



**NORTON**

**Ghost**™

**for NetWare**

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## **Introduction:**

## **Disk Cloning Technology**

### **for the Overburdened CNE**

Norton Ghost for NetWare supports cloning and imaging of Novell NetWare servers. It dramatically reduces the time spent by system administrators when reconfiguring, cloning or restoring Novell NetWare servers. With Norton Ghost for NetWare, you can clone entire drives, partitions or volumes. You can also resize partitions or volumes to be larger or smaller in each process.

## **Overview**

### **Abstract**

Norton Ghost for NetWare is an ideal system tool for anyone who manages, upgrades, repairs or administers Novell NetWare servers. When you use Norton Ghost for NetWare the process of replacing a hard disk drive for a larger disk drive could not be easier. VAR's and system integrators can dramatically reduce the time spent installing Novell NetWare on new systems for customer delivery.

### **VAR's and System Integrators**

Norton Ghost for NetWare allows VAR's and System Integrators a powerful system configuration tool for Novell NetWare. The first installation of Novell NetWare on a new server, using a Ghost image, is reduced from hours to as little as 15 minutes. Norton Ghost for NetWare automatically recognizes the disk hardware including required NetWare device drivers. The size and characteristics of the Novell NetWare partitions and volumes are completely configurable during the restoration process. Replacement of a disk drive with a larger drive, including NetWare partition or volume resizing, could not be easier.

### **Novell CNEs**

Norton Ghost for NetWare allows Novell CNEs a fast and flexible solution for disaster recovery of downed NetWare servers. By creating an

image of a NetWare server, recovery is as simple as booting a diskette and using Norton Ghost for NetWare to quickly restore the server without needing to reinstall Novell NetWare or any application first. A typical reinstallation of Novell NetWare, from a tape backup program, can take 3 to 5 hours before the restoration from tape can begin. With Norton Ghost for NetWare, the recovery from tape begins almost immediately.

## **System Manufacturers**

System Manufacturers, using an image containing a copy of a single version of Novell NetWare can simplify the manufacturing process of Novell NetWare servers. System installation no longer requires numerous entries in Novell NetWare screens, just boot and load.

## **Competitive products**

Norton Ghost for NetWare is the only product on the market that directly supports Novell NetWare Volumes. No other product offers the level of functionality found in Norton Ghost for NetWare. ServerMagic from PowerQuest only supports sector-by-sector copying of a NetWare partition. It does not support intelligent copying, nor does it support NetWare volume configuration, resizing or cloning as does Norton Ghost for NetWare. See the comparison of the two products in Section 3, below.

# **Section One: The Benefits of Disk Cloning**

## **What is Norton Ghost for NetWare?**

Norton Ghost for NetWare is software that duplicates or clones entire Novell NetWare disks, partitions, volumes, volume segments, or files. It works by copying all NetWare partition and volume information from the source to the target disk. The source and target disks may be on the same computer or different computers as long as they are connected by a network or parallel ports. Norton Ghost for NetWare is particularly useful for cloning NetWare servers. You need not install NetWare on the target drive. Norton ghost for NetWare automatically installs all the NetWare files on the target disk as part of the cloning process. The source and target disks can also be different sizes and configurations. Norton Ghost for NetWare can automatically adjust the size of the NetWare partitions and volumes on the target drive, or you can specify them to be either larger or smaller than the source partitions and volumes. Norton Ghost for NetWare copies all or part of the source disk to one or more image files on a network server, CD-ROM, JAZ, ZIP or tape drive. You can then use this image to restore or clone copies of the original disk. This makes the process of recovering or

upgrading existing networks or rolling out new ones easier, faster and more dependable.

## **Who Benefits from Disk Cloning?**

Disk cloning is applicable for a wide range of corporate and academic settings that require a standardized, consistent, and properly tested Novell NetWare environment. The value of disk cloning technology multiplies as the number of servers in the organization increases. Norton Ghost for NetWare is suitable for small service firms or for the largest members of the Global 100.

It is also suitable for anyone with a Novell network who wants enhanced network security, rapid disaster recovery or the ability to restore any or all machines to a known state.

