



Disk Imaging Products for Servers

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Few things in life are permanent. However, sometimes the cost of change isn't worth the benefit. Case in point: You pour a new cement patio in your backyard, and just as the cement is setting up, you decide that the patio would be better on the other side of the yard. Too bad you say since the cement is now hard enough to bounce a Buick off of. Although you could break up the new patio and start over on the other side, you probably won't. Given the cost, not to mention the lost weekends, making this change is not worth the effort.

The same is true in networking: For example, suppose you install a new NetWare server, on which you create a 50 MB DOS partition, a 10 GB SYS volume, and a 4 GB APPS volume. Several weeks later, when all of the users begin accessing the server, you realize that the DOS partition is too small, the SYS volume is too large, and the APPS volume is constantly running out of space. Your company's users and your boss demand changes, but you explain that changing the server now isn't feasible. The server's storage configuration is now set up harder than your concrete patio. Of course, you could fix the server, but given the cost, not to mention the lost weekends, making this change is not worth the effort.

Although changing partitions, volumes, and volume segments is time consuming and risky business, two third-party tools allow you to modify a server's storage configuration with minimal fuss, risk, or lost weekends. ServerMagic 4.0 for NetWare from PowerQuest Inc. and Norton Ghost for NetWare 2.0 from Symantec Corp. allow you to easily manipulate partitions, NetWare volumes, and volume segments. In addition, these products also provide disk-imaging utilities. (If you are looking for a product to image workstations, see "Deploying and Managing Windows 2000 With ZENworks for Desktops," on pp. 34-43. Also, look for an article about Altiris' LabExpert in an upcoming issue of *Novell Connection*.)

THE STORAGE-MANAGEMENT NIGHTMARE

After you configure a server and after users store data on that server, you usually don't want to change that configuration. Months or even years later, however, you may find that you need more space on the DOS partition, the SYS volume is too large, and the APPS volume is too small. You may decide that the easiest way to add storage capacity to the APPS volume is to add a volume segment to the volume—a solution that increases the risk of losing data because the volume spans two drives.

Illustration: Debbie Reynolds



Fixing situations such as these can be painful: For example, after the last person logs out on Friday, you must back up the entire server. Then you must delete the existing volumes and partitions you want to reconfigure, recreate them according to your new requirements, and restore the data.

If you have performed this procedure, you know that it makes for a hectic weekend (assuming you get the job done in one weekend). You also know that the following week you will be just as busy troubleshooting the errors that this procedure can create.

Both ServerMagic for NetWare and Norton Ghost for NetWare were created to simplify the process of reconfiguring an established server. To complete the imaging process, both products work on the sector level, rather than on a file-by-file level. Working on the sector level means that the drive is sliced into sectors like a pie. The imaging software then picks up each sector just as it exists on the drive.

Working on the sector level is critical because a file-by-file approach doesn't work with NDS files or with files that are hidden or encrypted. If those files get picked up and copied incorrectly, the files may become corrupted or lost.

Although ServerMagic 4.0 for NetWare and Norton Ghost for NetWare 2.0 offer some similar features, the two products approach the solution differently. This article describes the features of both ServerMagic 4.0 for NetWare and Norton Ghost for NetWare 2.0 and explains the advantages and disadvantages of each product.

SERVERMAGIC 4.0 FOR NETWARE

I first evaluated ServerMagic 1.0 in 1998 and was amazed at the never-before-available, time-saving features the product provides, especially the ability to manipulate NetWare and DOS partitions. ServerMagic 1.0 allows you to move or copy NetWare partitions and to enlarge existing NetWare partitions. Subsequent versions of ServerMagic have included additional features, making

