Novell NetWare® 6

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UTILITIES REFERENCE

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Contents

Overview

Utilities Reference gives you essential information about NetWare® utilities. For more information about each utility, see the online help for that utility.

For step-by-step instructions to accomplish specific tasks, or for information on NetWare concepts, follow the cross-reference links listed with the respective utilities.

Some new utilities have been included with NetWare 6. Some NetWare utilities have been discontinued, while others have been combined with related utilities.

Before you can work effectively with NetWare 6 utilities, you must have a basic understanding about the NDS® and Novell® eDirectory™ infrastructures. For more information, see the online NDS and eDirectory documentation (http://www.novell.com/documentation/).

Documentation Conventions

In Novell documentation, a greater-than symbol (>) is used to separate actions within a step and items in a cross-reference path.

Also, a trademark symbol (®, ™, etc.) denotes a Novell trademark. An asterisk (*) denotes a third-party trademark.

In this *Utilities Reference*, certain command syntax conventions are used. The following MAP example illustrates several of these conventions, and the subsequent table lists and explains all the possible conventions.

MAP [P | NP] [*option*] *drive*:= [*drive*:|*path*]

HINT: Unless specifically noted otherwise in the documentation, text typed at command line prompts, in configuration files, etc., is not case sensitive and can be entered in either upper- or lowercase letters.

Convention	Explanation
Boldface characters	Boldface characters indicate items that you type at the prompt, such as commands.
Italicized characters	Italicized characters indicate variables that you replace with information pertinent to your task.
...	Ellipses indicate that parameters, options, or settings can be repeated.
[ ]	An item enclosed in square brackets is optional. You can enter the command with or without the item.
[[ ]]	Items enclosed by nested square brackets are optional. But if you use the items within the innermost brackets, you must also use the items within the outer brackets.
|	When items are separated by a delimiter bar, you can use either item, but not both.
{ }	Braces indicate that you must choose at least one of the enclosed options.
< >	Angle brackets enclose a descriptive name for any value that is provided as output by a computer.

1 Utilities

This chapter gives you essential information about NetWare® utilities. For more information about each utility, see the online help for that utility.

For step-by-step instructions to accomplish specific tasks, or for information on NetWare concepts, follow the cross-reference links listed with the respective utilities.

ABORT REMIRROR

Purpose

Use at the server console to stop remirroring a logical partition.

Syntax

ABORT REMIRROR ***logical _partition_number***

Parameter	Use to
number	Specify the number of the logical partition you want to stop remirroring.

NOTE: To view a list of disk partitions, execute the MIRROR STATUS command. See “MIRROR STATUS” on page 100.

Example

To stop remirroring logical partition 2, enter

```
ABORT REMIRROR 2
```

Additional Information

Topic	See
Restart remirroring	“REMIRROR PARTITION” on page 157

ADD NAME SPACE

Purpose

Use at the server console to store non-DOS files on a NetWare® volume.

IMPORTANT: Before you can use this command, you must load a name space module. See “LOAD” on page 86.

Syntax

ADD NAME SPACE [*name* [TO [VOLUME]] *volume_name*]

Parameter	Use to
(no parameter)	Display the loaded name spaces.
name	Specify the name of the name space module you loaded. Supported names are LONG (OS/2*, Windows* 95, Windows NT*) MAC (Macintosh*) NFS (NFS*) FTAM (FTAM) FTAM is an add-on module that you can purchase from another provider.
volume_name	Specify the name of the volume you want to store the non-DOS files on.

Using ADD NAME SPACE

- You need to add a name space only once to a volume with the ADD NAME SPACE command.

  Each time you mount a volume to which you added a name space (for example, each time you bring up the server), the corresponding name space module is autoloaded.

  NOTE: Because you don't need to add a name space to a volume each time the server comes up, you don't need to put the ADD NAME SPACE command in the autoexec.ncf file.

- When name space support is added to a volume, another entry is created in the directory table for the directory and file naming conventions of that name space (file system).

Additional Information

Topic	See
Adding name space support	Adding a Name Space

AIOCON

Purpose

Configure low-level port information. You can use this utility by loading NIASCFG and following this path:

Select Configure NIAS > Remote Access > Configure Ports

AIOPDCON

Purpose

Create Packet Assembler Disassembler (PAD) profiles used to configure PAD parameters for X.25 connections. You can use this utility by loading NIASCFG and following this path:

Select Configure NIAS > Remote Access > Set Up... > Configure AIOPAD Parameters

ALERT

Purpose

Use at the server console to manage NetWare® alerts. You can enable or disable the display and logging of specific alerts, limit the amount of information displayed with an alert, and control other aspects of alert messages.

Syntax

ALERT *nmID command* ON|OFF

Parameter	Use to
nmID	Specify the nmID number of the alert you want to manage. This number appears in parentheses whenever the alert is generated. For example, server address changes cause a 50019 alert. The alert message includes the alert ID number in brackets, like this: [nmID=50019].
command	Specify the functionality to be turned on or off for the alert. Valid command values are: EVENT LOG EVERYONE CONSOLE BELL ID LOCUS ALERT NMID ALL
ON|OFF	Enable or disable the functionality of the command parameter.

Command Parameter Values

Command	Function
EVENT	Generates an event when the alert is generated.
LOG	Sends the alert message to a log file.
EVERYONE	Sends the alert to everyone on the network.
CONSOLE	Displays the alert message on the server console.
BELL	Sounds a warning bell when the alert is generated.
ID	Displays ID information. This information appears in some older error and alert messages but is no longer used.
LOCUS	Displays locus information. This information appears in some older error and alert messages but is no longer used.
ALERT	Generates the alert.
NMID	Displays the alert nmID in the alert message.
ALL	Enables or disables the LOG, CONSOLE, EVERYONE, and BELL commands at the same time.

Using ALERT

- Use ALERT to stop the logging of less important alerts or to prevent the repeated display of alerts you don't want to see on the server console.
- You can specify one command parameter at a time. Repeat the ALERT command to execute additional command parameters. (The exception is the ALL command, which lets you set the LOG, CONSOLE, EVERYONE and BELL commands at the same time.)

Examples

- The following command turns off logging, console display, and the warning bell for everyone on the network for all 50019 alerts (a server address change alert):

  ```
  ALERT 50019 ALL OFF
  ```

- The following command turns off logging of all 50019 alerts.

  ```
  ALERT 50019 LOG OFF
  ```

ALIAS

Purpose

Use at the server console to define an alias. An alias is a user-defined keyword that represents a string. (The string can include both spaces and punctuation.)

When you enter the keyword at the command line, the server replaces the word with the string. The keyword remains in effect until you restart the server.

WARNING: If you are associating a keyword with a command string, make sure that you do not inadvertently leave out the keyword. If you do leave out the keyword, the first word in the command string becomes the keyword. If you then try to execute the command, the server will interpret it as a keyword, not as a command.

For example, if you enter ALIAS LOAD INSTALL, LOAD becomes a keyword for INSTALL. If you then try to execute a LOAD command, the server displays a message saying that INSTALL has been replaced by NWCONFIG.

Syntax

ALIAS [*keyword*[*text*]]

Parameter	Use to
(no parameter)	Display all defined aliases and the text they represent.
keyword and *text*	Assign the keyword to the text.
keyword	Delete the keyword as an alias for the text.

Using ALIAS

Define an alias to reduce keystrokes or to avoid having to remember arguments in a long command string.

Examples

In the following example, ALIAS associates the keyword proto with a command to bind a protocol.

```
ALIAS PROTO BIND IPX NE3200 NET=12345678
```

To use the keyword, enter the alias at the server console prompt, instead of the BIND command:

```
PROTO
```

Executing ALIAS with no parameter displays a list of defined aliases, similar to the following:

```
1. PROTO alias for <BIND IPX NE3200 NET=12345678>
2. M alias for <MODULES>
```

To revoke the keyword proto as an alias, you would enter the following at the server console prompt:

```
ALIAS PROTO
```

ARASCON

Purpose

Configure AppleTalk* Remote Access Service (ARAS) options. You can use this utility by loading NIASCFG and following this path:

Select Configure NIAS > Remote Access > Configure Service > ARAS

ATCON

Purpose

Use at the server console to

- Monitor the activity of AppleTalk* network segments
- Examine the configuration of the local AppleTalk router
- Diagnose operational problems in network segments that support AppleTalk
- Verify the connectivity of an AppleTalk router to the rest of the internetwork
- Monitor the status of AppleTalk Update-based Routing Protocol (AURP)

Syntax

```
[LOAD] ATCON
```

Using ATCON

When you load ATCON, an Available Actions menu appears. You access ATCON features from this menu. Menu options are shown in the following table.

ATCON Menu Options

Option	Use to
AURP Information	View the status of the Internetwork Protocol (IP) Tunnel for AURP and its peers. (Available only if AURP is enabled.)
Interfaces	View addressing information about interfaces directly connected to the AppleTalk router.
Log Files	Set logging levels for AppleTalk messages. View NetWare® system log and volume log files.

Option	Use to
Lookup Network Entities	Query for services available on the AppleTalk network.
Packet Statistics	View statistics maintained by the AppleTalk router.
Protocol Configuration	View the configuration of the AppleTalk protocol stack. This is a read-only screen.
Routing Table	View the AppleTalk router's Routing Table Maintenance Protocol (RTMP) table. This table lists all destinations the AppleTalk router can reach.
Zones List	View the list of zones known to this AppleTalk router. This list should be identical to the one displayed by the Macintosh* Chooser.

ATMCON

Purpose

To verify the configuration of the AppleTalk* router and the connectivity to the rest of the AppleTalk internetwork.

BIND

Purpose

- Use at the server console to link a communication protocol to a network board and its LAN driver. Unless you link the protocol to the board, the board can't process packets.
- You can also use INETCFG to link the network boards and their LAN drivers to the communication protocols.

  NOTE: Before you bind a protocol to a network board and LAN driver, you must install the network board and load the LAN driver.

Syntax

```
BIND protocol [TO] lan driver | board name [driver
  parameter...] [protocol parameter...]
```

Bind Parameters

Parameter	Use to
protocol	Specify the communication protocol.
lan driver | *board name*	Specify either the LAN driver name or the network board name.
driver parameter	Identify a particular network board. If you specified a network board name, you do not need to specify driver parameters. If you specified a LAN driver and your server has more than one instance of the LAN driver loaded, use a driver parameter to specify the particular board the driver is running. For a list of valid driver parameters, see “Driver Parameters” on page 21.
protocol parameter	Specify the protocol parameters required for the protocol you are binding. See “Protocol Parameters” on page 22.

Driver Parameters

Depending on your system, one or more of the following parameters can be used to identify a particular board.

Parameter	Use to
DMA=*number*	Specify the DMA channel for the board. Use the same channel number you did when you loaded the driver.
FRAME=*number*	Specify the frame type for the board. Use the same type you did when you loaded the driver.
INT=*number*	Specify the interrupt number for the board. Use the same interrupt number you did when you loaded the driver.
MEM=*number*	Specify the memory address for the board. Use the same memory address you did when you loaded the driver.
PORT=*number*	Specify the I/O port for the board. Use the same I/O port number you did when you loaded the driver.
SLOT=*number*	Specify the network board by the lot it was installed in. Use this parameter with microchannel and EISA computers. Specify the same slot number you used when you loaded the driver.
NODE=*number*	Specify the node address for the board. This is a 12-digit hexadecimal number.

Protocol Parameters

Protocol/Parameter	Use to
For IPX protocol: NET=*number*	Specify the IPX™ external network number. This is the number of the cabling system attached to the board. If the board is attached to an existing cabling system, use the same IPX external network number as used by other boards of the same frame type attached to this cabling system. Do *not* use the same number that was used by boards of a different frame type. If the board is attached to a new cabling system or if it is the first board of its frame type attached to the cabling system, you can enter any hexadecimal number of up to eight digits, as long as the number is different from all other network numbers. Remember that all boards of the same frame type attached to the same cabling system must use the same IPX external network number for that cabling system.
For other protocols: Refer to the documentation that comes with the protocol. Or, consult the Novell® Support Connection™ Web site (http://support.novell.com) or your Novell Authorized Reseller℠ representative.	Specify the information required by the particular protocol.

Using BIND

- You may not need to use the BIND command unless you want to add new LAN drivers after the initial server installation.
- You can also use INETCFG to load and bind LAN drivers. INETCFG places the BIND statements in the initsys.cfg file.
- If you use only the IPX/SPX™ protocol, you can add the BIND statement to the AUTOEXEC.NCF file.