The most common corporate application involves the rollout of standardized and tested servers and workstations using a proven hard disk image. A corporate network-training lab can use disk cloning to “reset” dozens of servers to a known configuration just before the start of each test or training session. The procedure is the same in both cases.

## **How it Works**

Disk cloning software works by creating an image of a server's disk subsystem (effectively taking a “snapshot” of all the files, both hidden and visible) that make up the various partitions, volumes, operating systems, applications, and configuration settings. Most managers start with a clean, newly formatted system on which the disk operating system is installed. Following this, they install Novell NetWare and then the standard suite of approved applications. Once the system installation and configuration has been thoroughly tested, a disk image is created. This disk image can then be copied to any number of machines, creating identical servers. Working with a thoroughly tested installation means less frustration, greater productivity and less chance of time and data loss due to network incompatibilities.

Disk cloning software is an essential part of any CNE's toolkit. As companies continue to newer applications (and larger and faster hardware) disk cloning is fast becoming a “must have” tool to remain competitive.

## **The Benefits of Disk Cloning**

CNEs are looking more closely at the bottom line when it comes to purchasing PCs for Novell networks or intranets. They have come to

accept that the cost factor has shifted to outlays for installing, configuring, tuning and supporting new servers. The situation is similar for managers looking to upgrade existing servers or those who need to return a machine to a known initial state.

One goal of the CNE is to create an identical installation across a set of servers, thereby reducing training as well as maintenance and support costs. Traditionally, this installation has been a manual process, fraught with errors and frustration, especially when the process is repeated on dozens of computers. It could take from 2 to 8 hours to install and configure each new server manually.

One solution that reduces the cost and time is disk cloning. Disk cloning has come a long way since the early days of DOS when a manager would use the XCOPY command to move entire directory trees from one computer to another. Today's technology enables managers to create fully standardized hardware and software environments; based on a single Novell NetWare installation that has already been fully configured and tested. The resulting savings in cost and time can be dramatic, reducing server rollout time to as little as 15 minutes. Both Microsoft and Novell endorse disk cloning.

## **Norton Ghost for NetWare's Advanced Capabilities**

Norton Ghost for NetWare is a disk-, partition-, and volume- copying program that enables CNEs to perform the following important tasks:

- Copy the contents of one server to another
- Create an image file of a server that can be a template to create other servers
- Copy the entire contents of one hard drive to another
- Create an image file of one drive and use this image to create clones of the original
- Copy the contents of one partition to another
- Create an image file of a partition that can be a template to create other partitions
- Copy the contents of one volume to another
- Create an image file of a volume that can be a template to create other volumes
- Resize a NetWare partition, larger or smaller
- Resize a NetWare volume, larger or smaller
- Resize NetWare volume block sizes, larger or smaller
- Create or delete a NetWare volume
- Create or delete an empty NetWare volume
- Copy and restore individual NetWare files

Norton Ghost for NetWare automatically takes care of some of the most time-consuming aspects of installing and configuring servers, including dynamically resizing FAT12, FAT16, and NetWare partitions, and formatting the disks “on the fly.” Manual procedures like FDISK and FORMAT are a thing of the past. When the source and target disks are different sizes, Norton Ghost for NetWare verifies the safety of doing so, then adjusts the position and size of the partitions automatically.

Norton Ghost for NetWare significantly reduces the amount of space required to store an image file by using an advanced image compression system. Images can be compressed by up to 70% depending on the compression method you select and the contents of the partition or disk. Norton Ghost for NetWare performs a CRC check on the files to detect any corruption and is capable of verifying that a replicated disk contains the same files as the original. Image files can also be password protected for additional security. Depending on the needs of the organization, image files can easily be saved to local or network drives, as well as removable storage devices such as JAZ drives, ZIP drives, CD-ROM or other removable media. Norton Ghost for NetWare permits you to split a disk or partition image across multiple volumes prompting you to insert another disk (or other media), or permitting you to select an alternate location. You can also save Norton Ghost for NetWare images to, and load them from tape drives. This provides an ideal robust disaster recovery solution.