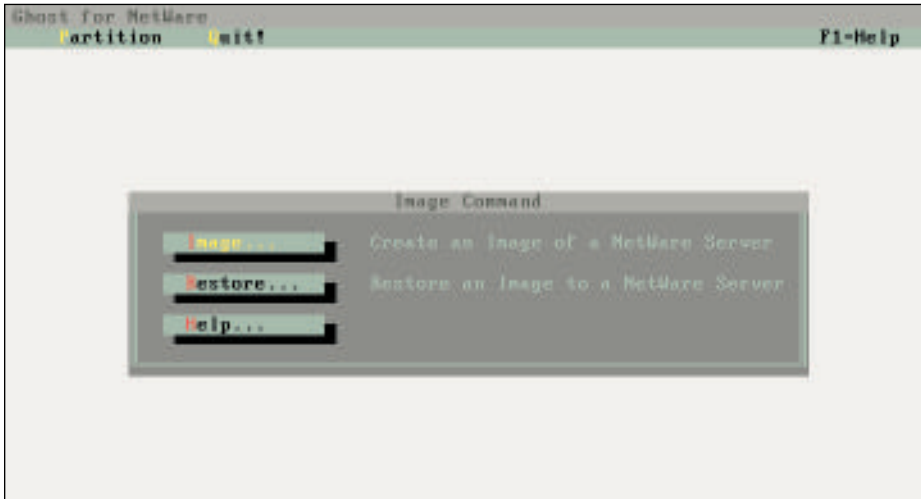


Figure 1. The ServerMagic 4.0 for NetWare interface

ServerMagic an even better resource for network administrators. ServerMagic 4.0 for NetWare is no exception to this rule.

Previous versions of ServerMagic supported both NetWare and Windows in the same box. However, in ServerMagic 4.0, support for Windows NT has been removed and is now offered as a separate product, ServerMagic 4.0 for Windows NT. In addition, ServerMagic 4.0 for NetWare includes support for TCP/IP. This support enables across-the-wire migrations.

With ServerMagic 4.0 for NetWare, you can quickly and easily perform the following functions:

- Upgrade server hard drives to new, higher-capacity drives
- Resize, copy, move, or create NetWare File Allocation Table (FAT), FAT32, Linux Ext2, Linux Swap, or High Performance File System (HPFS) partitions on-the-fly
- Copy and move Novell Storage System (NSS) partitions
- Copy and move entire NetWare partitions, including data, NDS files, and hidden files and directories
- Move, resize, merge, and delete NetWare volume segments
- Transfer partition data across the wire for server migrations
- Copy and move NetWare volumes and consolidate data at the same time, either including or excluding purgeable (deleted) data

When ServerMagic was originally released, it was touted as a single-use upgrade tool. Since that time, ServerMagic has evolved into a full-featured, daily-use

storage maintenance tool for NetWare servers. This tool provides features for ongoing storage maintenance, server hardware upgrades, deployment of new servers, and disaster recovery.

Even if you use only one of ServerMagic's features, you will recognize how valuable the product is: Compared to the traditional process of changing a server configuration, even one of ServerMagic's features saves server downtime.

What sets ServerMagic 4.0 for NetWare apart from its competitors is its patented SmartSector technology, which enables ServerMagic 4.0 for NetWare to look only at the the sectors on the drive that contain data. For example, if you have a 10 GB volume but only 1 GB holds data, the image file of the volume will contain only the 1 GB of data. SmartSector technology reduces the size of image files and speeds the imaging process. In addition, SmartSector technology copies files exactly the way they were stored on the source hard drive.

ServerMagic 4.0 for NetWare contains a utility called *Server Image*, which allows you to create images of DOS and NetWare partitions or of an entire hard drive. Not surprisingly, Server Image uses SmartSector technology. When Server Image copies an image, the utility can resize the image to fit drives of different capacities and geometries.

In addition, Server Image can store images on a variety of media, including removable media or network drives. Server Image can also transfer images across-the-wire using TCP/IP and ServerMagic's Remote Agent utility.

Using ServerMagic 4.0 for NetWare Because ServerMagic 4.0 for NetWare is a NetWare Loadable Module (NLM), you can use NetWare's NW-CONFIG utility to install the product. You simply select the "Install a Product Not Listed" option.

Note: Although ServerMagic 4.0 for NetWare is an NLM, you must dismount all volumes to use it. When you load ServerMagic 4.0 for NetWare, it warns you before dismounting all volumes.

I must admit I was timid to use ServerMagic 4.0 for NetWare the first time. Manipulating partitions and volumes seemed unnatural. In addition, I had to familiarize myself with the character-based menus. After a few minutes of reading the documentation included on the ServerMagic 4.0 for NetWare CD, however, I felt comfortable proceeding.

