VERSION 4.11

NetWare

Enhanced

Security

Server
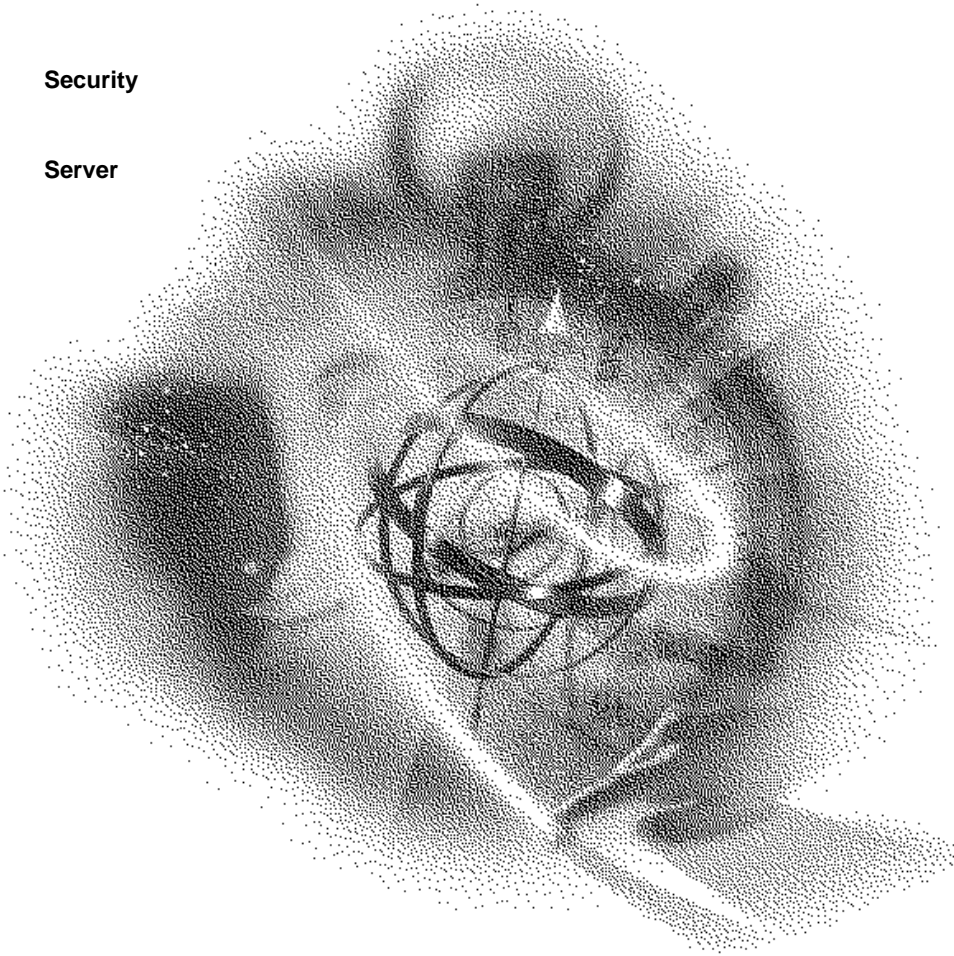
NetWare 4®
NETWORK SOFTWARE ™

Novell®

Contents

How to Use This Manual

Introduction

This manual summarizes the hardware, software, and documentation for the server component of the NetWare® Enhanced Security configuration.

Warning ▼ The term *NetWare Enhanced Security configuration* refers to the C2 evaluated configuration for NetWare 4.11. It explicitly defines the hardware and software that may be used in a C2 server. Use of any other hardware or software not listed in this document is outside the scope of the server evaluation.

This document is intended for use by system integrators, accreditors, evaluators, and administrators to determine which materials are to be included in the NetWare Enhanced Security configuration.

This manual serves as an adjunct to *NetWare Enhanced Security Administration,* which describes how to administer the hardware and software listed in this manual.

Note ▼ In Novell® documentation, an asterisk denotes a trademarked name belonging to a third-party company. Novell trademarks are denoted with specific trademark symbols, such as ^{TM}.

System Overview

NetWare is a distributed network operating system made up of three network components:

◆ Servers

◆ Workstations

◆ Network media

The NetWare Enhanced Security server described in this document can serve an arbitrary number of workstations using the network media, limited only by software license restrictions.

The server component is a Network Trusted Computing Base (NTCB) partition, which is used to enforce the security policies and to protect data stored on the server. The NetWare Enhanced Security server component must not be used to run untrusted software.

As a network system composed of these three components, NetWare Enhanced Security is designed to meet the Controlled Access implementation (Class C2) requirements of the *Trusted Network Interpretation* (TNI) [NCSC-TG-005] of the *Trusted Computer System Evaluation Criteria* (TCSEC) [DoD5200.28-STD].

The evaluated server is an IAD component, as defined in Appendix A of the TNI document.

Manual Overview

Chapter 1, "Server Overview," on page 11 describes the major parts of the server hardware and software, breaking the server component into the following parts:

1. Machine-independent software

2. Network hardware and software

3. Storage hardware and software

4. Platform hardware and BIOS

5. Printers

Chapter 2, "Evaluated and Tested Configurations," on page 15 describes the evaluated and test configurations.

Chapter 3, "The Yes Certification Program," on page 17 summarizes Novell's Yes certification program.

Chapter 4, "Machine-Independent Software," on page 23 lists the machine-independent software (part 1 of the server component listed above).

Chapter 5, "Network Hardware and Software," on page 29 describes the certification procedures used for network hardware and software (part 2 of the server component).

Chapter 6, "Storage Hardware and Software," on page 35 describes the certification procedures used for storage hardware and software (part 3 of the server component).

Chapter 7, "Platform Hardware and BIOS," on page 41 describes the certification procedures used for platform hardware and BIOS (part 4 of the server component).