Additional Information

Topic	See
Binding a protocol to a driver	“INETCFG” on page 69
Viewing a list of communication protocols	“PROTOCOL” on page 141
Loading LAN drivers	“LOAD” on page 86

CAPITRCE

Purpose

If a problem with a PPP over ISDN connection cannot be traced to the PPP layer, CAPITRCE can be used to observe and debug negotiation between the CAPI Manager and its upper and lower layers (the CAPI adaptation layer and CAPI driver, respectively).

CAPTURE

Purpose

CAPTURE is a command line utility that allows you to print from applications not designed for NetWare® print services. It sets up redirection parameters for printing output from your workstation; the NetWare DOS Requester™ software then redirects the workstation output from an LPT port to the specified network printer or file.

NOTE: This utility is for use with Novell’s legacy, queue-based print services. Novell® Distributed Print Services® (NDPS®) is the default and preferred print system in NetWare 6. Queue-based printing is fully supported in NetWare 6, which allows your users to continue printing as they always have until you complete the transition to NDPS®.

For a discussion of NDPS support for legacy printing, see Supporting Queue-Based Client Workstations. For information on migrating to NDPS, see Planning the Migration to Novell Distributed Print Services.

Syntax

```
CAPTURE [P=printername | Q=queuename] [L=1|LPT1] [options]
```

Additional Information

Topic	See
Using CAPTURE	Setting Up CAPTURE for Applications Not Designed for Network Printing (http://www.novell.com/documentation/lg/nw51/printenu/data/hzm3nqx9.html)

CDROM

Purpose

Use at the server console to allow a CD-ROM disk to function as a Novell® Storage Services™ (NSS) volume. Your NSS™ volume will mount immediately.

This version of CDROM replaces the version used in previous NetWare® releases. (The previous version of CDROM is now named CDINST.NLM and should be used only for NetWare 5 installation.)

The NetWare 6 version of CDROM is a simple NetWare module that loads the following:

- NSS
- CD9660.NSS
- CDHFS.NSS

Syntax

```
[LOAD] CDROM
```

You can load NSS, CD9660.NSS, or CDHFS.NSS separately if preferred.

You can use CDINST.NLM as long as CD9660.NSS or CDHFS.NSS are not loaded at the same time.

Using CDROM

IMPORTANT: Use CD-ROM as a read-only NSS volume. Don't enable block suballocation or use file compression on the volume.

- CDROM won't load unless you have loaded the NWPA.DSK NPA driver (an I/O device-independent driver that interfaces with the Media Manager).
- CDROM autoloads the NSS modules.
- NSS supports CD-ROM volumes mounted with the Macintosh* and ISO 9660 name spaces.
- CD9660.NSS supports High Sierra and ISO 9660 formats. The HFS (Apple*) file system is supported by CDHFS.NSS. To enable HFS support, load CDROM or CDHFS.NSS.

Additional Information

Topic	See
NSS volumes	Other Volumes That NSS Creates in the NSS section of the NetWare 6 online documentation

CHARSET

Purpose

Use at the server console to change the code page currently used by the NetWare® server.

Syntax

CHARSET CP*xxx* [stay]

Parameter	Use to
(no parameter)	Display available code pages.
CP*xxx*	Specify the code page you want to use on the server, where *xxx* is the code page number.

Parameter	Use to
stay	Leave the CHARSET code in memory. If you do not use the stay option, CHARSET unloads itself after it changes the code page.

Using CHARSET

The following code pages are supported for NetWare 6: 437, 737, 850, 852, 855, 857, 860, 861, 863, 865, 866, 869.

Additional Information

Topic	See
Changing code pages	Changing Code Pages
Understanding code pages	Code Pages

Certificate Server

Novell® Certificate Server enables the use of public keys cryptography and public key certificates in an eDirectory-enabled network. Certificate Server allows you to request, manage, and store public key certificates and their associated key pairs in the eDirectory tree, and establish and manage an eDirectory tree certificate authority (CA) that is specific to your eDirectory tree and to your organization.

Certificate Server also works with most commercial certificate authorities and with the major certificate authority software.Certificate Server optionally generates PKCS #10 formatted certificate signing requests (CSR) that can be used by commercial or external CAs.

Certificate Server consists of a PKI NLM™ and a snap-in module to ConsoleOne™. A network administrator uses ConsoleOne as the administration point for Certificate Server.

Certificate Server uses the cryptography services provided by the Novell International Cryptography Infastructure (NICI). NICI is a modular infrastructure that offers replaceable cryptography engines. As such, a single version of Certificate Server can be used in NetWare installations throughout

the world. Certificate Server derives all supported cryptography and signature algorithms, as well as supported key sizes from NICI.

For additional information and procedures, refer to the Help system or to the *Novell Certificate Server Administration Guide*.

CLEAR STATION

Purpose

Use at the server console to clear a workstation connection.

WARNING: If you use CLEAR STATION while the workstation is in the middle of a transaction or a file update, files might be saved with incomplete data.

Syntax

CLEAR STATION {*n*|all}

Parameter	Use to
n	Specify the connection number of the workstation you want to clear from the server.
all	Clear all workstation connections to the server.

Using CLEAR STATION

- To determine the connection number, from MONITOR's Available Options, select Connections > Connection Information at the server console or use NLIST on a workstation.
- You can use CLEAR STATION either after a workstation has crashed and left files open on a server or before you need to bring down the server.
- CLEAR STATION closes the workstation files and erases the server's internal tables for the station, including drive mappings not saved in the login script.
- The communication link between server and station is broken.

Additional Information

Topic	See
Removing server resources from a workstation	Clearing a Workstation Connection
Clearing a workstation connection from a client that has Auto Restart enabled	Clearing a Connection That Uses Auto Reconnect

CLIB

Purpose

The functionality of earlier versions of CLIB has been incorporated into a server library of C functions. The server library provides an ANSI-compliant runtime interface for other NetWare® Loadable Module™ (NLM™) programs. You cannot load the server library manually because it is autoloaded by the server operating system. The server library includes the following NLM programs, of which clib.nlm is one:

- **fpsm.nlm**—A library of functions providing floating-point support for NLM programs
- **threads.nlm**—A library of functions that constitute the NetWare threads package
- **requestr.nlm**—A library of functions that make up the NetWare requester
- **nlmlib.nlm**—A library of functions that provide basic runtime support for NLM programs, including POSIX-mandated functionality
- **nit.nlm**—A library of NetWare interface tools needed by some NLM programs
- **clib.nlm**—The standard C runtime library containing ANSI-mandated functions
- **lib0.nlm**—The message library, containing system and error messages for most of the other server library NLM programs

Using CLIB

CLIB and the other modules of the server library are autoloaded by the server operating system.

CLS

Purpose

Use at the server console to clear the console screen and move the console prompt to the top of the screen.

Syntax

```
CLS
```

CONFIG

Purpose

Use at the server console to view the following:

- NetWare® server name, internal network number (server ID), server up time, and loaded LAN drivers
- Driver version numbers, hardware settings, node (station) addresses, external network number of the cabling scheme, board name, frame type, and networking protocol for each network board
- The server's eDirectory tree and bindery context

Syntax

```
CONFIG
```

Using CONFIG

- Before installing memory boards, network boards, or host bus adapters, execute CONFIG to see a list of hardware settings already in use by LAN drivers.

- On some systems, CONFIG may also display information about NetWare Loadable Module™ (NLM™) programs. The kind and amount of NLM information depends on the system.

The following is an example of server information that CONFIG returns.

```
IPX internal network number: 0F42DB87
  Server Up Time: 15 Days 17 Hours 7 Minutes 6 Seconds

Novell NE2000
     Version 3.65a   December 22, 1997
     Hardware setting: I/O ports 300h to 31Fh,
       Interrupt 3h

     Node address: 00001B2709AF
     Frame type: ETHERNET_802.2
     Board name: NE2000_1_E82
     LAN protocol: IPX network 01010340

Novell NE2000
     Version 3.65a December 22, 1997
     Hardware setting: I/O ports 300h to 31Fh,
       Interrupt 3h
     Node address: 00001B2709AF
     Frame type: ETHERNET_II
     Board name: NE2000_1_EII
     LAN protocol: ARP
     LAN protocol: IP address 123.45.678.910
       mask FF.FF.FF.0 interfaces 1     mask FF.FF.FF.0
  interfaces 1

Tree Name: DS_JSBACH

Bindery Context(s):
     .novell
```

Additional Information

Topic	See
Loadable modules	“MODULES” on page 101 “MONITOR” on page 103
Configuration information for storage device drivers	“MONITOR” on page 103
Server’s external network numbers	“DISPLAY NETWORKS” on page 45

CONLOG

Purpose

Use at the server console to

- Capture all console messages generated at the server while CONLOG is loaded. This includes system messages, eDirectory messages, the console output of all commands executed, and messages that announce RCONSOLE connections and disconnections.
- Write the messages to the default sys:\etc\console.log file (or to another file of your choice).
- View console messages for useful information although they scroll too quickly to read.
- Reveal errors that might occur during system initialization.

Syntax

[LOAD] CONLOG [FILE=*log filename*] [SAVE=*backup filename*] [ARCHIVE=YES] [ENTIRE=YES] [MAXIMUM=*max file size*] [NEXT=*hh*:*mm*:*ss*] | HELP

HINT: Do not include a space before or after the equals sign (=).

Parameter	Use to
HELP	View a description of each CONLOG command option. You can load CONLOG using any combination of these options.
FILE=*log filename*	Specify the log file you want to use if you don't want CONLOG to write to the default log file sys:\etc\console.log. **Note:** You can change the name of the log file and store it in another directory. However, most configuration files are in the sys:\etc.

Parameter	Use to
SAVE=*backup file name*	Specify the filename in which you want to save the preexisting console log. By default, when you load CONLOG or when the console log file reaches its maximum size, the server deletes the existing console log file and creates a new file in its place. This parameter also enables autoexec.ncf to load CONLOG without overwriting the previous console log. Use this parameter at the command line or in autoexec.ncf if you want to examine the old console log for troubleshooting purposes. The backup file is in turn overwritten when a preexisting console log is saved just before it is replaced with a new file.
ARCHIVE=YES	Archive up to 1000 console log files on your NetWare server. The first time you load CONLOG with this option, the server saves the existing console log file as the console.000 file. Then each time you load the CONLOG utility with the ARCHIVE option (or each time the console log file reaches its maximum when when CONLOG is loaded with the ARCHIVE option), the server increments the extension of the archive file by 1—console.001, console.002, etc.
ENTIRE=YES	Capture the lines already on the screen at the time CONLOG is loaded. Without this parameter, CONLOG starts logging with the next output to the console after it is loaded.

Parameter	Use to
MAXIMUM=*max file size*	Specify the maximum size, in kilobytes, of the log file. If the log file exceeds the *max file size*, it is deleted—or renamed if *backup filename* was specified. In either case, logging starts over with an empty log file. **Important:** If a maximum file size is not specified, there is no limit.
NEXT=*hh*:*mm*:*ss*	Specify the time of day (24-hour clock) with hour, minutes, and seconds when the server archives the existing console log and creates a new file. This option allows you to know the beginning time of a backup file or an archive file. Use this option with SAVE or ARCHIVE.

Using CONLOG

You can view the console log from a workstation with any text editor. Any logged-in user with the Read right to the sys:\etc directory can view console log files in this way.

To view the console log file from the server console, use the VIEW utility or the INETCFG utility.

- Console messages can reveal errors that occur during system initialization.
- The command LOAD CONLOG is typically added to the autoexec.ncf file, as in the following example:

```
FILE SERVER NAME NETW5_SVR
IPX INTERNAL NET C92556E
LOAD CONLOG
LOAD REMOTE
LOAD RSPX
```

  Where you place the LOAD CONLOG command in autoexec.ncf determines which console messages the server saves in the console log

file. To record as many console messages as possible, place the LOAD CONLOG command near the beginning (immediately after the FILE SERVER NAME, as above). Use EDIT or NWCONFIG to modify the AUTOEXEC.NCF file.

Examples

- To start capturing console messages during system initialization, enter

  ```
  [LOAD] CONLOG
  ```

- To load CONLOG but save the current log file as clog.bak and limit the size of console.log to 100 KB, enter

  ```
  [LOAD] CONLOG SAVE=CLOG.BAK MAXIMUM=100
  ```

- To load CONLOG, limit the size of console.log to 200 KB, and schedule existing console log files for daily archiving at 6:00 a.m., enter

  ```
  [LOAD] CONLOG MAXIMUM=200 ARCHIVE=YES NEXT=06:00:00
  ```

- To stop capturing console messages, enter

  ```
  UNLOAD CONLOG
  ```

Additional Information

Topic	See
View console log file	“VIEW” on page 278 “INETCFG” on page 69
Edit autoexec.ncf file	Using Server Batch Files

ConsoleOne

Purpose

Use at a Windows* workstation or a NetWare® server to manage your network and its resources. By default, ConsoleOne™ lets you manage:

- eDirectory™ objects, rights, and schema
- NetWare file system resources

If you install other Novell® products, additional functionality might be added to ConsoleOne. For example, if you install NDS® 8 or later, LDAP management functionality is added.