Using Norton Ghost for NetWare is as simple as performing the following steps:

- Identify what type of cloning you need to do. Do you need to do disk duplication, partition duplication or volume duplication? Do you need disk, partition, volume or image file creation? How many computers are involved?
- Select how to transfer the image file. You can use removable media; network drives, IPX/SPX or TCP/IP over a network.
- Ensure that the removable media or network connections are functioning properly.
- Start Norton Ghost for NetWare and select the options you want along with the source and destination of the files. After checking the selections, start the cloning procedure.

Norton Ghost for NetWare is designed to be the most efficient and simple-to-use NetWare disk cloning solution for Novell NetWare networks. Norton Ghost for NetWare is all about helping CNEs complete their work efficiently, quickly and without error.

The following are some of the more common uses for disk cloning:



## **Corporations**

Corporate CNE professionals are often required to install a consistent and tested environment on hundreds of servers. Disk cloning makes this task both manageable and reliable, translating to greater productivity and lower support costs.

## **VARs**

VARs and Network Integrators reduce installation time and increase customer satisfaction by replicating a customer-defined image(s) on all servers. This translates to lower support costs. The VAR may also sell Norton Ghost for NetWare to an organization's MIS staff enabling them to restore the network to its original configuration should a disaster occur.

## **Universities**

University computer lab networks are a place of exploration and experimentation. Disk cloning enables students to have full privileges learning the network, while ensuring support staff that, if the network goes down, it can be brought back on-line with minimal disruption. Disk cloning is also an effective way of stopping a virus before it spreads throughout the campus. Disk cloning is effective in removing other unauthorized software and files from the network.

## **Training Centers**

Novell NetWare training centers use Norton Ghost for NetWare to provide each student with a consistent and well-defined environment as defined by the instructor. Students are free to follow the instructor interactively without worry of spoiling the environment for the next class. Disk cloning can also be used to load different environments on the same network, allowing each instructor to tailor the network to match their curriculum.

## **Testing Labs**

Disk cloning allows quality assurance and test engineers to quickly recover from crashed and corrupted environments, returning to precisely the same disk image as before the tests began. This level of consistency allows the tester to more accurately determine whether the environment or the test application is at fault.

## **Help Desks**

Help desk professionals can use disk cloning to reload a corrupted system, replacing the hard disk with a refreshed image while using the opportunity to upgrade the user to a newer configuration.

## **More Productivity, Better Service**

Norton Ghost for NetWare also excels in flexibility, featuring the ability to store an image on another hard drive, network drive, CD-ROM, or JAZ, ZIP or tape drives. The software supports FAT12, FAT16 and Novell NetWare 3.x, 4.x and 5.0. file systems, but not NSS.

## **Complementing Your Existing Toolkit**

Norton Ghost for NetWare easily fits into a CNE professional's existing toolbox of network administration applications.

## **Microsoft Endorses Disk Cloning**

Microsoft is the primary developer of the Windows family of operating systems, so their position regarding disk cloning is important. Microsoft initially had concerns about how customers would manage their licensing agreements with the company, in addition to supporting cloned systems. But as customer demand increased, Microsoft has reassured itself that both issues are resolvable and has outlined guidelines on how customers can use disk cloning products while still maintaining secure and reliable systems without invalidating its support agreement.

Microsoft has now publicly endorsed the cloning of PCs running Windows 98 and Windows NT 4.0, and has stated that support for disk cloning in NT version 5.0 is expected.

## **Novell Endorses Disk Cloning**

Novell, Inc. manufacturers of NetWare uses disk cloning at their SuperLab facility for disk cloning in the production of new Novell NetWare servers. The process they use is far less powerful and sophisticated than Norton Ghost for NetWare.

## **Symantec's Norton AntiVirus for NetWare**

Symantec Corporation offers additional products for optimizing the value of Norton Ghost for NetWare. These include Norton AntiVirus for NetWare, the most up-to-date NetWare virus protection product. After installing and configuring NetWare and the applications during a rollout or an upgrade, Norton AntiVirus for NetWare can perform the critical duty of checking a disk image for viruses to assure servers remain free of viruses during operation.

## Section Two - Product Comparison

### Competitive Products

Here is a feature-by-feature comparison of Norton Ghost for NetWare and ServerMagic from PowerQuest.