Chapter 8, "Printer Hardware," on page 47 describes the certification procedures used for printers (part 5 of the server component).

Chapter 9, "Documentation," on page 51 describes the user documentation that is part of the NetWare Enhanced Security configuration.

Terms and Acronyms

The following terms and acronyms are used throughout this manual. Every effort has been made not to duplicate or conflict with NCSC-TG-004, Version 1. However, some duplication may occur.

BIOS	Basic Input/Output System
EISA	Enhanced Industry Standard Architecture. An open bus architecture used in higher performance DOS/Windows* workstations.
EPL	Evaluated Products List.
IDE	Integrated Drive Electronics.
ISA	Industry Standard Architecture. An open bus architecture used in DOS/Windows workstations.
MCA	Micro Channel* Architecture. An IBM* proprietary bus architecture.
NLM^{TM}	NetWare Loadable Module^{TM}.
RAMP	Rating Maintenance Phase. The phase of the Trusted Product Evaluation Program (TPEP) that follows the Evaluation Phase.
	RAMP consists of rating maintenance actions (RAMP cycles) that assess the compliance with applicable requirements of updated versions of the product and allow those versions to be listed on the EPL.
	During RAMP, the vendor performs the majority of the work to determine that changes to the product maintain the previously attained rating.
SCSI	Small Computer System Interface. An industry standard for peripheral devices.

Related Documents

This section lists related documents which may be useful in conjunction with this manual.

Novell World Wide Web site	Updates to this manual and other NetWare Enhanced Security documentation can be found in the Technical Support area of the Novell, Inc. World Wide Web site (http://www.novell.com). We recommend that you check this area *regularly* for updated NetWare Enhanced Security information.
ODITestProc	*NetWare v4.x ODI Server Driver Test Procedures for Driver Specification*, Version 3.2, Novell, Inc., Part Number 107-000073-001, January 1995
PrintTestProc	*Novell Labs^{TM} Print Services Novell Certification Alliance Test Procedures*, (Revision A Beta), Novell, Inc., March 21, 1995
NESA	*NetWare Enhanced Security Administration*, Novell, Inc., Part Number 100-003611-001 A, September 1996
StorageTestProc	*Novell Labs Storage Device, Device Driver, and Host Bus Adapter Test Procedures*, Revision 2.3, Novell, Inc., Part Number 100-001997-001, January 1, 1995
SysCertProc	*Novell Labs System Certification Test Procedures*, Revision H, Novell, Inc., Part Number 107-000025-001, March 1995
DoD5200.28-STD	*Department of Defense Trusted Computer System Evaluation Criteria*, National Computer Security Center, December 1985
NCSC-TG-004	*Glossary of Computer Security Terms*, Version 1, National Computer Security Center, October 1988
NCSC-TG-005	*Trusted Network Interpretation of the Trusted Computer System Evaluation Criteria*, Version 1, National Computer Security Center, July 1987

| NCSC-TG-013-95 | *Rating Maintenance Phase Program Document*, Version 2, National Computer Security Center, Final: March 1, 1995 |
| SCSI-II | *Draft Proposed American National Standard, Small Computer System Interface (SCSI-II)*, X3.131, American National Standards Institute, November 11, 1991 |

User Comments

We are continually looking for ways to make our products and our documentation as easy to use as possible.

You can help us by sharing your comments and suggestions about how our documentation could be made more useful to you and about inaccuracies or information gaps it might contain.

Submit your comments by using the User Comments form provided or by writing to us directly at the following address:

Novell, Inc.
Documentation Development MS C-23-1
122 East 1700 South
Provo, UT 84606 USA

We appreciate your comments.

1 *Server Overview*

Major Server Subsystems

NetWare® Enhanced Security is a subset of the software found in NetWare 4.11, together with hardware capable of supporting the software.

The NetWare Enhanced Security server is composed of five major areas, as shown in Figure 1-1. The dashed line shows the separation between hardware and software portions of the server.

Figure 1-1
Major Server Subsystems
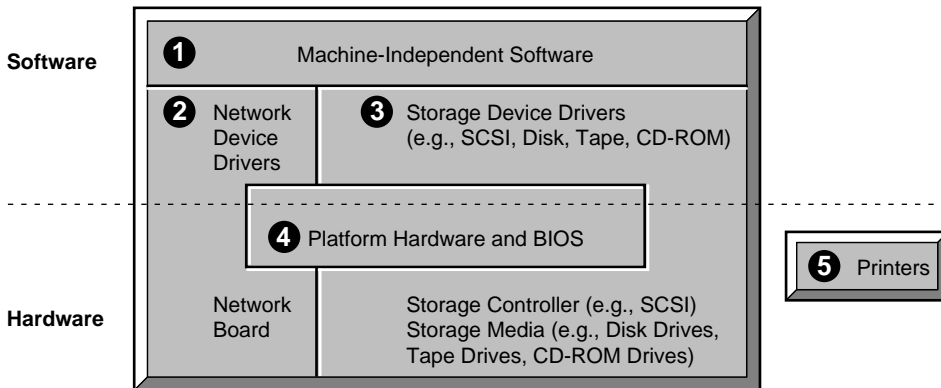
The hardware and software that make up each of the major areas is summarized as follows:

1. Machine-independent software, including

   ◆ NetWare core operating system

   ◆ Installation software

   ◆ Support NLM^{TM} software

   ◆ Administrative NLM programs

   Machine-independent means independent of the manufacturer of the underlying hardware. It does not imply independence from the hardware architecture, which must be IBM* PC compatible.

2. Network hardware and software, including

   ◆ Network board

   ◆ Network device drivers and NLM programs

   These enable the machine-independent software to communicate with workstations and other servers over a LAN.