Using ServerMagic 4.0 for NetWare's traditional C-worthy interface (see Figure 1), I performed the following tasks:

1. I resized the DOS partition on my NetWare 5.1 server from 100 MB to 50 MB. The process took only a couple of minutes. When the process was completed, I noticed that the partition had shrunk to only 89 MB, rather than the 50 MB I had specified. Luckily for me, ServerMagic 4.0 for NetWare is idiot proof. ServerMagic 4.0 for NetWare shrunk the size of the partition to 89 MB, rather than to the 50 MB I had specified, because the partition contained 89 MB of data.
2. I shrunk the SYS volume and then expanded the DOS partition to take up the new space.
3. I cut the APPS volume in half and created a new DATA volume.
4. As a result of taking the previous steps, the SYS volume was too small. To remedy the situation, I deleted the DATA volume, moved the boundaries of the APPS volume, and expanded the SYS volume.

Confused? Although these steps make it look like I did a lot of work, the entire process actually took only a few minutes. In fact, ServerMagic 4.0 for NetWare displays a progress bar that indicates what percentage of the process has been completed. (See Figure 2.)

I was so impressed with ServerMagic 4.0 for NetWare that I took it to a friend who is a network administrator. He had a



server he needed to upgrade by installing a higher-capacity hard drive, so I handed him the CD and watched.

My friend had already backed up the server and was planning to spend most of the night recreating the server and restoring the data from tape to the new drive. Instead, I asked him to perform the following tasks:

1. Install the new drive in the server.
2. Load NetWare and ServerMagic 4.0 for NetWare.
3. Copy the DOS and NetWare partitions from the old drive to the new drive.
4. Resize the partitions on the new drive to fill the extra space.
5. Shut down the server.
6. Remove the old drive.
7. Boot the server.

The entire process took approximately 20 minutes from start to finish. I then had to pry the ServerMagic CD from my friend's grubby hands and tell him to buy his own copy. (For more examples of how you can use ServerMagic 4.0 for NetWare, see "Working That ServerMagic" on p. 46.)

NORTON GHOST FOR NETWARE 2.0

You are probably familiar with Norton Ghost and have used it to deploy workstations. After all, Norton Ghost started the disk-imaging revolution. Supporting disk imaging for servers was a natural progression for Norton Ghost.

When I contacted Symantec about reviewing Norton Ghost for NetWare 2.0, the first thing the Symantec representative pointed out to me was that Norton Ghost for NetWare 2.0 is a 2.0 product release—not a product for NetWare 2.0. Although this possibility had never occurred to me, I promised Symantec I'd pass along the message.

In fact, I asked the Symantec representative about the version number because I was not aware of a 1.0 product. The Symantec representative told me that Norton Ghost for NetWare had an extended beta cycle that lasted more than a year. Symantec released the product with a series of iterative beta cycles designed to capture customer feedback, including large enterprise customers who were running the beta product on production servers. The 2.0 tag is a result of selling the 1.0 beta product to a small group of enterprise customers who need-

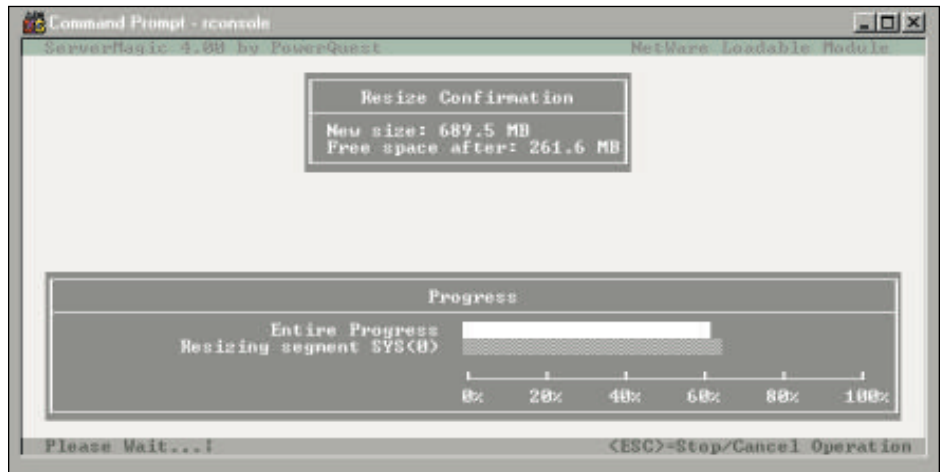


Figure 2. ServerMagic 4.0 for NetWare displays a progress bar that indicates what percentage of the job is completed.

ed the product immediately for server year-2000 migrations.

Norton Ghost for NetWare 2.0 is designed to meet the following three customer needs. (See Figure 3 on p. 47.)