ConsoleOne is designed like a file manager utility: in the left window pane you browse containers, and in the right window pane you work with the resources in those containers.

Starting ConsoleOne

To start ConsoleOne on a NetWare server, do either of the following:

- On the servertop (server GUI), click Novell > ConsoleOne.
- At the system console prompt, type C1START.

To start ConsoleOne on a workstation (Windows 95, 98 or NT*/2000),

1. Map a drive to the SYS: volume of a NetWare server.
2. On the mapped drive, go to PUBLIC\MGMT\CONSOLEONE\1.2\BIN, and then run CONSOLEONE.EXE.

Additional Information

Topic	See
Why Use ConsoleOne?	ConsoleOne User Guide (http://www.novell.com/documentation/lg/consol13/index.html)

CPUCHECK

Purpose

Use CPUCHECK at the server console to display per-processor information, including processor number, processor clock speed (MHz), processor ID, processor version and subversion, amount of L1 and L2 cache memory, and current revision number.

Syntax

CPUCHECK [*processor_number*...]

Using CPUCHECK

When you run CPUCHECK, the output for a uniprocessor server is similar to the following:

```
Processor Speed 199 MHZ, CPUID 619:FBFF
       Family 6, Model 1, Stepping 9
       L1 cache: 16K Bytes, L2 cache: 256K Bytes
       Current Revision: D1
```

To verify information for a particular processor, specify the processor number.

Additional Information

Topic	See
Display information on processors	“DISPLAY PROCESSORS” on page 46
Check processor’s clock speed	“SPEED” on page 250

CX

Purpose

Use at a workstation to view or change your eDirectory™ context, or to view containers and leaf objects in your eDirectory tree structure.

Syntax

CX [*new context*] [*/option...*] [*/?* | */VER*]

Parameter	Use to
(no parameter)	View the current context.
new context	Move to a new context or specify the context you want for an option.
/*option*	Replace *option* with any available option. See "CX Options" on page 38.
/?	View online help. All other parameters are ignored when /? is used.
/VER	View the version number of the utility and the list of files it uses to execute. All other parameters are ignored when /VER is used.

Using CX

- CX is similar to the DOS CD and DIR commands in that CX allows you to change contexts and view all objects below a given container.
- CX doesn't recognize spaces in object names. If you have spaces in container names, put quotation marks around the names or use underscores (_) in place of the spaces.

  For example, for container CORPORATE ADMIN, type **`Corporate Admin`** or **`Corporate_Admin`**.

CX Options

Option	Use to
/R	List containers at the root level, or change context in relation to the root.
/T	List containers below the current context or a specified context in a tree structure.
/CONT	List containers at the current context or a specified context in a vertical list with no structure.
/A	Include all objects at or below the context. Use with /T or /CONT.
/C	Scroll continuously through output.

Examples

- To see your context in eDirectory before logging in, type

  CX

- To set a new context from the root
  - Place a period in front of the new context you type, or
  - Enter the proper number of trailing periods to reach the root level, or
  - Use the /R option.
- To back up one level in the eDirectory tree, type

  CX .

  (You must put a space between the command and the trailing period.)
- To go down two levels from PROVO.NOVELL to SYSTEM.ENGINEERING. PROVO.NOVELL, type

  CX SYSTEM.ENGINEERING
- To change your current context from TESTING. PROVO.NOVELL.US to SYSTEM.MARKETING. PROVO.NOVELL.US, type

  CX .SYSTEM.MARKETING.PROVO.NOVELL.US

  or

  CX SYSTEM.MARKETING.

- To change to the root when your context is TEST.PROVO.NOVELL, type

  ```
  CX . . .
  ```

  or

  ```
  CX /R
  ```

- To change the complete context from TESTING. PROVO.NOVELL to TESTING.PARIS.NOVELL, type

  ```
  CX .TESTING.PARIS.NOVELL
  ```

- To show all containers in the current context, type

  ```
  CX /CONT
  ```

- To show all containers in the context SALES.NOVELL in a tree structure, type

  ```
  CX .SALES.NOVELL /T
  ```

- To show all containers and leaf objects in the current context in a tree structure, type

  ```
  CX /T /A
  ```

DISABLE LOGIN

Purpose

Use at the server console to prevent users from logging in.

Syntax

```
DISABLE LOGIN
```

Using DISABLE LOGIN

- Use this command to prevent users from logging in when you are making repairs, backing up files, or loading software.
- Users already logged in aren't affected. However, a user who logs out can't log in again until you execute ENABLE LOGIN. See "ENABLE LOGIN" on page 56.

DISMOUNT

Purpose

Use at the server console to make a volume unavailable to users.

Syntax

DISMOUNT ***volume_name***

Parameter	Use to
volume_name	Specify the name of the volume you want to dismount.

Using DISMOUNT

- DISMOUNT allows you to maintain or repair a volume and to upgrade disk drivers while the NetWare® server is up.
- Use this command to dismount all volumes residing on a removable drive before you remove the drive.
- If you are running out of memory and can't add more RAM, consider dismounting a volume that isn't used often.

  Mounted volumes take up memory allocated for file caching and thus affect server performance.
- You can also use NWCONFIG to dismount a volume.

Additional Information

Topic	See
Dismounting a volume	Dismounting a Traditional Volume or Creating a Logical Volume.

DISPLAY ENVIRONMENT

Purpose

Use at the server console to display current search paths and current values of the settable server parameters, along with their default values and range of valid values.

If you use a color monitor as your console, the parameter name appears in white and its current value in yellow.

NOTE: DISPLAY ENVIRONMENT displays only settable server parameters that are not marked as hidden.

Syntax

```
DISPLAY ENVIRONMENT
```

Using DISPLAY ENVIRONMENT

DISPLAY ENVIRONMENT lists the server's current search paths first and then the settable server parameters follow.

The following example illustrates a sample of the command display. Note that the sample begins with the Communications Parameters, just as SET and MONITOR do.

```
PATH=\\BREMEN\SYS\SYSTEM\;C:\NWSERVER;\\BREMEN\SYS\JAVA\BIN\
  ;\\BREMEN \SYS\JAVA\NWGFX\;

  SPX Maximum Window Size: 0
  TCP Defend Land Attacks: ON
  TCP Defend SYN Attacks: OFF
  IP Wan Client Validation: OFF
  Allow IP Address Duplicates: OFF
  IPX Router Broadcast Delay: 0
  Reply To Get Nearest Server: ON
  IPX NetBIOS Replication Option: 2
  Use Old Watchdog Packet Type: OFF
  Number of Watchdog Packets: 10
  Delay Between Watchdog Packets: 59.3 seconds
  Delay Before First Watchdog Packet: 4 minutes
  Console Display Watchdog Logouts: OFF
  Maximum Packet Receive Buffers: 500
  Minimum Packet Receive Buffers: 128
  Maximum Physical Receive Packet Size: 4224
```

```
New Packet Receive Buffer Wait Time: 0.1 seconds
IPX CMD Mode Routing: OFF
Load Balance Local LAN: OFF
Garbage Collection Interval: 5 minutes
Alloc Memory Check Flag: OFF
Reserved Buffers Below 16 Meg: 300
Read Ahead Enabled: ON
Read Ahead LRU Sitting Time Threshold: 10 seconds
Minimum File Cache Buffers: 20
Maximum Concurrent Disk Cache Writes: 4000
Dirty Disk Cache Delay Time: 0.1 seconds
```

Additional Information

Topic	See
List server parameters settings that have been modified from default values	“DISPLAY MODIFIED ENVIRONMENT” on page 44
Restore server parameter settings to their default values	“RESET ENVIRONMENT” on page 162
Descriptions of settable server parameters	“SET” on page 186
Print server parameter settings to a file	Printing Current Parameter Values to a File

DISPLAY INTERRUPTS

Purpose

Use to display currently assigned hardware interrupts, interrupt handlers (also called Interrupt Service Routines or ISRs), and interrupt statistics.

Syntax

DISPLAY INTERRUPTS [*option*]

Option	Use to
(no option)	Display interrupts currently in use.
n ...	Display one or more interrupts by number.
ALL	Display all interrupts.
PROC	Display per-processor interrupt information.
ALLOC	Display allocated interrupts.
REAL	Display interrupts that occurred while the OS was in real mode and that were then reflected back to protected mode to be serviced.

Using DISPLAY INTERRUPTS

When a processor is taken offline or when an interrupt handler (ISR) is removed, the detailed statistics pertaining to that processor or interrupt handler are, by default, removed from memory.

To retain per-processor interrupt handler statistics for offline processors or to retain the total interrupt contribution from a previously loaded handler, change the SET parameter Set Auto Clear Interrupt Statistics to OFF.

Examples

To display interrupts currently in use, enter DISPLAY INTERRUPTS with no options. The display is similar to the following sample:

```
Total Interrupt Count For All Processors: 940208


Interrupt 0: OS Allocated Bus Interrupt 292828
  Interrupt Handler: Timer 0 Interrupt Handler

Interrupt 1: OS Allocated Bus Interrupt 375
  Interrupt Handler: Keyboard Interrupt Handler 375

Interrupt 5: OS Allocated Bus Interrupt 86229
  Interrupt Handler: E100B Hardware ISR 94829

Interrupt 9: OS Allocated Bus Interrupt 30691
  Interrupt Handler: NPA Environment 30691
```

```
Interrupt 12: OS Allocated Bus Interrupt 1299
  Interrupt Handler: PS/2 Mouse Port Interrupt 1299

Interrupt 39: MPS14.PSM Allocated Local Interrupt 0
  Interrupt Handler: APIC Spurious Interrupt Handler
```

Additional Information

Topic	See
Registered system interrupts and interrupt information	MONITOR Available Options > Kernel > Interrupts

DISPLAY MODIFIED ENVIRONMENT

Purpose

Use at the server console to display all server parameter settings that have been modified from default values.

Syntax

DISPLAY MODIFIED ENVIRONMENT

Using DISPLAY MODIFIED ENVIRONMENT

DISPLAY MODIFIED ENVIRONMENT displays the current values of the server parameter settings that have been modified from their default values. Default values are also displayed. When parameter values are changed, the new values are persistent.

The following example shows a portion of the command display:

```
Maximum Concurrent Disk Cache Writes:
       Current Setting: 4000
       Default Setting: 200

Dirty Disk Cache Delay Time:
       Current Setting: 0.1 seconds
       Default Setting: 3.3 seconds
```

```
Auto Restart After Abend:
       Current Setting: 0
       Default Setting: 1

Default Tree Name:
       Current Setting: DT_BREMEN
       Default Setting:
```

Additional Information

Topic	See
List server parameters and display their current settings with defaults and limits	“DISPLAY ENVIRONMENT” on page 41
Restore server parameter settings to their default values	“RESET ENVIRONMENT” on page 162
Print server parameter settings to a file	Printing Current Parameter Values to a File

DISPLAY NETWORKS

Purpose

Use at the server console to list all networks and assigned network numbers that the NetWare® server’s internal router recognizes.

Syntax

DISPLAY NETWORKS

Using DISPLAY NETWORKS

DISPLAY NETWORKS lists the IPX™ external network numbers of networks recognized by this server. The following example illustrates a portion of the command display:

```
0000000D 2/3   00000016 5/11  00000070 5/11
00000097 6/12  000000ED 5/6   000000F1 3/3
000000FF 2/2   00000101 6/11  00000111 5/11
000003E8 5/11  00000456 6/12  00000666 5/17
```

Each address is followed by two numbers separated by a slash.

- The first number is the number of routing hops between your server and the network at that address.
- The second number is the number of ticks (1/18th of a second) required to send a packet to that address.

Additional Information

Topic	See
Listing servers on the network	"DISPLAY SERVERS" on page 48

DISPLAY PROCESSORS

Purpose

Use at the server console to display the status of all processors installed in the server computer and available to the NetWare® operating system.

Syntax

DISPLAY PROCESSORS [***n*** **...]**

Parameter	Use to
(no parameter)	Display online or offline status of all processors.
n ...	Specify the number of the processor for which you want to display status. By using spaces to separate processor numbers, you can display the status of more than one specific processor.

Using DISPLAY PROCESSORS

DISPLAY PROCESSORS lists the online or offline status of all processors. The following example illustrates the command display when all four processors are online:

```
Processor 0 is ONLINE.
  Processor 1 is ONLINE.
  Processor 2 is ONLINE.
  Processor 3 is ONLINE.
```

If you have a color monitor for your console, the output appears in green for online processors and in red for offline processor.