3. Storage hardware and software

   ◆ The hardware includes the device controllers (for example, SCSI card), disk, tape, and CD-ROM drives.

   ◆ The software includes device drivers and NLM programs for this hardware.

4. Platform hardware and BIOS, including the IBM PC compatible hardware, firmware, and BIOS that run the software characterized in items 1 through 3

5. Printers that can be connected to the platform hardware characterized above

The software and documentation that make up the machine-independent software are described in Chapter 4, "Machine-Independent Software," on page 23.

Modifications and additions to the machine-independent software are performed under the supervision of the U.S. National Computer Security Center (NCSC) through the Rating Maintenance Phase (RAMP). The procedures used for such changes are described in Novell's Rating Maintenance Plan, which is subject to approval by the NCSC.

Network hardware and software, storage hardware and software, platform hardware, and printers are certified through the Yes certification program described in Chapter 3, "The Yes Certification Program," on page 17.

Specific requirements for the network are found in Chapter 5, "Network Hardware and Software," on page 29.

Specific requirements for storage are found in Chapter 6, "Storage Hardware and Software," on page 35.

Specific requirements for the platform are found in Chapter 7, "Platform Hardware and BIOS," on page 41.

Specific requirements for printers are found in Chapter 8, "Printer Hardware," on page 47.

Modifications and additions to the hardware or software in Chapters 5 through 8 are performed by Novell®, Inc. through programs within the Yes certification program.

Modifications and additions to the Yes program documentation and test software is itself performed under the supervision of the U.S. National Computer Security Center (NCSC) through the Ratings Maintenance Plan (RAMP). The procedures used for such changes are described in Novell's Rating Maintenance Plan, which is subject to approval by the NCSC.

Characterizing Nonserver Software

The workstation software delivered as part of the NetWare 4.11 CD-ROM includes the client protocol stack and client utilities. These are not part of the server component Trusted Computing Base (TCB).

The client protocol stack and utilities may, however, be part of a particular workstation component's TCB. In that case, integrators, accreditors, and system administrators must verify that the software versions evaluated as part of the workstation are consistent with the software versions distributed with NetWare 4.11 software.

In addition, the workstation vendor must ensure, through the workstation's evaluation and RAMP processes, that changes made in the software are consistent with the workstation's evaluation. To determine the specific workstation software used with NetWare 4.11, refer to the workstation vendor documentation.

Evaluated Documentation

Chapter 9, "Documentation," on page 51 lists the documentation that is part of the NetWare Enhanced Security configuration.

2 *Evaluated and Tested Configurations*

Evaluated Configurations

An *evaluated configuration* of a NetWare® Enhanced Security server consists of the following:

◆ Only the machine-independent software listed in Chapter 5, "Network Hardware and Software," on page 29

◆ One or more instances of the network hardware and software characterized in Chapter 5, "Network Hardware and Software," on page 29

◆ One or more instances of the storage hardware and software characterized in Chapter 6, "Storage Hardware and Software," on page 35

◆ One instance of the platform hardware and BIOS characterized in Chapter 7, "Platform Hardware and BIOS," on page 41

◆ Zero or more instances of the printers characterized in Chapter 8, "Printer Hardware," on page 47

Tested Configurations

Because Chapters 5 through 8 each characterize hundreds of configurations, the number of possible evaluated configurations is nearly unlimited.

The other configurations meet the NetWare Enhanced Security requirements even though they have not been specifically tested with the NetWare Enhanced Security test suite.

chapter **3** *The Yes Certification Program*

The Novell® Yes certification program allows hardware and software vendors to certify that their products work with the NetWare® operating system. Twelve different categories of hardware and software can be certified.

However, as shown in the second column of the following table, only five of these categories contain products that may be used in the NetWare Enhanced Security configuration. Chapters 5, 6, 7, and 8 state further NetWare Enhanced Security requirements for specific products in these categories.

Major Areas of Server	Certification Categories for Enhanced Security
Platform hardware and BIOS	Systems (File Servers)
Network hardware and software	LAN Adapters (Network Boards) and Drivers
Storage hardware and software	Host Bus Adapters and Drivers
	Storage Devices
Printers	Other Novell Labs[TM] Certifications (Printers)

None of the following products certified for any of the Yes categories, nor any other categories not shown explicitly in the second column of the table, are part of the server's NetWare Enhanced Security configuration.

◆ Workstation systems

◆ WAN adapters and drivers

◆ Third-party routers

◆ Backup products

◆ Third-party print servers

◆ Uninterruptible power supplies

◆ Client applications

◆ Server applications (third-party NLM^{TM} programs)

◆ Video adapters and drivers, keyboards, fax hardware, and other such devices or drivers

Each category of products that can be approved through the Yes program has a set of tests and a description of product requirements. These are explained in Chapters 5 through 8.

When a vendor believes that its product meets the requirements, the product can be submitted for testing. The test processes are summarized in "Test Administration" below.

Product purchasers, integrators, administrators, and users can receive product bulletins containing the test results for certified products. These product bulletins are available through an automated fax-based service, as explained in "Obtaining Test Results" on page 19.

Each category of products—storage, network, platform, and printer—has a Yes version number that identifies Novell's current set of requirements and tests for that category of products.

This version number is associated with the *category*, not the *version* of the NetWare operating system. Consequently, the various categories of products may have different versions of Yes requirements and tests.

Test Administration

Tests for the Yes program are administered by Novell Labs testing services, by independent third-party testing organizations, (approved by Novell as NetWare Authorized Test Centers), or by hardware vendors themselves (approved by Novell through the NetWare Certification Alliance).

Novell establishes strict criteria for approval of independent and vendor test labs. Test labs

◆ Must have a variety of hardware to perform testing.

◆ Must be able to test the full scope of Novell products, including a variety of workstations, NetWare servers, and UnixWare®.