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<b>Product Feature</b>	<b>Norton Ghost for NetWare</b>	<b>PowerQuest ServerMagic</b>
NetWare Volume Resizing	Yes	No
NetWare Volume Block Resizing	Yes	No
NetWare Server to Server Cloning	Yes	No
NetWare Disk Cloning	Yes	Yes
NetWare Volume Imaging	Yes	No
NetWare Partition Copying	Yes	Yes
NetWare Partition Resizing	Yes, larger or smaller	Yes, but larger size only
NetWare Volume Creation	Yes	No
NetWare Volume Deletion	Yes	No
NetWare File Backup	Yes	No
NetWare File Restore	Yes	No
Supports NetWare Trustees	Yes	No
Supports NetWare User Restrictions	Yes	No
Move volumes from server to server	Yes	No
Supports TCP/IP for disk copying	Yes	No
Supports Disaster Recovery	Yes	No
Supports NetWare Volume Segments	Yes	No
Supports Intelligent Copying	Yes	No, sector-by-sector
Supports NetWare compressed files	Yes	No
Supports NetWare sparse files	Yes	No
Supports File System Conversion	Yes	No
Supports Dynamic RAID Array Growth	Yes, & volume expansion	No, only partition size
Imaging to SCSI Tape Drives	Yes	No
Image to CD-ROM, ZIP & JAZ Drives?	Yes	No
NetWare volume management utilities?	Yes	No

## Section Three: Resource Directory

### Articles, Publications and Journals

#### InfoWorld

InfoWorld is a leading resource for professionals and has covered numerous issues related to disk cloning over the past couple of years. InfoWorld examined disk cloning and compared leading disk cloning solutions in 2 articles: *Ghost beats out rivals for disk replication options* by Mike Avery, (September 15, 1998; Vol. 19, Issue 37) and *Ghost still tops in disk duplication* by Mike Avery (June 29, 1998; Vol. 20, Issue 26). You can find these articles at:

[www.idg.net](http://www.idg.net)

Or search on *Ghost*.

The article *Three methods for deploying Windows 98 provide different strengths* by Jeff Symoens, June 15, 1998, (Vol. 20, Issue 24), explores some of the alternatives for migrating an organization to a new operating system. You can find this article at:

[www.idg.net](http://www.idg.net)

Or, search on: "deploying Windows 98"

The article, *Microsoft moves to ease NT Workstation deployment* by Cara Cunningham, Posted June 17, 1998 explains Microsoft's recent endorsement of disk cloning, as well as offering a concise description of the System Preparation Tool. You can find this article at:

[www.idg.net](http://www.idg.net)

Or, search on: "ease NT Workstation."

*A friendly Ghost, a helpful boot, and a little lab noir*, April 27, 1998, OPINIONS, briefly looks at Ghost and disk cloning. This article is at:

[www.idg.net](http://www.idg.net)

Or, search on: "A friendly Ghost."

InfoWorld also published an article describing the Symantec acquisition of Ghost: *Symantec buys Ghost disk-cloning* by James Niccolai, June 29, 1998 (Vol. 20, Issue 26). You can find this article at:

[www.idg.net](http://www.idg.net)

Or, search on: "disk cloning."

## PC Week

PC Week is a leading weekly newsmagazine that focuses on PCs in the corporate environment. PC Week has also identified disk cloning as an important issue for its audience of IS professionals and has featured numerous articles about disk cloning.

In *Ghost cloning gains GUI* by William Wong, July 6, 1998, PC Week Labs tests Norton Ghost 5.0 and presents its findings. You can find this article at:

[web-e6.zdnet.com/pcweek/reviews/0706/06ghost.html](http://web-e6.zdnet.com/pcweek/reviews/0706/06ghost.html)

An executive summary is available at:

[web-e6.zdnet.com/pcweek/reviews/0706/06ghost1.html](http://web-e6.zdnet.com/pcweek/reviews/0706/06ghost1.html)

In the Net Adviser: the article, *How fast can you build a PC?* by Neil Plotnick, June 22, 1998 discusses the benefits of using Norton Ghost to clone the hard drives. You can find this article at:

[search.zdnet.com/pcweek/opinion/0622/22neil.html](http://search.zdnet.com/pcweek/opinion/0622/22neil.html)