Additional Information

Topic	See
Stopping secondary processors	“STOP PROCESSORS” on page 257
Starting secondary processors	“START PROCESSORS” on page 255
Starting processors automatically when Platform Support Module is loaded	SET “Multiprocessor Parameters” on page 218
Adjust load balancing threshold	SET “Multiprocessor Parameters” on page 218
Display per-processor interrupts and interrupt information	“DISPLAY INTERRUPTS” on page 42
Display per-processor information	“CPUCHECK” on page 36
Display per-processor information	“MONITOR” on page 103 MONITOR Available Options > Kernel > Processors

DISPLAY SERVERS

Purpose

Use at the server console to view a list of IPX™ servers and services being advertised by Service Advertising Protocol (SAP) packets.

Syntax

DISPLAY SERVERS [*string*]

Parameter	Use to
(no parameter)	Display a list of all servers the IPX internal router is aware of.
string	Specify the name of the server for which you want to display information. The string can include an asterisk (*) as the last character. In this case, the system displays a list of all servers the names of which begin with the string. For example, DISPLAY SERVERS D* displays a list of all servers with names beginning with the letter D.

Using DISPLAY SERVERS

- DISPLAY SERVERS lists server address names for services such as

  File services
  eDirectory
  Print services
  Storage Management Services™ (SMS™)
  Services for Structured Query Language (SQL) servers

- The following sample shows the beginning of a typical display:

```
AAA        4    ACAPULCO   5    AIRBUS     7
ANATOL     4    ASSURE1    4    ASSURE2    4
BEAST      3    BANCROFT   6    BREMEN     3
```

The number listed after the server name indicates the number of routing hops between this server and the listed servers. Your server is indicated by 0 hops

Servers more than 16 hops away aren't recognized.

- DISPLAY SERVERS also displays eDirectory trees and network addresses. A server can be displayed many times, once for each service that it advertises.

  For example, a NetWare server running IPX would be listed at least twice because it would use SAP both for eDirectory and for advertising file services.

Additional Information

Topic	See
Listing networks	"DISPLAY NETWORKS" on page 45

DOWN

Purpose

Use at the server console to execute an orderly shutdown of the NetWare® server before either

- Turning off power to the server, or
- Rebooting NetWare with new parameters or accessing DOS files

Syntax

```
DOWN
```

Using DOWN

- DOWN ensures data integrity by writing cache buffers to disk, closing files, and updating Directory tables and File Allocation Tables.

  If you turn off power without using DOWN first, changes held in cache buffers will be lost.

- DOWN executes a shutdown.ncf file if one is present.

  For example, although most modules, including those in protected address spaces, unload automatically when you down or restart the server, some modules might require that you unload them individually first.

  You can unload them manually at the server prompt. Or you can simply place the UNLOAD commands in a shutdown.ncf file. (Run the MODULES command to determine address spaces for specific modules.)

Additional Information

Topic	See
Bring down the NetWare server	Starting and Stopping the Server
Restart the server without rebooting it	"RESTART SERVER" on page 166
Creating server batch files	Using Server Batch Files
Determine the address space a module is loaded in	"MODULES" on page 101

DSDIAG (DS DIAGNOSTICS)

Purpose

Use at the server console to

- Document your current eDirectory™ configuration
- Check the health of your eDirectory tree
- Diagnose or pinpoint problems

Syntax

[LOAD] [*path*]DSDIAG

Parameter	Use to
path	Specify the path to DSDIAG.NLM if you moved it from the default directory of SYS:SYSTEM.

Additional Information

Topic	See
Using DSDIAG	F1 in the utility

DSMERGE

Purpose

Use at the server console to

- Merge the roots of two separate eDirectory™ trees
- Rename a tree to verify that all servers in the eDirectory tree are responding properly and have the same tree name
- View time synchronization information and display the time server for all servers in the tree

Syntax

[LOAD][*path*]DSMERGE

Parameter	Use to
path	Specify the path to DSMERGE.NLM if you moved it from the default directory of SYS:SYSTEM.

Things to Consider before Merging Trees

- Before merging two trees, make sure that time synchronization is operating correctly, and that both trees are synchronized. DSMERGE allows the merge to complete if the time on the source tree is behind 5 minutes of the target tree time, but not ahead of the target tree time.
- When merging very wide trees with long subordinate names or many subordinate names (500 or more), the error -251 OS: ERR_NO_SUCH_PROPERTY is returned. Rename the objects using shorter names or reduce the number of subordinates.

- When preparing a NetWare® 4.1x tree for a merge, use DSREPAIR v4.56 or later to import the schema. Previous versions of DSREPAIR import the schema for NetWare 6 incorrectly.
- Partition synchronization operations generally complete quickly after a merge, but in some cases can take several hours. Use DSREPAIR to check synchronization status before performing a merge to ensure that replica synchronization processes are occurring properly.
- If you will merge trees where both your source and target tree contain Security containers, one of the Security containers must be deleted to successfully complete the merge. The Security container is located in [Root] of the eDirectory tree. Deleting the Security container could have serious consequences for the eDirectory tree Certificate Authority and Key Material objects. See the *Novell Certificate Server Administration Guide* for more information on this issue.

Additional Information

Topic	See
Configuring time synchronization	*Network Time Management Administration Guide*
Using DSMERGE	F1 in the utility

DSREPAIR

Purpose

Use at the server console to repair and correct problems in the eDirectory™ database. Such problems might include bad records, schema mismatches, bad server addresses, and external references. DSREPAIR can also perform advanced changes to the eDirectory schema.

DSREPAIR

- Performs structure checks of the database automatically without closing the database and without user intervention.
- Performs index checks.

- Repairs the database without closing the database or locking out users.
- Reclaims free space by discarding empty records.

If the server abends, use DSREPAIR to verify the integrity of the eDirectory database after restarting the server.

Syntax

[LOAD][*path*]DSREPAIR [-U|-A]

Option	Use to
path	Specify the path to DSREPAIR.NLM if you are not running it from SYS:SYSTEM.
-U	Perform a full unattended repair and exit automatically upon completion.
-A	Make advanced (and possibly destructive) replica and partition options available in the DSREPAIR menus.

DSREPAIR Options

Unattended Full Repair

An unattended full repair performs all possible repair operations that do not require your input. This is the suggested means of repair unless you are told by Novell® technical support to perform other operations manually.

The log file is displayed by default when the repair completes. The log file is a text file named DSREPAIR.LOG, stored in the SYS:SYSTEM directory.

Time Synchronization

Select this option to determine whether this server has synchronized its clock with other servers on the network. Since replica synchronization depends on time stamps, replica synchronization can be delayed until time synchronization is achieved.

When changing a read/write replica to a master, make sure the time synchronization on the server is working correctly so the changes will happen in a timely manner.

NOTE: eDirectory operates on “synthetic time” if true synchronization has not been accomplished. Synthetic time is generated when the time stamp on a replica of a partition is ahead of the actual server time. eDirectory conducts its normal operations fully on synthetic time, but some partition and replication work can be delayed until time is synchronized.

If time is not synchronized to the network, server clocks are automatically adjusted in small increments until synchronization is achieved. In this case, no user intervention is required.

The Time Synchronization option of DSREPAIR generates a warning message if synchronization has not completed within twelve hours. In this case, you should troubleshoot your time server configuration.

Report Synchronization Status

This option gets replica synchronization status from all servers that hold replicas of the same partitions held on this server. It also reports other eDirectory errors associated with those servers or replicas. Use this option to determine whether you need to repair replicas, resolve communications problems, or initiate some other action.

Error code descriptions are in the Novell Error Code online documentation (http://www.novell.com/documentation/lg/nwec/docui/index.html).

Repairing Network Addresses

Repair Network Addresses (RNA) checks the network address for every server in the local eDirectory database files by searching the local SAP tables if IPX is enabled or by using SLP in an IP-only environment.

Each address is then compared to the NetWare® Server object’s Network Address property and the address record in each Replica property of every partition [ROOT] object. If the addresses are different, they are updated to be the same.

If the server address is not found in the SAP table or through SLP, no other repair is performed.

Additional Information

Topic	See
Using DSREPAIR	F1 in the utility

DTRACE

Purpose

DTRACE is a menu-driven trace utility used with U.S. Robotics* ISDN Allegra adapter with FXPRI.LAN and FXBRI.LAN ISDN drivers.

EDIT

Purpose

Use at the server console to create or modify a text file on either a DOS or NetWare® partition.

Syntax

[LOAD] [*path*]EDIT [*pathname*]

Parameter	Use to
path	Specify the path to edit.nlm if you moved it from the default directory (C:\nwserver)
pathname	Specify the pathname of the file you want to edit.

Using EDIT

- If you don't enter a pathname when you load EDIT, EDIT displays a dialog box where you can enter the pathname.

  You can also press Insert to display a browse window from which you can select a file. To see the contents of a volume or directory, highlight the volume or directory name in the window and press Enter. Use the arrow keys to scroll up and down the list of files and directories. When the file you want to edit is highlighted, press Enter to select and display the file.

- If the file doesn't exist, EDIT displays a prompt asking if the file should be created.

- When you create a new file, the file can be no larger than 8 KB. Each time you open the file after that, you can increase the file size by up to 4 KB.

- You can use EDIT to view read-only files.
- EDIT is particularly useful for creating .ncf batch files that automatically execute server commands.

Additional Information

Topic	See
Creating and editing text files on the server	Using EDIT to Create and Edit Text and Batch Files

ENABLE LOGIN

Purpose

Use this command at the server console prompt to

- Reenable the login function after using DISABLE LOGIN.
- Enable the supervisor account when the account has been locked by the intruder detection function. (The supervisor account exists only on bindery-based servers or on NetWare® 4 servers when bindery emulation is active.)

Syntax

```
ENABLE LOGIN
```

Using ENABLE LOGIN

You don't need to use ENABLE LOGIN when you start the NetWare server or workstation. The login function is enabled during the startup process.

Enhanced SBACKUP

Purpose

Use at the server console to back up and restore Storage Management Services™ (SMS™) targets such as eDirectory, binderies, the file system, or hard disks on workstations to media for off-site storage.

Starting Enhanced SBACKUP

Certain prerequisites must be met before loading the backup software. See *Storage Management Services Administration Guide* in the NetWare 6 online documentation.

A series of NetWare modules must be loaded in sequence:

1. Type **smdr**. This loads the backup submitter so the backup software on the server can communicate with the TSA.
2. Enter the full context of your user name.
3. Enter the administrator password.
4. Type **tsa600**. This loads the TSA for NetWare 6.
5. Type **smsdi**.
6. Type **qman**. This creates a queue.
7. Type **sbsc**.
8. Type **sbcon**. This loads the backup engine.

You can also back up data from a Windows* 95* or Windows NT* workstation by starting NWBACK32 (SYS:public\nwback32.exe).

Using Enhanced SBACKUP

When you type **sbcon**, the backup engine loads, and the main menu appears. Make your selections from this screen. Press F1 for Help.

Additional Information

Topic	See
Storage Management Services	Storage Management Engine (SME) in the *Storage Management Services Administration Guide*

FILTCFG

Purpose

Use at the server console to set up and configure filters for IPX™, TCP/IP, and AppleTalk* protocols.

Syntax

```
[LOAD] FILTCFG
```

Using FILTCFG

Filters help you control what kind of information is sent and received by a router by selectively discarding packets of specified types.

Filters help you to limit specific kinds of traffic to a certain part of your network, or to provide security.

The NetWare® operating system provides the following filter types:

- Packet forwarding
- Service information
- Routing information

The following table shows filtering support for protocols:

Table 1 Filtering Support for Protocols

Protocol	Packet Forwarding Filter	Service Information Filter	Routing Information Filter
IPX	X	X	X
AppleTalk		X	X
TCP/IP	X		X

Packet Forwarding Filters

Packet forwarding filters restrict access to services by filtering data packets sent by the restricted location to the service location.

Because these filters don't restrict Service Advertising Protocol (SAP) packets sent by servers, restricted users might see advertisements of services even when they cannot access the service.

Although these filters provide the highest level of security of all the filters, they might affect the performance of the router because the filters are applied to each data packet the router receives.

Service Information Filters

Service information filters restrict service advertisement on a router's internetwork.

This type of filtering provides low-level security by preventing users from finding the network addresses of services.

It also reduces the network bandwidth consumed by periodic service broadcasts.

Service information filters are of two types:

- Service advertisement filters limit the service advertisements sent by a router for a specified set of services to a specified set of networks.
- Service acceptance filters limit the acceptance of service advertisements received by the router for a specified set of services at a specified set of networks. (By filtering what a router sees, you are restricting the set of services that are advertised by the router on any other interface.)

Routing Information Filters

Routing information filters restrict the exchange of routing information between routers by limiting the routes added to the routing tables of specified routers.