- **Server Deployment.** Configuring a NetWare server takes between four and six hours. Norton Ghost for NetWare 2.0 enables you to configure one server, take a snapshot of the server configuration, and distribute that image to the remaining servers—thereby reducing the total cost of ownership.
- **Server Migration/Hardware Migration.** NetWare cannot migrate a server to a different configuration. For example, NetWare cannot migrate a five-disk array to a seven-disk array. To do this, you must uninstall NetWare, back everything up, and reinstall NetWare to reconfigure the five-disk array to a seven-disk array. Norton Ghost for NetWare 2.0 enables you to migrate a server to a different configuration and to expand volumes.
- **Disaster Recovery.** If configuring a NetWare server takes four to six hours, what happens if a disaster occurs and you must reinstall NetWare and restore the data on that server from tape? You may spend a day or even a weekend using a tape backup to recover a downed server.

With Norton Ghost for NetWare 2.0, you can put that server back online in about 30 minutes. You simply use a bootable floppy diskette that includes the Norton Ghost for NetWare 2.0 client and drivers for a JAZ drive attached to the server. This capability saves expenses that server downtime causes,

including IT staff overtime and loss of productivity—not to mention the money you save on headache remedies.

Norton Ghost for NetWare 2.0 does not depend on NetWare services—it runs as a DOS executable. As a result, Norton Ghost for NetWare 2.0 can write directly

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Working That ServerMagic

ServerMagic 4.0 for NetWare is an incredibly versatile product. The following scenarios illustrate some of the circumstances when ServerMagic 4.0 for NetWare could make your job a lot easier:

SCENARIO 1

If you are upgrading your company's server from NetWare 3 to NetWare 5, ServerMagic enables you to resize the DOS and NetWare partitions. DOS partitions on NetWare 3.x are usually approximately MB. However, Novell recommends that DOS partitions for NetWare 5.1 be 100 MB. Using ServerMagic 4.0 for NetWare to expand the DOS partition will take minutes rather than days.

SCENARIO 2

If you must upgrade your Redundant Array of Independent Disks (RAID) 5 subsystem to increase its capacity, you usually are not given any tools to extend those partitions and volumes to add free space. With ServerMagic 4.0 for NetWare, you can resize the partitions and volumes on this RAID subsystem.

SCENARIO 3

If you are installing a new server but aren't sure how much space to allocate to each volume, ServerMagic 4.0 for NetWare enables you to later adjust the volume size as necessary.

SCENARIO 4

Suppose that you run out of disk space on a volume. You can shut down the server, add another disk, create a NetWare partition, and then create another volume segment to add disk space to the volume. If a drive fails, however, you lose everything on that volume. With ServerMagic 4.0 for NetWare, you can consolidate multiple, smaller drives into a single, new big drive and merge volume segments and volumes back together so you don't run into

NetWare's segment limitation. You can then increase volumes as you add disk space.

SCENARIO 5

Suppose a server drive is failing and you need to replace it. Although ServerMagic is not a backup solution, you can create an image of your DOS partition and the NetWare partition that contains the SYS volume. You can then restore these images and use your tape backup solution to restore the rest of the server. This capability prevents you from having to recreate the DOS partition, install NetWare, and install the tape backup software before you begin the restore.

SCENARIO 6

Suppose that you need to deploy a dozen new servers by next week. Using ServerMagic 4.0 for NetWare, you can configure the first server and create an image of the server. You can then distribute this image to the other servers using the image file located on a CD, shared volume, or across the wire.

Note. You will need to modify the hardware drivers, provide unique server names, netmasks, IP addresses, and routing information for each server after you distribute the image.

SCENARIO 7

Some RAID vendors with hot-pluggable systems offer features to dynamically increase a partition if you are using disk arrays. However, you are actually creating a spanned RAID—a RAID within a RAID. The expanded partition is actually not incorporated into the existing partition.

With ServerMagic 4.0 for NetWare, you can plug in the new drive, force the drive to restripe, and drag the boundary out to the edge of the new drive. You retain a fully functional, fully fault-tolerant RAID system without having to perform a backup and restore. b

to hardware devices, such as tape drives, ZIP disks, or JAZ disks. To get the server running again, you boot it from a floppy diskette, load the media drivers, run Norton Ghost for NetWare 2.0, and restore the image from the media to restore the DOS partition. You can then restore all of the NetWare partitions.