◆ Must be inspected before testing can begin. The first few products tested by the lab are cross-checked by Novell Labs for accuracy.

◆ Are inspected at least annually to verify that they are performing the tests appropriately. Vendors have minimal notice of inspections; labs that fail an inspection have their right to certify suspended.

◆ Must submit test results for all tested products to Novell Labs, which performs periodic audits of submitted results.

Novell provides extensive training for personnel who run the test labs to ensure that the high standards of the program are maintained by testers.

Obtaining Test Results

The inclusion of Yes-certified products in the server's NetWare Enhanced Security configuration means that NetWare customers can maintain the NetWare Enhanced Security configuration with a broad range of hardware from many different vendors.

The Yes program has certified more than 10,000 products from more than a thousand companies. These products include 3,000 file servers, 1,400 storage products, 3,000 network products such as network boards, and 200 printers.

New products are certified regularly and are available for use in the NetWare Enhanced Security configuration as soon as they are listed by Novell.

Novell Labs maintains a database of Yes-certified product bulletins, each with a document ID number.

To obtain lists of certified products or the certification bulletins for specific products, you can use Novell's automated FAXback system to retrieve information using a pushbutton (tone) telephone.

You can access the FAXback system by calling 1-800-414-5227 in the United States and Canada. In all other locations, call 1-801-861-2776.

A recorded message explains how to

◆   Request introductory information and the Master Index

◆   Request specific reports by their document ID numbers

The documents you request are sent to your fax machine.

The Master Index lists approximately 12 categories with some 80 subcategories such as "Pentium*-based File Servers" or "All Storage Device Certification in the Last 90 Days."

The index only lists products certified with in the preceding year, but if you know the ID number you can still retrieve reports for products certified prior to that time.

In the following table, only the categories shown in the first column are relevant to the NetWare Enhanced Security configuration. The second column lists types of products that might be candidates for the NetWare Enhanced Security configuration. The information in Chapters 5 through 8 will help make the final determination of whether a specific product can be used.

Categories	Subcategories
Systems (File Servers)	Look for lists of files servers, certifications in last 90 days, and NetWare 4$^{TM.}$
	Disregard lists for NetWare 3^{TM}, clients, UnixWare, SMP, Macintosh*, and SAA*.
LAN Adapters and Drivers	Look for lists of adapters and NetWare 4.
	Disregard lists for NetWare 3^{TM}, clients, UnixWare, SMP, Macintosh, and SAA.
Host Bus Adapters and Drivers	Look for lists of certifications in last 90 days, NetWare 4, and PCI Bus Host Bus Adapters (HBAs).
	Disregard lists for NetWare 3, clients, UnixWare, SMP, Macintosh, and SAA.
Storage Devices	All lists.
Other Novell Labs Certifications (Printers)	Look for lists of printers but disregard print servers in the list.

In addition to the FAXback service, you can access certification bulletins from the following alternative sources.

NSEPro^{TM} CD-ROM	The Network Support Encyclopedia Professional Volume^{TM} database is published monthly on CD-ROM. It contains a complete database of certification bulletins effective as of the date of the CD-ROM's publication.
NetWire®	The NetWire online service is available through CompuServe* and the World Wide Web (http://www.novell.com). NetWire provides access to all certification bulletins.

These sources both use the same database of Novell Labs bulletins as the FAXback service. For any product bulletin number, you get the same information. However, these sources may provide different top-level selection menus and the reports may be formatted differently.

To use either of these sources, check the instructions in the FAXback introduction. NSEPro and NetWire are faster and easier to use than the FAXback service but are not as widely available.

Because the mappings from the top-level menus to the file server, network, storage, and printer products may vary from one source to another, the remainder of this manual addresses only the headings in the FAXback service.

4 *Machine-Independent Software*

NetWare® machine-independent software consists primarily of

◆ Installation software

◆ NetWare core operating system software

◆ Service NLM^{TM} software

◆ Library NLM software

◆ Administrative NLM software

The risks of using machine-independent software *not* listed in this chapter are described in *NetWare Enhanced Security Administration*.

This chapter lists the name of each piece of machine-independent software. Unless otherwise noted, all are included as part of the NetWare 4.11 release CD-ROM.

Warning ▼ In order for your system to be compliant with NetWare Enhanced Security requirements, you must ensure that you are using the correct verisons of the software listed in this chapter. The software version numbers can be found in the Technical Support area of the Novell, Inc. World Wide Web site (http://www.novell.com). We recommend that you check this area *regularly* for updated NetWare Enhanced Security information.

The developer and commercial versions of the NetWare 4.11 operating system are identical. Either version may be used as part of the NetWare Enhanced Security configuration.

Each NLM program also uses a set of message files (stored in SYS:SYSTEM\NLS). These message files support various languages, including English, French, Italian, German, and Spanish.

Each NLM program automatically checks the version of its corresponding message files, and will not operate if the version is

incorrect. Thus, the message file versions are implicit in the following list of NLM software versions.

Installation Software

The NetWare installation software for the NetWare Enhanced Security configuration consists of the following:

- ◆ INSTALL.EXE

- ◆ Appropriate DOS version

Core Operating System

The NetWare core operating system consists of the following software:

- ◆ DS.NLM

- ◆ SERVER.EXE

- ◆ TIMESYNC.NLM

Service NLM Software

The following service NLM software is included in the NetWare Enhanced Security configuration:

- ◆ NPRINTER.NLM

- ◆ PSERVER.NLM

- ◆ SMDR.NLM

- ◆ SMSDI.NLM

- ◆ TSA410.NLM

- ◆ TSANDS.NLM

Driver NLM Software

The following machine-independent driver NLM software is included in the NetWare Enhanced Security configuration:

- ◆ CDROM.NLM

- ◆ ETHERTSM.NLM

- ◆ IDEATA.HAM

- ◆ NBI.NLM

- ◆ MSM.NLM

- ◆ NWPA.NLM

- ◆ SCSIPS2.HAM

- ◆ SCSI154X.HAM

The NetWare Enhanced Security configuration includes the following machine-dependent device drivers, which are listed here as part of Novell's standard NetWare distribution. Other machine-dependent drivers are permitted as described in Chapters 5 and 6.