In the Sm@rt Edge column, the article, *Microsoft has finally done something right. Check out the Win98 Image Prep Tool* by David Harvey and Rich Santalesa, June 26, 1998 provides an overview of Microsoft's new Image Preparation Tool for Windows 98. You can find this article at:

[www.zdnet.com/sr/products/richdave/980626.html](http://www.zdnet.com/sr/products/richdave/980626.html)

PC Week also covers the Symantec acquisition in the following articles: *Symantec Buys Disk-Clone Market Leader* by Rex Farrance, June 29, 1998, at:

[www1.pcworld.com/pcwtoday/article/0,1510,7299,00.html](http://www1.pcworld.com/pcwtoday/article/0,1510,7299,00.html)

*GHOST in the Machine*, Software Trends, June 26, 1998 is at:

[www.zdnet.com/pcmag/news/trends/t980626a.htm](http://www.zdnet.com/pcmag/news/trends/t980626a.htm)

*Symantec buys Ghost developer* by Anne Knowles, June 25, 1998, PC Week Online at:

[www.zdnet.com/zdn/stories/zdn\\_display/0,3440,332210,00.html](http://www.zdnet.com/zdn/stories/zdn_display/0,3440,332210,00.html)

## **PC Magazine**

In First Looks: Software, *GHOST Professional* by Jay Munro, May 22, 1998 provides a comprehensive summary of the features and advantages of disk cloning using Norton Ghost. You can find this article at:

[www.zdnet.com/pcmag/firstlooks/9805/f980522a.htm](http://www.zdnet.com/pcmag/firstlooks/9805/f980522a.htm)

## **WindowsPro Magazine**

WindowsPro Magazine examines the issues surrounding deploying large numbers of PCs in an organization in the article, *Roll Out NT Painlessly, The Cloning Alternative*, September 1998. You can find this article at:

[www.zdnet.com](http://www.zdnet.com)

## **Windows Sources**

In the NT Networking Help Desk column, the article *The Clone Ranger*, March 1998, examines how disk cloning can help IS professionals perform operating system installation faster and more reliably. You can find this article at:

[www.zdnet.com/wsources/content/0398/hd\\_nt\\_nw.html](http://www.zdnet.com/wsources/content/0398/hd_nt_nw.html)

## **Web Links**

### **Symantec**

Symantec's Web site provides complete and up-to-date information about all of the company's products, including Norton Ghost for NetWare. The main URL is:

[www.symantec.com](http://www.symantec.com)

### **Norton Ghost for NetWare**

You can find information specific to Norton Ghost for NetWare at:

[www.ghost4nw.com](http://www.ghost4nw.com)

## **Additional Reading**

This document is one of a series of papers on Symantec's software strategy and its product offerings. Additional papers include:

- Understanding and Controlling Viruses in 32-Bit Operating Environments
- Why Norton Utilities is a Natural Complement to the Windows 95 Environment
- Managing Desktop Interfaces Across the Enterprise
- A Strategy for the Migration to Windows 95
- File Management and Windows 95
- Understanding Virus Behavior in the Windows NT Environment
- Integrating Remote Communications into Enterprise Computing
- Using Outsourcing to Reduce IT Labor Costs
- Understanding and Managing Polymorphic Viruses
- Using Outsourcing to Reduce IT Labor Costs
- Understanding Symantec's Anti-virus Strategy for Internet Gateways

For copies of these papers or information about Symantec enterprise network products, call 1-800-249-8313 and ask for Code V23. Outside the United States contact the sales office nearest you (listed on the back cover of any Symantec manual) or see [www.symantec.com](http://www.symantec.com) on the Internet.

## **Section Four: FAQs**

### **Norton Ghost for NetWare FAQs**

#### **How do I request an evaluation copy?**

An evaluation copy of the beta version of Norton Ghost for NetWare may be requested by completing the evaluation form located at [evaluation.htm](#). If you have forgotten your password, please complete the evaluation form again.