Norton Ghost for NetWare 2.0 can also identify NetWare versions and, if necessary, can change versions. For example, if you have a NetWare 3.12 server on which you want to upgrade the hardware and upgrade to NetWare 5.1, you can use Norton Ghost for NetWare 2.0 to image the NetWare 3.12 server. During the restore process, you can then instruct Norton Ghost for NetWare 2.0 to change the partition to a NetWare 5.1 partition. Norton Ghost for NetWare 2.0 will then convert the file format on-the-fly. In addition, Norton Ghost for NetWare 2.0 offers NSS support as a sector-based copy.

Norton Ghost for NetWare 2.0 supports a variety of media types. For example, if you want to upgrade the hard drive in a server to a higher-capacity drive, you can use Norton Ghost for NetWare 2.0 to image the old hard drive to the new hard drive within the server.

You can also replicate the entire hard drive inside the server using the clone command. In addition, Norton Ghost for NetWare 2.0 enables you to perform imaging tasks from server to server over a TCP/IP connection. This feature is particularly useful when a high volume of data is being transferred.

Aside from its imaging capabilities, Norton Ghost for NetWare 2.0 enables you to resize partitions, volumes, and volume segments. You can resize partitions with the data in place. If you want to resize a volume, however, you must create an image of the entire volume, resize it, and then copy the data to the

drive. You cannot resize the volume with the data in place.

You should also be aware that Norton Ghost for NetWare 2.0 offers tape support because of the large image sizes Norton Ghost for NetWare 2.0 produces. In addition, Norton Ghost for NetWare 2.0 offers limited support for Redundant Array of Independent Disks (RAID) controllers because it cannot use the existing NetWare drivers. Rather, Norton Ghost for NetWare 2.0 must use its own drivers.

Using Norton Ghost for NetWare 2.0

Norton Ghost for NetWare 2.0 ships on a CD and runs from DOS on the NetWare server. As a result, to use Norton Ghost for NetWare 2.0, you must shut down the server and then access the CD through DOS. When I tested Norton Ghost for NetWare 2.0, I didn't have the DOS CD-ROM drivers loaded. I used NetWare 5.1's RCONSOLE file transfer

utility to transfer the files from my workstation's CD drive to the server's DOS partition.

I found Norton Ghost for NetWare 2.0 to be a good tool for imaging. However, I was uncomfortable using the Norton Ghost for NetWare 2.0 partition and volume manipulation features because these features are part of the imaging process rather than separate utilities. I didn't want to have to create and restore an image every time I wanted to make a change to a partition or volume.

COMPETITIVE DIFFERENCES BETWEEN SERVERMAGIC AND NORTON GHOST

ServerMagic 4.0 for NetWare has two main advantages over Norton Ghost for NetWare 2.0:

- ServerMagic 4.0 for NetWare has the patented SmartSector technology.
- ServerMagic 4.0 for NetWare separates volume and partition management features from the imaging features.

As I explained earlier, if a partition is 10 GB, but contains only 1 GB of data, ServerMagic 4.0 for NetWare uses its patented SmartSector technology to create a 1 GB image of the partition. ServerMagic 4.0 for NetWare then compresses that image up to 50 percent.

Norton Ghost for NetWare 2.0, on the other hand, uses both sector-based and file-by-file imaging processes. Norton Ghost for NetWare 2.0 uses sector-by-sector imaging to create a 10 GB image of a 10 GB partition, even if that partition contains only 1 GB of data. (See Figure 4.) In addition, Norton Ghost for NetWare 2.0 does not have a compression feature.

These image size differences—500 MB versus 10 GB—are significant. Because Norton Ghost for NetWare 2.0's image files are substantially larger than those created by ServerMagic 4.0 for NetWare, I had to be keenly aware of what volumes I had the capacity to image. I also found Norton Ghost for NetWare 2.0 to be slower than ServerMagic 4.0 for NetWare.

The SmartSector technology is more efficient than both file-by-file and sector-based imaging. The SmartSector technology offers all the advantages of both: speed, reliability, small image size, and data integrity.