- ◆ IDEHD.CDM

- ◆ SCSI2TP.CDM

- ◆ SCSICD.CDM

- ◆ SCSIHD.CDM

- ◆ SCSIMO.CDM

Library NLM Software

The following library NLM software is included in the NetWare Enhanced Security configuration:

- AFTER311.NLM

- CLIB.NLM

- CLNNLM32.NLM

- DSAPI.NLM

- DSI.NLM

- FPSM.NLM

- LOCNLM32.NLM

- MATHLIBC.NLM

- MATHLIB.NLM

- NCPNLM32.NLM

- NETNLM32.NLM

- NIT.NLM

- NLMLIB.NLM

- NWSNUT.NLM

- REQUESTER.NLM

- SPXS.NLM

- STREAMS.NLM

- THREADS.NLM

- TLI.NLM

Administrative NLM Software

The following administrative NLM software is included in the NetWare Enhanced Security configuration:

- ◆ DSMERGE.NLM

- ◆ DSREPAIR.NLM

- ◆ INSTALL.NLM

- ◆ MONITOR.NLM

- ◆ SBACKUP.NLM

- ◆ SERVMAN.NLM

- ◆ VREPAIR.NLM

5 *Network Hardware and Software*

The NetWare® Enhanced Security configuration can include any Ethernet network board or LAN driver characterized in the FAXback listing that

◆ Has been tested and certified by Novell® as compliant with a C2-approved version of the *32-Bit ODI Driver Test Procedures for Driver Specification*

◆ Satisfies the specific constraints listed under "Specific Requirements for Enhanced Security" on page 33

Network wiring, hubs, and other equipment are not part of the NetWare Enhanced Security configuration.

The network drivers consist of the following modules:

◆ Media-Specific Module (MSM.NLM)

◆ Topology-Specific Module (ETHERTSM.NLM)

◆ Hardware-Specific Module (for example, SMC9000.LAN)

The MSM.NLM and ETHERTSM.NLM modules are part of the machine-independent software discussed in Chapter 4, "Machine-Independent Software," on page 23. In this chapter, the term *driver* applies to the hardware-specific module only.

The Yes Program for Network Hardware and Software

For a network product to receive Yes certification, it must

◆ Be written to the ODI^{TM} interface specification

◆ Pass a comprehensive set of tests

The following sections summarize the test suite and how results are documented.

Chapter 3, "The Yes Certification Program," on page 17 summarizes the Yes program and how to obtain test results. For additional information on the test suite, refer to *NetWare v4.x ODI Server Driver Test Procedures for Driver Specification* Version 3.2.

Network Test Suite Overview

The network test suite verifies that the network hardware and software can run under the NetWare operating system without failing and without causing other software in the NetWare server to fail.

The test suite consists of a combination of manual and automatic tests. The *NetWare v4.x ODI Server Driver Test Procedures for Driver Specification* manual provides step-by-step instructions on how to install the driver software, run the tests, and interpret the results.

The network test suite includes the following:

◆ **Error cases** verify that the driver

   ◆ Displays an error message if the hardware is not present

   ◆ Recovers from temporary cable disconnects

   ◆ Rejects packets of the wrong frame type

   ◆ Performs internal routing of IPX^{TM} packets

In addition, optional features that may not be supported, but must not cause failures if used, include setting the network address and varying the network address format.

- **Normal operations** verify that the drive

    - Supports the required I/O control operations

    - Can handle various fragment lengths, packet ordering, and packet data integrity

    The focus of this portion is stress testing.

- **Compatibility tests** verify that the driver

    - Supports the AppleTalk* Filing Protocol

    - Supports TCP/IP

    In addition, for certain types of drivers, source routing tests are performed. Optional tests include SAA* gateways, promiscuous mode, and others.

Documentation of Test Results

When a network product has been tested and the test results examined, Novell Labs[TM] issues a Product Bulletin. Table 5-1 shows an edited sample bulletin for an Ethernet adapter and ODI driver.

Certification is only valid while the product is unchanged. Any change to hardware or software—for example, drivers—requires a recertification.

Table 5-1
Sample Network Certification Bulletin

Acme NetZapper model 123   F-9997
Acme Computer Corporation   29 Feb 1996
Faxback Document ID #99997

Tested and Approved compatible as an ODI Server Driver with the following Novell products and listed drivers:

Certified OS:	NetWare 3.12; NetWare 4.01; NetWare 4.11
Driver file(s):	ZAP123.LAN

Test configuration:

Product Name/Model/Rev	NetZapper model 123
Specification Version	3.1
Topology	Ethernet
Bus Type	EISA
Cabling Type	AUI, 10 Base T
Transmission Line Speed	10 Mbps
Promiscuous Mode	Not supported
Multicast Mode	Supported
Error Capturing	Not applicable
Configuration notes:	Does not support raw mode.

The term "Tested and Approved" applies only to the exact configuration documented in this bulletin. For more information regarding the specific test configuration, please contact:

Acme Computers
123 Main Street
Anytown, US 12345
Voice: 555/555-1212
FAX: 555/555-1212

Specific Requirements for Enhanced Security

A Network Certification Bulletin ensures that a product can be included as a NetWare Enhanced Security component if the product meets the following requirements:

◆ The "Tested and Approved" line characterizes the product as an "ODI Server Driver." In LAN bulletins, the term "driver" refers to the combination of a network board and its associated device driver software.