These filters increase network security by limiting the visibility of specified networks. They also reduce the bandwidth used by the periodic exchange of routing information between routers.

Routing information filters are of two types:

- Route advertisement
- Route acceptance

When you add a routing information filter, an implicit server filter is also added for all services residing on the filtered networks.

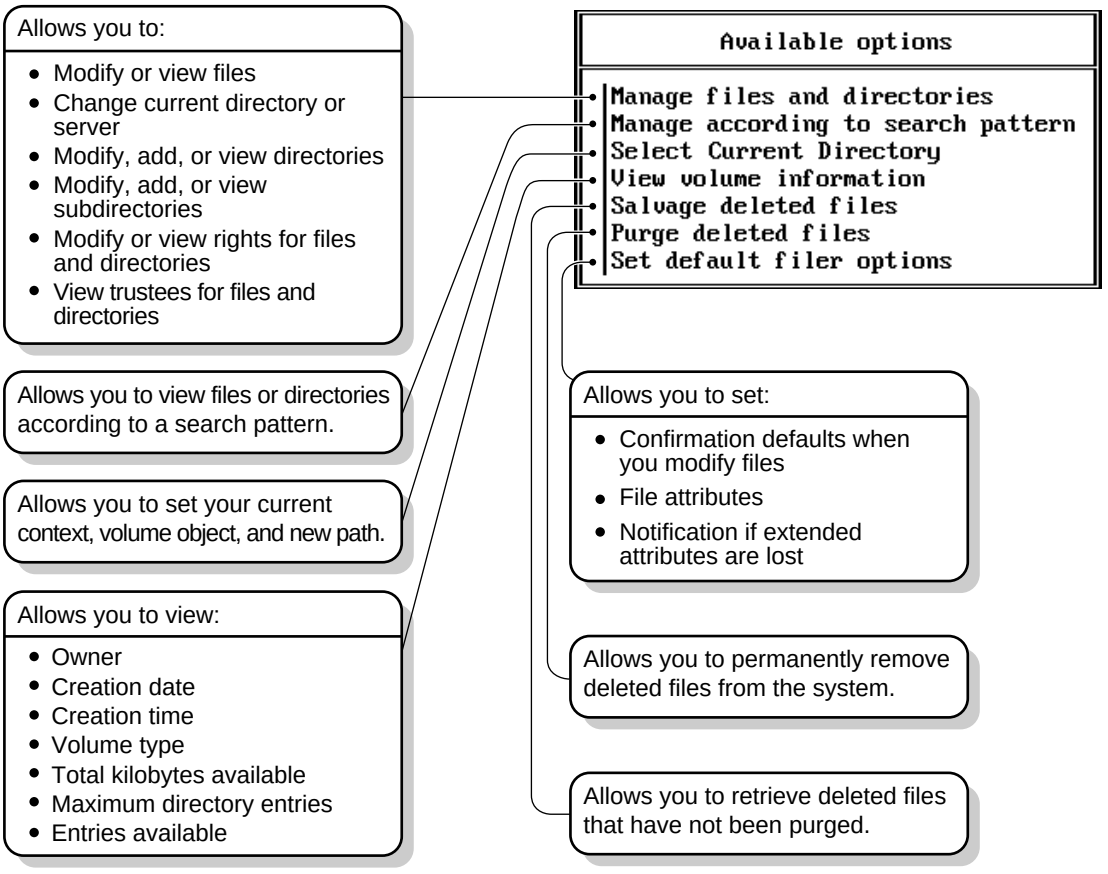
FILER

Purpose

Use at a workstation to manage files and directories. FILER works with the file system; it doesn't affect eDirectory objects.

Figure 1 on page 61 shows the functions of FILER.

Figure 1 FILER Functions



FLAG

Purpose

Use at a workstation to

- View or modify file and directory attributes to determine which operations can be performed with the file or directory
- Modify the owner of a file or directory
- View or modify the search mode of executable files to determine how the program uses search drives when looking for a file

Syntax

SYS:PUBLIC\FLAG.EXE *path* [[+ | -] *attribute*...] [/ *option*...] [/? | /VER]

Parameter	Use to
(no parameter)	If you type FLAG with no parameters, the attribute status of all the files in the current directory appears.
path	Specify the path to the file or directory whose attributes or search modes you want to modify.
+ | -	Add attributes to a file or directory with the + (plus). Remove attributes from a file or directory with the - (minus). If neither + nor - is used, the attributes will be assigned to the file/directory as specified. If you add and remove attributes in the same command, group all + (plus) attributes together and all - (minus) attributes together.
attribute	Specify one or more file or directory attributes. See “Directory Attributes” on page 64 and “File Attributes” on page 64.
/*option*	Replace option with any available option. See “General FLAG Options” on page 63.
/?	View online help. All other parameters are ignored when /? is used.
/VER	View the version number of the utility and the list of files it uses to execute. All other parameters are ignored when /VER is used.

NOTE: For help with tasks, press F1 in the utility.

Using FLAG

- Use FLAG options to add or delete directory and file attributes, as defined in the preceding parameters table.

  For attributes that can be applied to directories, see "Directory Attributes" on page 64.

  For attributes that can be applied to files, see "File Attributes" on page 64.
- When you add or delete multiple attributes, include a space between attribute abbreviations.
- You can't remove the Execute Only attribute. You must delete the file and then reinstall it.
- You can use wildcard characters.

General FLAG Options

Option	Use to
/NAME | GROUP = *name*	Change the owner of a file or directory.
/D	View details about a file or directory.
/DO	View or modify only directories in the specified path.
/FO	View or modify only files in the specified path.
/OWNER=*name*	View all files or directories owned by a user.
/M=*mode*	Modify search modes of executable files. See "Search Modes for Executable Files" on page 66.
/S	Search the subdirectory in the specified path and any subdirectories below that level.
/C	Scroll continuously through output.

Directory Attributes

Option	Use to
ALL	Specify the Di, H, Ic, P, Ri, and Sy attributes as a group. Primarily used to assign directories these specific attributes.
Di (Delete Inhibit)	Prevent the directory from being deleted.
Dc (Don't Compress)	Prevent the directory from being compressed (regardless of what the volume is set to).
Dm (Don't Migrate)	Prevent the directory from being migrated to a secondary backup system (regardless of what the volume is set to).
H (Hidden)	Prevent the directory from being seen with a DOS DIR command.
Ic (Immediate Compress)	Compress the directory as soon as the OS can.
N (Normal)	Specify no attributes.
P (Purge)	Purge the directory immediately when the directory is deleted.
Ri (Rename Inhibit)	Prevent the directory from being renamed.
Sy (System)	Prevent the directory from being seen with a DOS DIR command; also to prevent it from being copied or deleted.

File Attributes

Option	Use to
ALL	Specify the A, Ci, Di, H, Ic, P, Ri, Ro, Sh, Sy and T attributes as a group. Primarily used to assign files these specific attributes.
A (Archive needed)	Indicate that the file has been modified since the last backup.
Ci (Copy Inhibit)	Prevent files from being copied. (Only for MAC files.)

Option	Use to
Dc (Don't Compress)	Prevent a file from being compressed (regardless of what the volume or directory is set to).
Di (Delete Inhibit)	Prevent a file from being deleted or copied over.
Dm (Don't Migrate)	Prevent a file from being migrated to a secondary backup system (regardless of what the volume or directory is set to).
Ds (Don't Suballocate)	Prevent an individual file from being suballocated, even if suballocation is enabled for the system. Use on files which are enlarged or appended to frequently, such as certain database files.
H (Hidden)	Prevent a filename from being displayed with the DOS DIR command. The file can't be copied or deleted.
Ic (Immediate compress)	Compress a file as soon as the OS can.
N (Normal)	Specify the Rw attribute.
P (Purge)	Purge a file immediately if the file is deleted.
Ri (Rename Inhibit)	Prevent a file from being renamed.
Ro (Read Only)	Allow a file to only be read; it can't be written to or deleted (in other words, Ro includes Ri and Di).
Rw (Read Write)	Allow a file to be read and written to.
Sh (Shareable)	Allow a file to be used by several users simultaneously.
Sy (System)	Prevent a filename from being displayed with the DOS DIR command. It can't be copied or deleted.
T (Transactional)	Protect a file by using the Transaction Tracking System™.
X (Execute Only)	Prevent a file from being copied or copied over. This attribute can be given only to .EXE or .COM files, *and cannot be removed.*

Search Modes for Executable Files

IMPORTANT: The syntax is /M=*mode*. Replace *mode* with a mode number from the following table.

Mode	Use to
0	Search for instructions in the NET.CFG file (the default mode).
1	Search the path specified in the file. If there is no path, the file searches the default directory, and then all search drives.
2	Search the path specified in the file. If there is no path, the file searches only the default directory.
3	Search the path specified in the file. If there is no path, the file searches the default directory; then if the open request is read only, the file searches the search drives.
4	Reserved; don't use.
5	First search the path specified and then all search drives. If there is no path, the file searches the default directory and then all search drives.
6	Reserved; don't use.
7	First search the path specified. If the open request is read only, the file searches the search drives. If there is no path, the file searches the default directory and then all search drives.

Status Flags

NOTE: Status flags show attribute information for a file or directory. You can't change these flags.

Status	Indicates
Cc (Can't Compress)	The file can't be compressed because of limited space savings.
Co (Compressed)	The file has been compressed.
M (Migrated)	The file has been migrated.

Examples

- To add Rw and Ic and remove Di and A from all files in the current directory, enter

  ```
  FLAG *.* +R W Ic -Di A
  ```

- To view attributes for file STUDENTS in directory SYS:\COURSE\WINTER, enter

  ```
  FLAG SYS:\COURSE\WINTER\STUDENTS
  ```

- To give files in drive G: the Hidden attribute, enter

  ```
  FLAG G:*.* H /FO
  ```

- To set the search mode to 7 for all executable files in the current directory, enter

  ```
  FLAG *.* /M=7
  ```

- To set the search mode to 1 and assign all files in the current directory the Read Write attribute, enter

  ```
  FLAG *.* RW /M=1
  ```

FRCON

Purpose

Use FRCON to view NetWare® Link/Frame Relay™ interface configuration and statistical information.

FRTRACE

Purpose

The Frame Relay Trace utility (FRTRACE) can be used locally at the router or server console, or remotely from a workstation that is running RCONSOLE.

HELP

Purpose

Use at the server console to view the syntax, a brief description, and an example of a console command.

Syntax

HELP [*console command*] [ALL]

Parameter	Use to
(no parameter)	View a list of all console commands.
console command	Specify the name of the console command you want to view help for.
ALL	View a short description of each console command. Press Enter after each description to view the next description. Press Esc to exit.

Examples

- To view help for LIST DEVICES, type

  HELP LIST DEVICES

- To view a description of each command, type

  HELP ALL

INETCFG

Purpose

Use at the server console to set up and customize your internetworking configuration for IPX™, IP, and AppleTalk*.

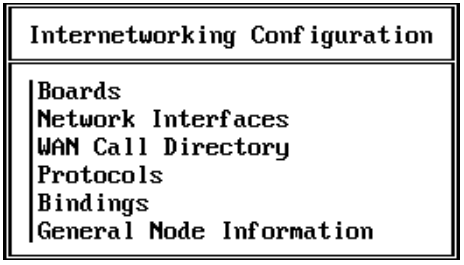
INETCFG simplifies the process of configuring local area networks (LANs) to work with network and routing protocols supported by NetWare®.

Syntax

[LOAD] INETCFG

Using INETCFG

When you load INETCFG, the Internetworking Configuration menu appears, as shown in the following figure. You access INETCFG features from this menu.



Menu options are described in the following table.

Option	Use to
Boards	Select and configure boards. To configure a board, you select a driver, assign a name to the board, and specify values for the board parameters. Each driver that is compatible with NetWare has a driver description file, sometimes called the LDI file. The LDI file defines the parameters necessary for the driver to operate with the board you select. It also specifies the valid range of values for each parameter. If a driver has an LDI file, the parameters are presented in the Board Configuration window; you simply select a value for each parameter. If a driver has no LDI file, you must enter the values yourself in the Board Parameters field.
Network Interfaces	Applies only to wide area network (WAN) configurations for multiple interface WAN boards. (NetWare does not support WANs.)
WAN Call Directory	Applies only to WAN configurations. (NetWare does not support WANs.)
Protocols	Select and configure network protocols. To configure a protocol, you select the protocol, such as IPX or IP, and configure the protocol-specific parameters that pertain to routing, packet forwarding, etc.
Bindings	◆ Bind a network protocol to an interface. ◆ Configure protocol and interface-specific parameters, such as frame type, network number (for IPX), local IP address (for IP), and zone information (for AppleTalk). ◆ Delete a bound interface from the configuration.
Manage Configuration	Specify Simple Network Management Protocol (SNMP) information, such as the SNMP device name, hardware description, physical location, and human contact for the server or router.