Separating the volume and partition management features from the imaging

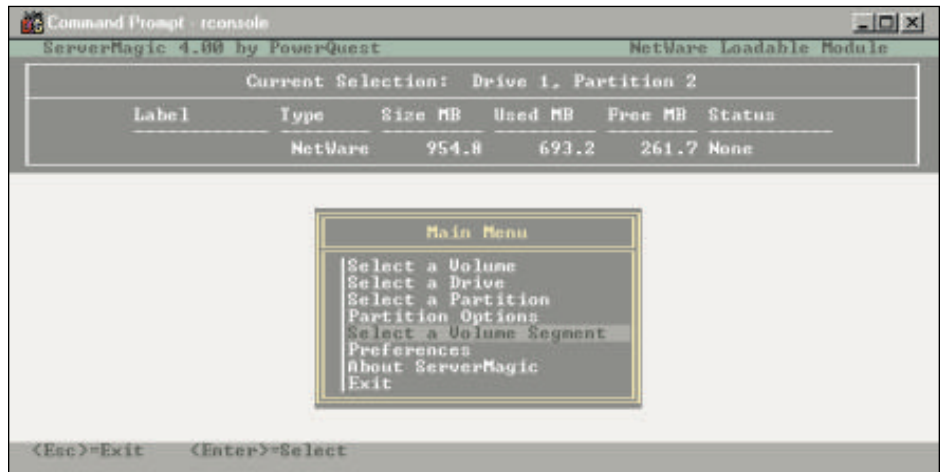


Figure 3. The Norton Ghost for NetWare 2.0 main menu

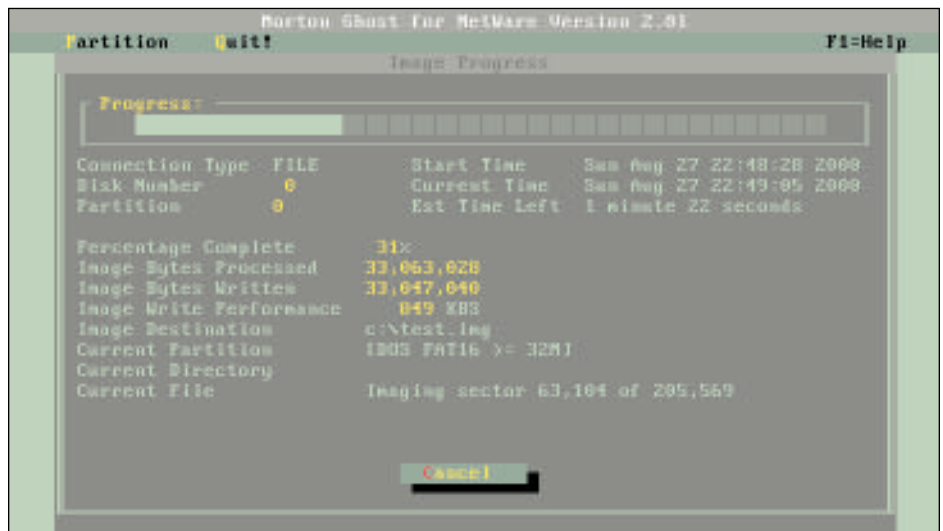


Figure 4. The Norton Ghost for NetWare 2.0 summary screen

features enables you to perform only the tasks you need to—nothing more. Imaging is just one of the features ServerMagic 4.0 for NetWare offers: ServerMagic 4.0 for NetWare is actually a storage management solution—not just a backup tool or a server deployment tool.

In contrast, imaging is the core technology of Norton Ghost for NetWare 2.0. The partition and volume manipulation features offered in Norton Ghost for NetWare 2.0 are part of its imaging feature.

As a result, ServerMagic 4.0 for NetWare is a far more robust storage management solution than Norton Ghost for NetWare 2.0. For example, Norton Ghost for NetWare 2.0 allows you to resize volumes, but you must create an image, resize the volume, then copy the image back to the drive again. Norton Ghost for NetWare 2.0 is really more of an automated backup and restore product. Although Norton

Ghost for NetWare 2.0 can perform in-place resizing on the partition level, it cannot perform in-place resizing on the volume level, and it cannot merge volumes.

CONCLUSION

It's clear I preferred using ServerMagic 4.0 for NetWare to Norton Ghost for NetWare 2.0. Incidentally, I took Norton Ghost for NetWare 2.0 to my network administrator friend. He tried it once, but said he also preferred ServerMagic 4.0 for NetWare. That said, I do think both are good products that allow you to do amazing things with your NetWare storage devices—things you previously only dreamed about doing.

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