◆ The "Certified OS" line includes NetWare 4.11. The product may also be certified for other NetWare operating systems, but this is not relevant to the NetWare Enhanced Security configuration.

◆ The "Specification Version" on the bulletin specifies a NetWare Enhanced Security version, such as version 3.2, of the Yes tests.

◆ The "Topology" line specifies Ethernet or a particular type of Ethernet such as 10BaseT, 10Base2, or 10Base5. The NetWare Enhanced Security configrution does not include other, non-Ethernet LAN topologies.

6 *Storage Hardware and Software*

NetWare® software provides two device driver architectures:

◆ Device Driver File System (DDFS)

DDFS provides a single machine-dependent driver (.DSK).

◆ NetWare Peripheral Architecture™ (NPA or NWPA)

NPA breaks the device driver into separate NLM™ programs: the machine-independent Host Adapter Module (HAM) and machine-dependent Custom Device Module (CDM).

Both the DDFS and NPA architectures are included in the NetWare Enhanced Security configuration.

Storage hardware and software include all storage devices, host bus adapters, and drivers characterized in the FAXback listing that

◆ Have been tested and certified by Novell as compliant with a C2-approved version of the *Storage Device, Device Driver, and Host Bus Adapter Test Procedures*

◆ Satisfy the specific constraints at the end of this chapter

The following section summarizes the requirements of this program for storage hardware and drivers.

The Yes Program for Storage

For a storage system to receive the Yes certification, it must pass a comprehensive set of tests. The following sections summarize the test suite and how results are documented.

Chapter 3, "The Yes Certification Program," on page 17 summarizes the Yes program and how to obtain test results.

Note ▼ For additional information on the Yes program for storage, refer to Section 4 of *Storage Device, Device Driver, and Host Bus Adapter Test Procedures*. That document includes test procedures for the DDFS and NPA architectures, as well as NetWare 3^{TM} and NetWare 4^{TM} device drivers.

Storage Test Suite Overview

The storage test suite verifies that the storage device, host bus adapter (HBA), and associated device driver run under NetWare without failing and without causing other software in the NetWare server to fail.

The test suite consists of a combination of manual and automatic tests for the HBA, its device driver, and various storage drives (fixed disks, RAID, magneto-optical, and CD-ROM).

The *Novell Labs Storage Device, Device Driver, and Host Bus Adapter Test Procedures* manual provides step-by-step instructions on how to install the driver software, run the tests, and interpret the results.

The storage test suite addresses the following:

◆ Rudimentary operations—Install DOS and the NetWare operating system to confirm that the storage subsystem can perform the following rudimentary disk operations:

- ◆ Formatting
- ◆ Partitioning
- ◆ Creating and mounting volumes
- ◆ File operations

- Functionality—Specific tests determine that

  - The driver properly detects and reports nonfunctioning network boards

  - The driver loads and unloads properly

  - The driver handles power down faults

  - The driver handles the required IOCTL operations

  - Cached file system data is written to the medium when the server is brought down

  The tests emphasize that the driver operates properly for all tests without abending or hanging the server.

- Endurance—One group of tests validates the operation of the driver under various load levels. This test runs for approximately 15 hours, to determine that the storage subsystem works properly with multiple workstations and at various load levels.

Documentation of Test Results

When a network product has been tested and the test results examined, Novell® Labs[TM] issues a Product Bulletin. Table 6-1 shows an edited sample bulletin for a storage device.

Certification is only valid while the product is unchanged. Any change to hardware or software—for example, drivers—requires a recertification.

Table 6-1
Sample Storage Certification Bulletin

Acme MagicSCSI model 987   F-9998
Acme Computer Corporation   29 Feb 1996
Faxback Document ID #99998

Tested and approved compatible as Device Driver/Host Bus Adapter with the following Novell products:

Certified OS:	NetWare 3.12; NetWare 4.01; NetWare 4.11
Driver file(s):	ACME987.DSK
	ACMEDISK.DSK

Text configuration:

Product Name/Model/Rev:	MagicSCSI
Specification Version:	2.3
Hard Disk Drive(s):	2 Acme 3GB RedDisk 777
Host Bus Adapter(s):	MagicSCSI model 987
Server Models	TrustServer Model 1000

The term *"Tested and Approved"* applies only to the exact configuration documented in this bulletin. For more information regarding the specific test configuration, please contact:

Acme Computers
123 Main Street
Anytown, US 12345
Voice: 555/555-1212
FAX: 555/555-1212

Specific Requirements for Enhanced Security

A Storage Certification Bulletin ensures that a product can be included as a NetWare Enhanced Security component if the product meets the following requirements:

◆ The "Tested and Approved" line characterizes the product as one of the following:

- ◆ Device driver/host bus adapter

- ◆ Hard disk drive

- ◆ Tape drive

- ◆ CD-ROM drive

- ◆ Magneto-optical drive

- ◆ Hardware RAID

◆ Products certified as device drivers/host bus adapters may only be used with certified drives such as hard disk drives, tape drives, or CD-ROM drives and only in the configuration characterized in the Yes bulletin.

◆ The storage device must not require any server software other than the machine-dependent driver for the Host Bus Adaptor and the machine-independent software characterized in Chapter 4, "Machine-Independent Software," on page 23.

◆ The "Certified OS" line specifies includes NetWare 4.11. The product may also be certified for other Novell operating systems, but this is not relevant to the NetWare Enhanced Security configuration.

◆ The "Specification Version" line on the bulletin specifies a NetWare Enhanced Security version, such as version 2.3, of the Yes tests.