#### **Where can I obtain the latest drivers for Novell NetWare?**

To obtain the latest drivers for Novell NetWare visit their download site at:

[developer.novell.com/devres/sas/driver/ddrivers.htm](http://developer.novell.com/devres/sas/driver/ddrivers.htm)

#### **Does Norton Ghost for NetWare use intelligent copying or just sector-by-sector copying?**

Norton Ghost for NetWare fully understands the layout and structure of NetWare partitions and volumes. Norton Ghost for NetWare does not use sector-by-sector copying.

### **Will Norton Ghost for NetWare resize NetWare partitions?**

Yes, Norton Ghost for NetWare will allow you to completely resize NetWare partitions. In the event that you want to decrease the size of a NetWare partition, it will validate that the sizes of the volumes within the NetWare partition.

### **Will Norton Ghost for NetWare resize NetWare volumes?**

Yes, Norton Ghost for NetWare will allow you to specify the size of a NetWare volume during disk-disk copying or during image restore. In addition, Norton Ghost for NetWare supports empty volume creation exactly as Novell's Install utility does.

### **Which versions of Novell NetWare will Norton Ghost for NetWare support?**

Norton Ghost for NetWare supports the following versions of Novell NetWare:

- NetWare 3.11
- NetWare 3.12
- NetWare 3.2
- NetWare 4.11
- NetWare 5.0 with traditional NetFile system, but not NSS

### **Can I create a disaster recovery disk for Novell NetWare?**

Yes, by imaging your NetWare server to a backup media, such as ZIP, JAZ, SCSI Tape, CD-ROM, or a network drive, emergency recovery is extremely fast and simple. You don't need to reinstall Novell NetWare first. Norton Ghost for NetWare will take care of everything.

### **Can I use Norton Ghost for NetWare to automate the installation of NetWare?**

Yes, by imaging your NetWare server to a backup media, such as ZIP, JAZ, SCSI Tape, CD-ROM, or a network drive, emergency recovery is extremely fast and simple. You don't need to reinstall Novell NetWare first. Norton Ghost for NetWare will take care of everything.

### **What environment does Norton Ghost for NetWare run under?**

Norton Ghost for NetWare executes under MS-DOS. Access to the physical disk drives or disk arrays is managed via the normal NetWare device drivers. When Norton Ghost for NetWare runs, you execute a load command just as you would under NetWare. Norton Ghost for NetWare automatically scans the PCI bus and recognizes which adapter



drivers are required. (Currently only disk drivers are processed). Therefore, no matter how the data was organized on the disk peripherals, Norton Ghost for NetWare accesses the data in the same manner.

### **What is the difference between a NetWare partition, a volume, and a volume segment?**

A NetWare partition is a section of a disk drive allocated to NetWare via the FDISK table.

It has a system type of 0x65. A NetWare volume is a section of a NetWare partition formatted into a file system. NetWare partitions can have more than one NetWare volume.

A NetWare Segment is a section of a NetWare volume. NetWare volumes can consist of several NetWare Segments on multiple disk drives.

### **Will Norton Ghost for NetWare support the NetWare 5 NSS File System?**

Norton Ghost for NetWare does not support the NetWare 5 NSS File System. There are no plans at this time to add this support.

### **About Symantec**

Symantec Corporation is a leading software company with award-winning application and system software for Windows, DOS, Macintosh, Novell NetWare and OS/2 computer systems. Founded in 1982, Symantec has grown rapidly through the success of its products and a series of 17 acquisitions resulting in a broad line of business and productivity solutions.

Symantec's acquisitions have strongly influenced the company's innovative organization. The company is organized into several product groups that are devoted to product marketing, engineering, technical support, quality assurance, and documentation. Finance, sales, and marketing are centralized at corporate headquarters in Cupertino, California.

Contact Symantec regarding Norton Ghost for NetWare at:

[www.ghost4nw.com](http://www.ghost4nw.com)

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**WORLD HEADQUARTERS**

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1 (800) 441-7234  
1 (541) 334-6054

World wide Web Sites

Corporate:

<http://www.symantec.com>

Norton Ghost for NetWare:

<http://www.ghost4nw.com>

Australia (Sydney): +61 3 9850 1000  
Australia (Melbourne): +61 3 9823 6204  
Brazil: +55 11 530 8869  
Canada: 1(416) 441-3676  
France: +33 1 41 38 5700  
Germany: +49 n2102 7453 0  
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