You can upgrade servers in your company's network in any order without having to worry about support for IPX communications. When all of the servers on your company's network are upgraded and all of the applications use only IP, you can then unbind the IPX protocol on these servers and disable IPX routing on the network. (For a detailed discussion of using the dual-stack and CMD approaches to migrating your company's network to IP, see “Switching From IPX to IP,” Netware Connection, Oct. 1999, pp. 6–14. You can download this article from www.nwconnection.com/past.)

The main disadvantage of selecting both IP and IPX is that you must manage two protocols rather than just one.

**TASK 6—RE-ENABLE THIRD PARTY APPLICATIONS**

When the NetWare 5.1 installation program completes the upgrade process, it prompts you to reboot the server. When you do, the server loads NetWare are 5.1. The next step is to re-enable the third-party applications that you disabled when you completed Task 4.

Before you re-enable these third-party applications, you may want to check these applications to see if they are Novell Yes, Tested and Approved for NetWare 5.1. A applications that are not Novell Yes, Tested and Approved may not run properly on the newly upgraded server. You can find information about applications that are Novell Yes, Tested and Approved for NetWare 5.1 at http://developer.novell.com/solutions/platformpage/netware51.htm.

To re-enable the third-party applications, edit the AUTOEXEC.NCF file by removing the pound signs you added to this file when you completed Task 4.

When you have completed this task, reboot the server.

**TASK 7—PROPAGATE NDS SCHEMA CHANGES THROUGH THE NDS TREE**

Regardless of whether you selected NetWare 5.1 or NetWare eDirectory during the upgrade process, the NetWare 5.1 installation program made changes to the version of NDS that is running on your company's network. For example, if you selected NetWare eDirectory, the NetWare 5.1 installation program made Light-weight Directory Access Protocol (LDAP) schema extensions to NDS.

You need to ensure that these and other schema extensions are propagated throughout the NDS tree. “A night you make a change to the schema, you want to make sure it replicates out before you continue with other things,” Flewellen advises.

To ensure that the schema extensions are propagated throughout the NDS tree, perform the following steps at the server console:

1. Type DSREPAIR to load and run the DSREPAIR utility.
2. Select the Advanced Options menu.
3. Select Global Schema Operations, and then log in as the ADMIN user or a user with equivalent rights.

**TASK 8—FORCE NDS CHANGES OUT TO THE REST OF THE TREE**

To ensure that NDS properly handles these schema extensions and other NDS changes, Neuman recommends that you repeat the DSRA CE commands that comprise Task 5 in “Stepping Up to NetWare 5.1: Preparing Your Company's NDS Tree for an Upgrade,” the first article in this two-part series. Specifically, you should type the following commands at the server console:

```
SET DSTRACE = ON
SET DSTRACE = +SYNC
SET DSTRACE = +SCMA
SET DSTRACE = +BLCN
SET DSTRACE = +U
SET DSTRACE = +B
SET DSTRACE = +H
SET DSTRACE = +S
SET DSTRACE = +F
SET DSTRACE = +SSA
SET DSTRACE = +SSD
```

As you may recall, these commands force the changes you’ve made to NDS out to the rest of the NDS tree.

Alternatively, you can download DSSYNC.NCF, a NetWare Control File (NCF) that includes these DSTRACE commands, at www.netvision.com/products/askarchitect.html.

To complete this task using DSSYNC.NCF, copy this file to the SYS:/SYSTEM directory of the newly upgraded NetWare 5.1 server and then reboot that server. You can then run the commands above by typing DSSYNC at the server console.

**TASK 9—REPAIR THE NDS DATABASE**

When the DSRA CE processes in Task 8 are completed, complete the following steps to ensure that the new NDS database is in good condition:

1. Launch the DSREPAIR utility.
2. Select the Advanced Options menu.
3. Select Repair Local Database, and accept default settings. Neuman recommends that you also select the Rebuild Operational Schema option in Repair Local Database.

**THE BEGINNING OF THE END**

After you have successfully upgraded the servers on your company's network, you can decide which additional products you want to install on which servers. For example, you may decide to install WebSphere Application Server for NetWare, NetWare Enterprise Web Server, and Novell Certificate Server on servers that provide the users on your company's network — whether they can run your company's new e-business system.

You may also earmark a server to provide the users on your company's network with FTP services, in which case you can install NetWare FTP Server on that server. These and other products are included with NetWare 5.1.

Like all of the products included with NetWare 5.1, these products are designed to help you accelerate your company's transition to e-business. How and where you use these products depend on the network you envisioned when you decided to upgrade your company's network to NetWare 5.1. The important thing is that you now have the foundation upon which you can realize that vision.

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