7 *Platform Hardware and BIOS*

Platform hardware and BIOS includes all file server platforms (with associated BIOS firmware) characterized in the FAXback listing that

◆ Have been tested and certified by Novell® as compliant with a C2-approved version of the *System Test Procedures*

◆ Satisfy the specific constraints under "Specific Requirements for Enhanced Security" on page 44

The primary requirement to meet this program is that the computer be IBM* PC compatible. The computer should have an Intel* 80386 (or upwardly compatible) processor and a system bus (typically ISA, EISA, PCI, VLB, or microchannel) architecture.

The BIOS must support the features of an IBM PC compatible computer (such as power-on self-test, keyboard, video, and disk drivers).

The following section summarizes the requirements of the Yes program for file server systems.

The Yes Program for Platforms

A platform must pass a comprehensive set of tests to receive the Yes certification.

The following sections summarize the test suite and how results are documented.

Chapter 3, "The Yes Certification Program," on page 17 summarizes the Yes program and how to obtain test results. For additional information, see the *Novell Labs System Certification Test Procedures* manual.

Platform Test Suite Overview

The platform test suite verifies that the platform hardware runs a wide variety of Novell products. All tests must be performed using network and storage hardware and software certified using the procedures described in Chapter 5, "Network Hardware and Software," on page 29 and Chapter 6, "Storage Hardware and Software," on page 35.

The test suite consists of a combination of manual and automatic tests. The *Novell Labs System Certification Test Procedures* manual provides step-by-step instructions on how to install software, run the tests, and interpret the results.

The platform test suite for NetWare® 4.11 includes

- ◆ Booting

- ◆ Disk operation

- ◆ Network operation

- ◆ Printer operation

- ◆ NDS[TM] program replication

Utility tests verify the proper operation of NetWare server utilities. Other tests operate by executing utilities on a NetWare client (for example, a DOS workstation) and sending NCP[TM] calls to the server.

Test logs are automatically maintained for all tests for analysis.

Documentation of Test Results

When a network product has been tested and the test results examined, Novell Labs[TM] issues a Product Bulletin. Table 7-1 shows an edited sample bulletin for a storage device. Certification is only valid while the product is unchanged. Any change to hardware or software—for example, drivers—requires recertification.

A network certification bulletin is valid as proof of inclusion in the NetWare Enhanced Security configuration so long as the network topology is Ethernet and the network product is listed as having been tested with NetWare Enhanced Security.

Table 7-1
Sample System Certification Bulletin

Acme TrustServer model 1000   F-9998
Acme Computer Corporation   29 Feb 1996
Faxback Document ID #99998

Tested and Approved compatible as a File Server with the following Novell products:

NetWare 3.12
NetWare 4.01
NetWare 4.11

Test Configuration:

Product Name/Model/Rev	TrustServer Model 1000
Specification Version:	J
CPU Family/Clock Speed	Pentium*/66MHz
Device Controller(s) (HBAs)	MagicSCSI model 987
Hard Disk Driver(s)	Three SCSI (1050 M) RedDisk 777
ROM BIOS Version	1234 8/18/93
CPU Memory:	65 MB
Bus Type:	3 EISA
Video Adapter:	Acme Whizzy Video
Video Memory:	1 MB
Vendor Software	MS-DOS* 6.0, Windows* 3.1

Configuration Notes:
The disk controller does not support NetWare SFT III^{TM} (v3.1)
Does not support NetWare MultiProtocol Router^{TM}

The term "Tested and Approved" applies only to the exact configuration documented in this bulletin. For more information regarding the specific test configuration, please contact:

Acme Computers   Voice: 555/555-1212
123 Main Street   FAX: 555/555-1212
Anytown, US 12345

Device controllers and drivers verified through testing

Adapter	Driver Type	File Name	Date
MagicSCSI	NetWare 4.01	ACMEDISK.DSK	1 Feb 94
	NetWare 4.01	ACMEDISK.DSK	10 Feb 94
	NetWare 4.11	ACMEDISK.DSK	1 Apr 94
	NetWare 4.11	ACMEDISK.DSK	15 Apr 94

Adapters and drivers used in testing:

Table 7-1 *continued*
Sample System Certification Bulletin

Adapter	Driver Type	File Name	Date
NetZapper	NetWare 4.01 Server	ACME123.LAN	10 Apr 94
	NetWare 4.11 Server	ACME123,LAN	25 Apr 94

Specific Requirements for Enhanced Security

A System Certification Bulletin ensures that a product can be included as a NetWare Enhanced Security component if the product meets the following requirements:

◆ The product must be listed as "Tested and Approved Compatible as a File Server." The "Tested and Approved" statement may also show compatibility as a workstation, but this is not relevant to the server's NetWare Enhanced Security configuration.

◆ The product bulletin must show the file server as compatible with NetWare 4.11. The product may be certified for other Novell products, but this is not relevant to the NetWare Enhanced Security configuration.

◆ If "Configuration Notes" are listed that require installing patches, you must verify that the patches correspond to the version of the software included in the NetWare Enhanced Security configuration.

◆ The "Specification Version" listed on the bulletin specifies a NetWare Enhanced Security version, such as version J, of the Yes tests.

An installed system is considered identical to the certified system described in the bulletin so long as the system satisfies the following requirements:

◆ The system model number and ROM BIOS version are identical to the model number and ROM BIOS version in the bulletin.

◆ Only those drivers and adapters listed in the bulletin (with the dates characterized in the bulletin) are used.

◆ If the system in the bulletin has 16 MB or less of main memory, it cannot be used as an NetWare Enhanced Security system with more than 16 MB of memory.

If the system in the bulletin has more than 16 MB of main memory, it can be used with any amount of memory up to 3 GB.

8 *Printer Hardware*

Printer hardware includes all printer devices characterized in the FAXback listing that

◆ Have been tested and certified by Novell® as compliant with a C2-approved version of the *Print Services Novell Certification Alliance Test Procedures*

◆ Satisfy the specific constraints under "Specific Requirements for Enhanced Security" on page 49

The Yes tests for printing devices address three types of print devices: printers, print servers, and remote printers. Of these, only printers can be included in the server's NetWare® Enhanced Security configuration.