Option	Use to
View Configuration	◆ View the INETCFG configuration information file and the console messages captured during system initialization ◆ Import or export configuration information to or from a diskette.

INETCFG records information in various configuration (.CFG) files located in SYS:\ETC. Some of these files are present at system startup; others are created by INETCFG, depending on what you configure. Here is a partial list of these files:

- AURP.CFG
- TCPIP.CGF
- IPXSPX.CFG
- NLSP.CFG
- NETINFO.CFG

WARNING: INETCFG creates these files strictly for its own use; do not delete them or change their contents.

Additional Information

Topic	See
Capturing console messages	“CONLOG” on page 31

INITIALIZE SYSTEM

Purpose

Use at the server console to enable the multiprotocol router configuration by executing all commands in the system NETINFO.CFG file.

Syntax

```
INITIALIZE SYSTEM
```

Using INITIALIZE SYSTEM

This command is typically executed from the INITSYS.NCF file during server startup.

WARNING: Executing INITIALIZE SYSTEM on a system that has already been initialized can generate errors when the system discovers that the commands in the NETINFO.CFG file have already been executed.

Additional Information

Topic	See
Server startup	“SERVER” on page 184

INSTALL

In the NetWare® 5 release, the INSTALL utility was replaced by the NWCONFIG utility.

See “NWCONFIG” on page 135.

IPXCON

Purpose

Use at the server console to

- Monitor and troubleshoot IPX™ routers and network segments throughout your IPX internetwork
- View the status of an IPX router or network segment
- View all paths through which IPX packets can flow
- Locate all active IPX routers on your internetwork
- Monitor remote IPX routers that are running NetWare® IPX Router software

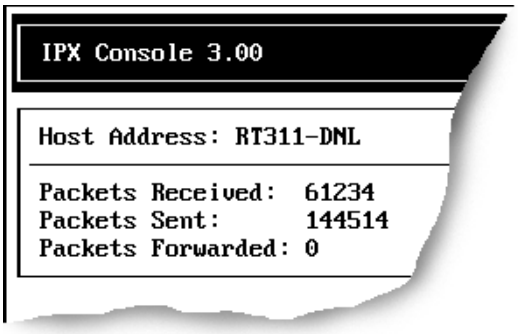
Syntax

```
[LOAD] IPXCON [/P]
```

Parameter	Use to
/P	View the Link State Packets (LSPs) received by the router, if the remote router is running NetWare Link Services Protocol™ (NLSP™).

Using IPXCON

When you load IPXCON, the top of the screen displays a summary of routing statistics for the selected router. (The following figure shows a partial display of routing statistics.) The bottom of the screen displays an Available Options menu.



The following table explains the fields in the summary display. Because IPXCON is a real-time monitor, these fields are always active, and some values in the fields change as the router processes IPX packets.

Field	Explanation
Host Address	Name of the router being monitored.
Packets Received	Number of IPX packets received by the selected router.
Packets Sent	Number of IPX packets sent by the selected router.
Packets Forwarded	Number of IPX packets forwarded by the selected router.
Circuits	Number of circuits in use on the router. A circuit is a logical attachment to a network segment through which a router can reach other systems. A circuit can be a local or wide area connection.
Networks	Number of networks known to the selected router.
Services	Number of services that can be reached from the selected router.

The Available Options menu allows access to additional features of IPXCON. These features are described in the following table.

Option	Use to
SNMP Access Configuration	Select the server you want to monitor. You can monitor the local system, which is the default, or a remote system. You can monitor the remote system through IPX or TCP/IP. You can also set the poll interval to specify how often the information will be retrieved through SNMP.

Option	Use to
IPX Information	View statistics for the selected router's IPX packet routing. To display additional packet routing statistics, select Detailed IPX Information from the bottom of the IPX Information window.
IPX Router Information	View general information about the selected IPX router.
NLSP Information	View the following NLSP information about the selected router: System information Area addresses Neighbors Routers LANs LSPs To view the Link State Packets (LSPs) received by the system, load IPXCON by typing **`[LOAD] IPXCON /P`** The LSP option is enabled only if the server is running NLSP.
Circuits	View circuit information.
Forwarding	View the Forwarding table.
Services	View information for the currently reachable services.

- IPXCON uses Simple Network Management Protocol (SNMP) to exchange management information and operational statistics with remote IPX routers.
- IPXCON operates over both IPX and TCP/IP networks.
- To execute IPXCON automatically each time you boot the server, add the LOAD IPXCON command after the INITSYS.NCF line in your AUTOEXEC.NCF file.

IPXPING

Purpose

Use at the server console to check connectivity to an IPX™ server on your internetwork.

Syntax

```
[LOAD] IPXPING
```

Using IPXPING

- IPXPING sends an IPX ping request packet to an IPX target node (server or workstation). When the target node receives the request packet, it sends back a reply packet.
- To select an IPX server or workstation, enter its IPX internal network number and node number.

  You can also specify the number of seconds between each request packet transmission.
- To start sending request packets, press Esc. The sending node continues to send request packets and collect response time statistics until you press Esc again to exit IPXPING.
- Request and reply packets use the same format; each packet contains the standard IPX header.
- To add other nodes, press Insert and select another server.

IPXS

Purpose

Provides IPX™ protocol to NLM™ programs that require STREAMS-based IPX.

Syntax

```
[LOAD] [path]IPXS [LDFILE = [path]filename[.ext]]
```

Parameter	Use to
path	Specify the path to IPXS.NLM if you moved it from the default directory.
LDFILE = [*path*]*filename*[.*ext*]	(Optional) Specify a filename that contains the SAP filtering, SAP and RIP timers, and IPX configuration parameters. **Note:** If you don't specify a filename, IPXS sets the parameters defined in the IPXSPX.CFG file. If you don't specify a file extension, the default is .CFG. For example, to load an alternate configuration file, type [LOAD] IPXS LDFILE = IPXSPX2.CFG

Using IPXS

NOTE: The IPXSPX.CFG file is modified from the INETCFG utility when you set SPX/IPX™ parameters.

- When you load IPXS, STREAMS is autoloaded.
- IPXSPX.CFG contains the Service Advertising Protocol (SAP) filtering, SAP and Router Information Protocol (RIP) timers, and the IPX configuration defaults.
- You can create multiple configuration files in addition to IPXSPX.CFG. Use this feature if you frequently alternate between two or more IPX/SPX™ configurations.

  To create multiple configuration files, copy the IPXSPX.CFG file to a new filename (IPXSPX2.CFG, for example). Then you can change the IPXSPX.CFG file (by using INETCFG) and still preserve the original configuration in the IPXSPX2.CFG file.
- To load a configuration file other than the default IPXSPX.CFG file, use the LDFILE option.

  For example, if you have a second configuration file called IPXSPX2.CFG, you can load that configuration by typing

  `[LOAD] IPXS LDFILE = IPXSPX2`

Additional Information

Topic	See
Filtering RIP and SAP packets using SET	“SET” on page 186
Filtering RIP and SAP packets using FILTCFG	“FILTCFG” on page 58
Setting IPX parameters using SET	“SET” on page 186
Setting IPX parameters using INETCFG	“INETCFG” on page 69

JAVA

Purpose

Load at the server console to start the Novell® JVM for NetWare® product. The Novell JVM product is comprised of several NLM™ programs that let the NetWare server run Java*-based applications and applets, including multi-threaded applications and applications that use a graphical interface.

Syntax

```
[LOAD] JAVA
```

Using JAVA

- You must load the JVM before you can run Java-based applications and applets on the server and before you can set necessary environment variables.
- Starting the NetWare servertop automatically loads the JVM.

Additional Information

Topic	See
General information about NetWare Java-based components	Java-Based Components of NetWare
Using Java on the NetWare Server	Using Java on the Server

KEYB

Purpose

Use at the server console to change the console keyboard type to the language of your keyboard.

The language you specify with KEYB must match the language of your keyboard, not the server language.

IMPORTANT: Changing the keyboard type causes some keys to represent different characters. Therefore, do not use this command unless you have the appropriate keyboard for the language you are specifying and you are familiar with the keyboard's use.

Syntax

[LOAD] [*path*]KEYB [*keyboard_type*]

Parameter	Use to
(no parameter)	View a list of available keyboard types.
path	Specify the path to keyb.nlm if you moved it from the default directory.

Parameter	Use to
keyboard_type	Specify one of the following keyboard types: Belgium Brazil Canadian French Denmark France Germany Italy Japan Latin America Netherlands Norway Portugal Russia Spain Sweden Swiss French Swiss German United Kingdom United States U.S. International

Using KEYB

To change the keyboard type, unload KEYB and then reload it, specifying the new keyboard type parameter.

LANGUAGE

Purpose

Use at the server console to set the language for subsequently loaded modules.

NOTE: LANGUAGE does not change the language of the operating system or of currently loaded modules.

The LANGUAGE command gives the modules access to directories containing message files in the specified language. This directory structure is under sys:system as follows:

sys:system\nls*language_number*

Syntax

LANGUAGE [*language_name* | *number*] [LIST | REN *number new_name*]

Parameter	Use to
(no parameter)	View the current language setting for modules.
language_name | *number*	Specify a language by its name or number.
LIST	Display a list of language names and numbers. (Not all languages in the list are supported.)
REN *number new_name*	Rename a language specified by a language number. The syntax is: LANGUAGE REN *number new_name*

Examples

- To set a module to use the German message files, type

  LANGUAGE GERMAN

  or

  LANGUAGE 7

- To change the name of Spanish to Espanol, type

  LANGUAGE REN 14 ESPANOL

- To display a list of language names and numbers, type

  LANGUAGE LIST

LIST DEVICES

Purpose

Use at the server console to display a list of the storage devices on the server and to register new devices with the server's Media Manager database.

A device can be a disk drive, magneto-optical disc drive, CD-ROM, or any other physical device.

Syntax

```
LIST DEVICES
```

Using LIST DEVICES

LIST DEVICES forces a scan for devices , displays the return list of storage devices, and registers any new devices with the Media Manager database. This command does not simply read the database.

When you are installing new storage devices, you can load drivers with a no scan parameter, and then run LIST DEVICES so that drivers will find their devices simultaneously.

The command output is returned by the device drivers. The information for each storage device includes the device number and name, as well as additional information that varies by device and by manufacturer.

Following is an example of a device listing:

```
0x0001:[V023-A0-D0:0] SEAGATE ST31051N rev:0530
  0x0002:[V023-A0-D0:1] NEC CD-ROM DRIVE:500 rev:2.5
```

The hexadecimal integer at the beginning of the line is the device's Media Manager object ID.

The bracketed numbers comprise the device name that identifies the storage device, as follows:

- **Vendor number.** A unique number specific to the device vendor
- **Adapter number.** The instance number of an adapter registered with Media Manager. In the example, A0 identifies the first instance of an adapter installed in the server.
- **Device number.** The number of the disk or other device.For a SCSI disk, this is the SCSI ID, usually set by a jumper on the hard disk.

  For an IDE disk, this number represents the bus from the IDE controller. IDE numbers range from D0 through D3, representing the primary, secondary, tertiary, or quaternary bus.
- **Logical unit number (LUN).** The LUN identifies individual devices when more than one device is attached to one bus.

  For example, one IDE bus can be attached to two disks, a master and a slave. LUN 0 represents the master and LUN 1 represents the slave.

However, because disk manufacturers rarely use the logical unit number to identify hard disks, the LUN almost always appears as 0.

The driver's version or revision number appears at the end of the line.

Additional Information

Topic	See
Read the Media Manager database and display a list of registered storage devices and controllers	"LIST STORAGE ADAPTERS" on page 83
Scan for new SCSI devices and register them with the Media Manager	"SCAN FOR NEW DEVICES" on page 177
Scan for all SCSI devices or a specified SCSI device and register new devices with the Media Manager	"SCAN ALL" on page 176
Storage device drivers	Drivers for Host Adapters and Storage Devices
Determine the operating status of a storage device	Activating and Deactivating a Hard Disk
Mounting and dismounting a CD-ROM device	Managing Removable Media Devices

LIST STORAGE ADAPTERS

Purpose

Use at the server console prompt to display a list of registered storage adapters and the devices they drive. The information is read from the Media Manager database.

Syntax

```
LIST STORAGE ADAPTERS
```

Examples

Following is an example of a listing of a server's storage adapter and the associated storage device:

```
[V025-A0] NOVELL IDE HOST ADAPTER MODULE
    [V025-A0-D1: 0] QUANTUM FIREBALL_TM3840a
```

The first line in the example identifies an IDE disk adapter. The second line identifies a hard disk operated by that adapter. The second line is indented to indicate that the device is associated with the adapter in the preceding line.