No machine-dependent device drivers are included in the printer subsystem. The machine-independent NPRINTER.NLM software (listed in Chapter 4, "Machine-Independent Software," on page 23) is used for driving all printers.

Printers may be connected to either the parallel or serial ports provided by the platform hardware listed in Chapter 7, "Platform Hardware and BIOS," on page 41.

The NetWare Enhanced Security configuration does *not* include

◆ Remote printers—printers that connect directly to the network and run NPRINTER.EXE or its equivalent

◆ Print servers—network-connected devices running PSERVER.EXE or its equivalent

The Yes Program for Printers

For a printer to receive Yes certification, it must pass a comprehensive set of tests. The following sections summarize the test suite and how results are documented.

Chapter 3, "The Yes Certification Program," on page 17 summarizes the Yes program and how to obtain test results. For additional information on the Yes program for printer devices, refer to Section 3 of the *Print Services Novell Certification Alliance Test Procedures* manual.

Printer Test Suite Overview

The Novell Print Signature Test Tool (NPSTT), described in Section 3 of the *Print Services Novell Certification Alliance Test Procedures* manual, tests the functionality of parallel and serial printers that are directly connected to a NetWare 4.11 server.

The NPSTT is a workstation-based tool that includes test procedures for a variety of print configurations, including network printers, client-based print servers, NetWare 3[TM] servers, and UnixWare® printing. The NetWare Enhanced Security configuration includes only printers that are directly connected to a NetWare 4.11 server via parallel or serial I/O ports.

For both parallel and serial printers, the NPSTT tests the printer's ability to print large graphic print jobs. The NPSTT generates print data in text, PostScript*, and PCL* formats.

Documentation of Test Results

When a network product has been tested and the test results examined, Novell Labs[TM] issues a Product Bulletin. Table 8-1 shows an edited sample bulletin for a printer.

Certification is only valid while the product is unchanged. Any change to hardware or software—for example, drivers—requires a recertification.

A printer certification bulletin is valid as proof of inclusion in the NetWare Enhanced Security configuration if the printer is listed as having been tested with NetWare 4.11 software.

Table 8-1
Sample Printer Certification Bulletin

Acme TrainPrinter Model 555	F-9997
Acme Computer Corporation	29 Feb 1996
Faxback Document ID #99997	

Tested and approved compatible as a Printer with the following Novell products:

Certified OS:	NetWare 3.12; NetWare 4.01; NetWare 4.11

Test configuration:

Product Name/Model/Rev:	TrainPrinter Model 555
Specification Version:	A
Printer Teste Mode:	Laser
Specification Version	3.0
Printer Port(s)	RS-232C, Ajax, PQ-45

The term *"Tested and Approved"* applies only to the exact configuration documented in this bulletin. For more information regarding the specific test configuration, please contact:

Acme Computers
123 Main Street
Anytown, US 12345
Voice: 555/555-1212
FAX: 555/555-1212

Specific Requirements for Enhanced Security

A Printer Certification Bulletin ensures that a product can be included as a NetWare Enhanced Security component if the product meets the following requirements:

◆ The product must be listed as "Tested and Approved Compatible as a Printer." The "Tested and Approved" statement may also show compatibility as a print server or remote printer, but this is not relevant to the NetWare Enhanced Security configuration.

◆ The product bulletin must show the printer as being compatible with NetWare 4.11. The product may be certified for other Novell products, but this is not relevant to the NetWare Enhanced Security configuration.

◆ The printer port must be either parallel (sometimes specified as Centronics*) or serial (sometimes specified as RS-232C), and the printer must be directly connected to the NetWare server component using the server's parallel or serial interface.

The printer may not be directly connected to the network, so you cannot use Ethernet (for example, BNC or RJ-45), token ring, LocalTalk*, or other network interfaces.

◆ The "Specification Version" listed on the bulletin specifies an NetWare Enhanced Security version, such as version A, of the Yes tests.

◆ A printer cannot be included in the NetWare Enhanced Security configuration if it requires any additional software to be run on the server to which it is attached.

The printers described in this section can be used only with the machine-independent printer driver NPRINTER.NLM characterized in Chapter 4, "Machine-Independent Software," on page 23.

NPRINTER.NLM can be used with a NetWare Enhanced Security print server (such as PSERVER.NLM characterized in Chapter 4) running on any other NetWare Enhanced Security component in the network.

9 *Documentation*

This section lists the documentation that is included with the NetWare® 4.11 operating system. Except as noted, all documentation is provided online as part of the NetWare 4.11 release CD-ROM.

This is not a complete listing of NetWare 4.11 documentation; it is only the documentation required for the NetWare Enhanced Security configuration.

Hard Copy and Online

◆ *Installing and Using Novell Online Documentation*. This manual provides instructions on how to use the online documentation for NetWare Enhanced Security using a standalone DOS system to access the CD-ROM.

◆ *Installation*. This manual provides instructions for installing NetWare 4.11 software.

Online Only

Note ▼ Although the following documentation is shipped only online on the NetWare 4.11 release CD-ROM, corresponding hard copy manuals can be purchased through your Novell® Authorized Reseller[SM] representative.

◆ *NetWare Enhanced Security Server* (this manual)

◆ *NetWare Enhanced Security Administration*

◆ *Security Features User Guide*

◆ *Auditing the Network*

◆ *Concepts*

◆ *Utilities Reference*

◆ *Supervising the Network*

◆ *Print Services*

◆ *Guide to NetWare 4 Networks*

◆ *Utilities Reference*

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*I*ndex

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NetWare 4.11
NetWare Enhanced Security Server
Part #100-003610-001 A
September 1996

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