The bracketed numbers at the beginning of each line comprise the device name. The device name identifies the adapter or device, as follows:

- **Vendor number.** A unique number specific to the device vendor.
- **Adapter number.** The instance number of an adapter registered with NWPA. In the example, A0 identifies the first instance of an adapter installed in the server.
- **Device number.** The number of the disk or other device.For a SCSI disk, this is the SCSI ID, usually set by a jumper on the hard disk.

  For an IDE disk, this number represents the bus from the IDE controller. IDE numbers range from D0 through D3, representing the primary, secondary, tertiary, or quaternary bus.
- **Logical unit number (LUN).** The LUN identifies individual devices when more than one device is attached to one bus.

  For example, one IDE bus can be attached to two disks, a master and a slave. LUN 0 represents the master and LUN 1 represents the slave.

  However, because disk manufacturers rarely use the logical unit number to identify hard disks, the LUN almost always appears as 0.

Additional Information

Topic	See
Scan devices and register new devices with Media Manager	"LIST DEVICES" on page 81
Scan for new SCSI devices and register them with the Media Manager	"SCAN FOR NEW DEVICES" on page 177

Topic	See
Scan for all SCSI devices or a specified SCSI device and register new devices with the Media Manager	“SCAN ALL” on page 176
Storage device drivers	Drivers for Host Adapters and Storage Devices
Determine the operating status of a storage device	Activating and Deactivating a Hard Disk
Mounting and dismounting a CD-ROM device	Managing Removable Media Devices

LIST STORAGE DEVICE BINDINGS

Purpose

Use at the server console to list all Custom Device Modules (CDMs) bound to a particular device.

Syntax

`LIST STORAGE DEVICE BINDINGS` ***`number`***

Parameter	Use to
number	Specify the object number for the device whose CDMs you want to list. To find the object number, enter LIST DEVICES at the console prompt. The object number is the first number on the left. This number is displayed with leading zeros, for example, 0x0001. Do not include the zeros on the command line; for example: **`list storage device bindings 1`**

Using LIST STORAGE DEVICE BINDINGS

When you execute the command, the screen displays information similar to the following:

```
Device: [V312-A0-D0:0] SEAGATE ST32430N rev:0510
  Filter: NetWare Elevator Filter
  Filter: NetWare Sector Conversion Filter
  Base: Novell SCSI Fixed Disk CDM
  HAM: [V312-A0] ADAPTEC PCI Host Adapter Module
```

The first line specifies the device.

The next lines specify the CDMs associated with the device.

- Filters are CDMs that communicate with the storage device. The elevator filter controls messages to and from the storage device, including scatter-gather messages. The sector conversion filter converts sector sizes to standard 512 byte units.
- The Base is the essential CDM required to manage communication with the Host Adapter Module.
- Information about CDMs for changers (called *Enhancers*) might also be displayed.

The last line identifies the Host Adapter Module for the adapter to which the device is connected.

LOAD

Purpose

Use LOAD to link loadable modules to the operating system. Loadable modules include disk drivers, LAN drivers, NLM™ programs, platform support modules, and name space modules.

Use the LOAD command to load application modules to a protected address space, a region of logical memory in user mode (ring 3). Protected modules operate in their own execution environment. You can also mark a protected address space for restart after cleanup.

IMPORTANT: LAN and disk drivers or the MONITOR utility are not candidates for protected address space because they must run in the kernel. For example, MONITOR makes system calls that the call gate doesn't allow between protected space and the kernel.

Use the LOAD command at the server console to load server NLM programs. You can also use LOAD at a workstation running the Novell® Client™ to load client modules. Client NLM programs used by Novell Client load without parameters.

HINT: In most cases you can load an NLM program by simply entering the name of the NLM program at the server console prompt. LOAD is implied. For example, to load monitor.nlm, just enter MONITOR.

The exception is if there is an .ncf file of the same name as the utility. In this case, you must use the LOAD command. Using LOAD tells the server to load the utility instead of executing an .ncf file with the same name.

The following information explains the loading process and load parameters, whether or not you actually use LOAD as part of the command string.

Syntax

[LOAD] [PROTECTED | RESTART | *address_space_name*]
[*path*]*loadable_module_name* [*parameter...*]

Option	Use to
path	Specify the path to the loadable module if you moved it from the default directory.
loadable_module_name	Specify the name of the loadable module. To determine the name, see the documentation for the loadable module.
parameters	Include parameters for the module you are loading. Parameters that can be used with most modules are explained in the following tables. Individual modules may have specific parameters of their own; see the documentation for the loadable module.

Memory Protection Parameters

Parameter	Use to
protected *module_name*	Load one module into a new protected address space. By default the space is named ADDRESS_SPACE*n*, where *n* is a number. If you want to load more than one module into the same address space, use the address space parameter instead of the protected parameter.
restart *module_name*	Load one module into a new protected space with restart functionality. By default the space is named ADDRESS_SPACE*n*, where *n* is a number. Restart functionality means that if the protected space abends, the system closes the space, cleans up its resources, restarts the space, and reloads modules into it.
address space = *address_space_name module_name*	Load one module into a new protected address space with a user-defined name. Use this command when you want to define your own name for the space and when you want to load more than one module into the same address space. You can specify only one module at a time to load into the address space, but you can repeat the command for each module you want to load into the space.

Using LOAD

- When a module is loaded, it links itself to the operating system and allocates a portion of the computer's memory for its use, thus using system resources. When modules are unloaded, allocated resources are returned to the system.

  Some modules, such as LAN drivers and disk drivers, need to be loaded every time the server is booted. To load modules automatically when the server boots, include LOAD commands in the autoexec.ncf or startup.ncf file. (See Using Server Batch Files.)

Other modules, such as MONITOR, can be loaded, used, and then unloaded. Refer to the documentation for the specific module.

- You can load modules in protected address space. Because NetWare supports NLM programs running in user mode (ring 3), server-based network applications, such as GroupWise® or Lotus* Notes* can have their own execution environment.
- You can also load shared libraries such as CLIB in more than one space (point one copy to two places). Multiple instances share code but have different data. Because each instance of the module must be loaded at the same logical address in each address space, that place is reserved across application spaces when you load the shared library in the first address space.
- When you install system and public files on the server, any .nlm and .lan modules are copied to sys:system. The .ham and .nam modules are copied to the boot directory of the server.
- The installation of LAN drivers can be best accomplished with NWCONFIG. This means that NWCONFIG can load, bind, and configure the drivers and add the LOAD command to the autoexec.ncf file. See Loading and Binding LAN Drivers and "NWCONFIG" on page 135.

Examples

- To load the NE3200™ driver (without parameters), enter

  ```
  [LOAD] NE3200
  ```

- To load the NWCONFIG module, enter

  ```
  [LOAD] NWCONFIG
  ```

- To load a module called database.nlm in a protected address space, enter

  ```
  [LOAD] PROTECTED DATABASE.NLM
  ```

- To load a module in a protected address space and flag the address space as restartable, enter

  ```
  [LOAD] RESTART GRPWISE
  ```

  The PROTECTED option is not necessary if either RESTART or ADDRESS SPACE are specified on the command line.

Additional Information

Topic	See
Loading disk drivers	Loading Disk Drivers
Loading LAN drivers	Loading and Binding LAN Drivers
Loading name space modules	Storing Non-DOS Files on a Traditional Volume
Loading modules	Loading and Unloading NetWare Loadable Modules
Using protected address spaces	Loading Protected Address Spaces Using Protected Address Spaces Unloading Protected Address Spaces

LOGIN

Purpose

Use at a workstation to access the network by logging in to a server and running a login script.

Syntax

LOGIN [*server_name/* | *tree/*][*user*] [*/option*...][/? | /VER]

Parameter	Use to
(no parameter)	Request a login prompt.
server_name/	Specify the server you want to log in to.
tree/	Specify the tree you want to log in to.
user	Specify the username you want to log in with.
/option	Replace option with any available option. See “LOGIN Options” on page 91.

Parameter	Use to
/?	View online help. All other parameters are ignored when /? is used.
/VER	View the version number of the utility and the list of files it uses to execute. All other parameters are ignored when /VER is used.

Using LOGIN

- Using LOGIN implies use of the LOGOUT command. That is, using LOGIN to access an additional server logs you out of all other servers.

  To remain logged in to other servers, use the no script (/NS) option.

  NOTE: Using the /NS option is similar to using the ATTACH command in NetWare® 3.

- To use another object's login script, you need the Read property right to the Login Script property of that object. This login script replaces the profile script (if one is specified).

- To set your context before you log in, either use the CX command or set your context in the NET.CFG file using the following statement:

  `name context = complete_name`

  NOTE: For OS/2* do not use the equals sign or quotation marks.

LOGIN Options

Option	Use to
/NS	Prevent a login script from running and prevent you from being logged out of other servers you are logged in to.
/NB	Prevent the Welcome to NetWare banner from being displayed during the login process.
/S *path* | *object_name*	Specify a login script file. Replace *path* with the path to the script. Replace *object name* with the object whose script you want to run.

Option	Use to
/B	Specify a bindery login.
/PR=*profile_object_name*	Specify the Profile object script you want to run.
/NOSWAP	Prevent LOGIN from swapping to extended or expanded memory, or to disk.
SWAP=*path*	Tells login to swap to this path when external commands are executed. DOS only.
/TREE	Specify that you want to log in to a tree.

Examples

- To log in to server PAYROLL as user MARIE without logging out of other servers you are logged in to, type

  LOGIN PAYROLL/MARIE /NS

- To log in to tree TERMINAL as user MARIE, type

  LOGIN TERMINAL/MARIE /TREE

- To log in to the eDirectory™ tree as user SAM (if current context is set to SAM's container), type

  LOGIN SAM

- To log in as user SAM and specify a Profile object to use as a login script, type

  LOGIN SAM /PR=WPGROUP.NOVELL

LOGOUT

Purpose

Use at a workstation to exit the network or to log out of servers.

Syntax

LOGOUT [*server_name* | /T][/? | /VER]

Parameter	Use to
(no parameter)	Exit the network by logging out of all servers and eDirectory™.
server_name	Specify the server you want to log out of if you want to log out of one server but remain logged in to other servers or to the eDirectory tree.
/*option*	Replace option with any available option.
/T	Log out of eDirectory and all servers in the eDirectory tree, but not out of bindery servers (NetWare® 2 and 3 servers).
/?	View online help. All other parameters are ignored when /? is used.
/VER	View the version number of the utility and the list of files it uses to execute. All other parameters are ignored when /VER is used.

Using LOGOUT

You can use wildcard characters in the *server name* parameter.

Examples

- To log out of all servers, type

  LOGOUT

- To log out of server MARATHON while remaining logged in to other servers, type

  LOGOUT MARATHON

- To log out of all servers that begin with TEST, type

  LOGOUT TEST*

MAGAZINE

Purpose

Use at the server console in response to the screen prompts Insert Magazine and Remove Magazine. The screen prompts refer to media magazines (hardware devices that hold several pieces of media).

Syntax

MAGAZINE [*parameter*]

Parameter	Use to
Inserted	Confirm that the media magazine was inserted in response to the Insert Magazine prompt.
Not Inserted	Confirm that the media magazine was not inserted in response to the Insert Magazine prompt.
Not Removed	Confirm that the media magazine was not removed in response to the Remove Magazine prompt.
Removed	Confirm that the media magazine was removed in response to the Remove Magazine prompt.

MAP

Purpose

Use at a workstation to

- View drive mappings
- Create or change network or search drive mappings
- Map a drive to a fake root directory (for applications that must use a root directory)

Syntax

MAP [P | NP] [*option*...] drive:= [*drive*: | *path*] [/? | /VER]

Parameter	Use to
(no parameter)	View drive mappings.
P	Map to a physical volume. Must be listed first or second.
NP	Overwrite local or search drives without being prompted. Must be listed first or second.
option	Replace *option* with any available option. See "MAP Options" on page 96.
drive:	Specify the drive you want to change.
path	Specify the path you want to map a drive to. To map to a physical volume on a server that is not your default server, specify the entire path (including server, volume, and directory name). For example, macbeth/sys:account\pay (server/volume:directory\subdirectory)
/?	View online help. All other parameters are ignored when /? is used.
/VER	View the version number of the utility and the files it uses to execute. All other parameters are ignored when /VER is used.

Using MAP

- If you don't include drive mappings in your login script, they will have to be manually recreated each time the user logs in.
- You can have up to 26 mappings, including local drives.
- Search drive mappings begin with the letter Z and continue backward through the alphabet.
- To map a search drive, use S and a number. (See "MAP Options" on page 96.)

- If you don't want to overwrite existing search drives, use the INS option.
- To map to the next available search drive, use S16:=.

MAP Options

Option	Use to
P	Map to a physical volume. Must be listed first or second.
Np	Overwrite local or search drives without being prompted. Must be listed first or second.
C	Change a regular drive to a search drive, or a search drive to a regular drive.
DEL	Delete a drive mapping.
INS	Insert a search drive mapping without replacing an existing mapping.
N	Map the next available drive to the specified path.
ROOT	Map a drive to a fake root directory for applications that require rights in a root directory.
W	Do not change master environment.

Examples

- To view mappings, type

  MAP

- To map drive G: to SYS:\HOME\JAN on the current server, type

  MAP G:=SYS:\HOME\JAN

- To extend the mapping for drive G: above to SYS:\HOME\JAN\PROJECTS, type

  MAP G:=PROJECTS

- To map search drive 4 to PRUFROCK (server) SYS (volume) APP (directory), type

  MAP S4:=PRUFROCK/SYS:APP

- To change Y: from a regular NetWare® drive to a search drive, type

  MAP C Y:

- To delete the mapping for drive G:, type

  MAP DEL G:

- To map drive F: to the DOSGAMES volume of the GAMES directory as a fake root, type

  MAP ROOT F:=GAMES\DOSGAMES:

- To map the last possible search drive to IZARD (server) SYS (volume) PUBLIC (directory), type

  MAP S16:=IZARD/SYS:PUBLIC

- To map the next available drive to Z:\PUBLIC\DOS\APP from Z:\PUBLIC, type

  MAP N DOS\APP

- To map the next available drive to MICHEL/SYS:ACCT\OLD, type

  MAP N MICHEL/SYS:ACCT\OLD

- To insert COUNT (server) SYS (volume) PUBLIC (directory) as a new search drive, type

  MAP INS S4:=COUNT/SYS:PUBLIC

- To map to PUBLIC\RPTS under Volume object SYS.ACCOUNTING.ACME.US from the root, type

  MAP H:=.SYS.ACCOUNTING.ACME.US:PUBLIC\RPTS

Additional Information

Topic	See
Creating login scripts	Network Services Documentation > Desktop Management Services > Login Scripts > Setting Up > Creating Login Scripts
Using Directory Map objects	Creating a Directory Map Object

MEDIA

Purpose

Use at the server console in response to the screen prompts Insert Media and Remove Media.

Syntax

MEDIA [*parameter*]

Parameter	Use to
Inserted	Confirm that the specified media was inserted in response to the Insert Media prompt.
Not Inserted	Confirm that the specified media was not inserted in response to the Insert Media prompt.
Not Removed	Confirm that the specified media was not removed in response to the Remove Media prompt.
Removed	Confirm that the specified media was removed in response to the Remove Media prompt.

MEMORY

Purpose

Use at the server console to display the total amount of installed memory that the operating system can address.

Syntax

MEMORY

About Memory Addressing

- On EISA bus computers, NetWare® 3.1 and later versions address memory above 16 MB.
- On microchannel and ISA (AT) bus computers, NetWare (all versions) can address memory only up to 16 MB.
- On PCI bus computers, NetWare can address up to 4 GB.

Additional Information

Topic	See
Enabling the operating system to address memory above 16 MB	“REGISTER MEMORY” on page 152.

MEMORY MAP

Purpose

Use at the server console to display the amount of memory (in bytes) allocated to DOS and to the server.

Syntax

```
MEMORY MAP
```

Using MEMORY MAP

MEMORY MAP displays the memory allocated to DOS and to the server’s memory.

MIRROR STATUS

Purpose

Use at the server console to

- View the status of mirrored disk partitions
- View the percentage of mirrored data on each partition

Syntax

MIRROR STATUS [*logical_partition_number*]

Parameter	Use to
(no parameter)	View a list of all logical disk partitions with their mirroring status.
logical_partition_number	Display the partition's mirrored status and the devices that make up the members of the mirror group.

Using MIRROR STATUS

The possible status messages are explained in the following table.

Status	Explanation
Being remirrored	Remirroring is in progress; the percent completed is displayed.
Fully synchronized	The mirrored partitions have the same data. Remirroring is complete.
Not mirrored	Disk mirroring was not set up for this partition. It has no mirrored partner.
Orphaned state	A partition has been removed from a mirrored group, and the volumes on the partition have not been renamed. These volumes cannot be mounted unless they are renamed or remirrored. **HINT:** You can restore the orphaned partition to its mirrored partner with NWCONFIG.

Status	Explanation
Out of synchronization	The partition is out of synchronization with its mirrored partners and for some reason cannot be resynchronized.

Additional Information

Topic	See
Mirroring disks	Mirroring and Duplexing Partitions

MODULES

Purpose

Use at the server console prompt (or at a workstation running Novell® Client™ software) to display a list of currently loaded modules. For each module, the command displays the following information:

- The module short name or filename
- Color coding that indicates the module's functional group
- The address space where the module is loaded
- The file from which the module was loaded
- A descriptive string or long name for each module
- The version number if the module is a disk driver, LAN driver, or NLM™ program
- The date on the module file
- Copyright information

Syntax

```
MODULES [string]
```

Parameter	Use to
(no parameter)	View a list of all loaded modules.
string	Display a list of all modules with names matching the string. The string can also contain an asterisk (*) as the last character. In this case, the system displays a list of module names where the names begin with the string. For example, **MODULES D*** displays a list of all modules beginning with the letter D.

Using Modules

If you are using a color monitor, each module name is displayed in a color that represents the functional group it belongs to.

- **Cyan** (light blue) module name indicates a module loaded by server.exe
- **Red** module name indicates a module loaded from the startup directory
- **White** module name indicates a module loaded from the autoexec.ncf file
- **Purple** module name indicates a module loaded by other modules

The following example illustrates output of the MODULES command:

```
CDBE.NLM        (Address Space = OS)
    Loaded from internal nlm list.
  NetWare Configuration DB Engine
  Version 5.00  (Build 28)   April 28, 1998
  Copyright 1998 Novell, Inc. All rights reserved.


CPUCHECK.NLM    (Address Space = OS)
  Loaded from internal nlm list.

NetWare Processor Checking Utility

Version 1.00     April 10, 1998

Copyright 1998 Novell, Inc. All rights reserved.


AHA2940.HAM    (Address Space = OS)

Adaptec 7800 Family HAM Driver for NetWare v7.00

Version 7.00     April 22, 1998

Copyright 1997 Adaptec, Inc. All rights reserved.
```

Additional Information

Topic	See
Loadable modules	“LOAD” on page 86 “UNLOAD” on page 272
Loading modules	Loading and Unloading NetWare Loadable Modules

MONITOR

Purpose

Use at the server console to

- View server statistics and activity
- Assess server RAM and processor utilization
- Set server parameter values
- Print server parameter settings to a file

NOTE: The screen saver and the console-locking features have been removed from MONITOR and incorporated in the SCRSAVER utility.

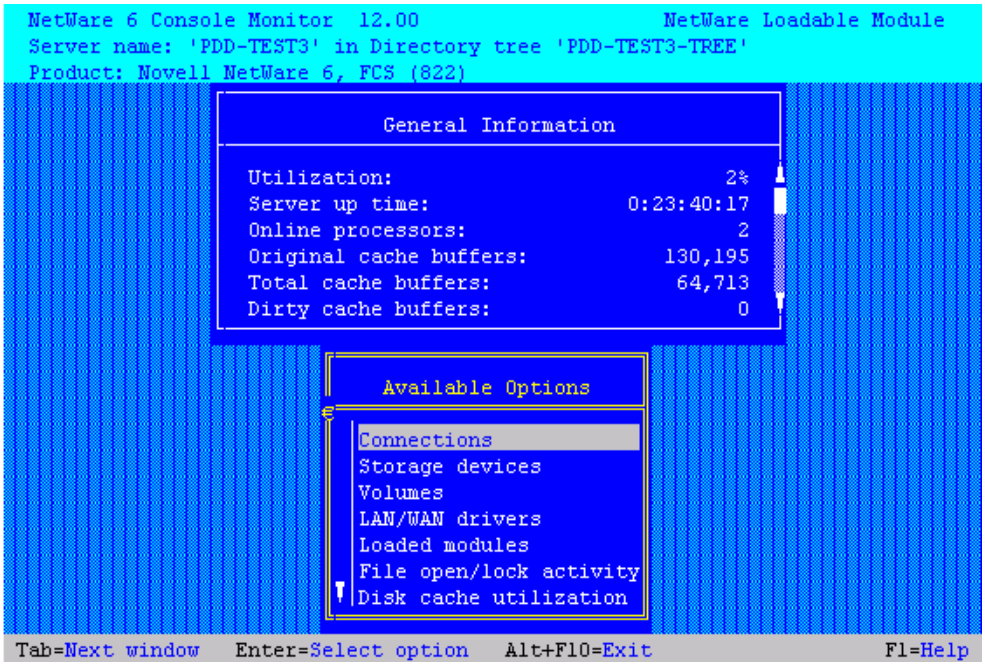
Syntax

```
[LOAD] [path] MONITOR
```

Parameter	Use to
path	Specify the path leading to MONITOR if you copied it to a directory other than the default directory.

Using MONITOR

When MONITOR is first loaded, both the General Information window and the Available Options menu are displayed.



The Available Options menu allows you to access additional server information, statistics, and settings. At some windows, you can also perform operations.

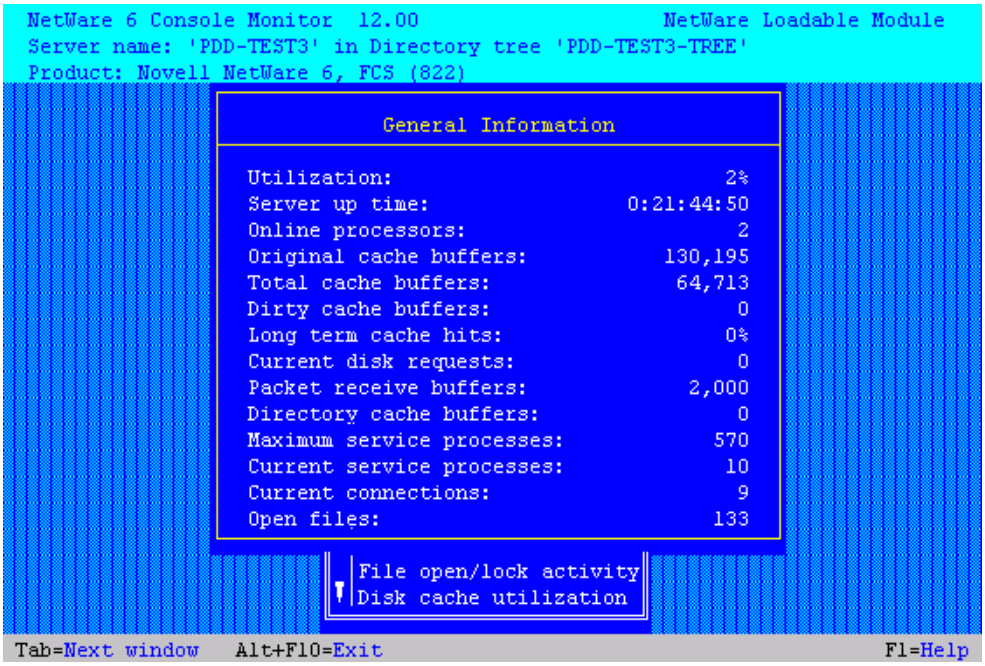
The General Information window displays many of the key statistics that MONITOR reports.

The arrow to the left of the vertical line in the Available Options menu indicates that the menu can be scrolled.

HINT: For explanations of options on MONITOR menus as well as lists and statistics, you can press press F1 to access MONITOR's online help when you are running MONITOR at the server console.

You can press Tab to expand and activate any information window. You can press Tab again to toggle back to a list or menu. The active window is always highlighted in yellow.

After a period of inactivity at the Available Options menu, the General Information screen expands by default to allow convenient monitoring of more critical statistics, as shown in the following figure.



The following table describes the fields of General Information.

Field	Explanation
Operating system version and date	The version and release date of the system (upper- left corner of the screen).
Server *server name* on network *tree name*	The name of the server and the eDirectory™ tree name.
Utilization	Average of the server's total processing capacity that was used during the last second (default update interval), expressed as a percentage. The remainder is spent in the idle loop process. On a uniprocessor server, this value reflects processor utilization. On a multiprocessor server, this value is the average utilization of all active processors. For utilization information about individual processors, select MONITOR Available Options > Kernel > Processors. This utilization value will reflect the changes in system configuration as they occur, such as an NLM™ program being loaded or unloaded, or a volume being mounted or dismounted.

Field	Explanation
Server Up Time	Time elapsed since the server was most recently started. This value is displayed in the format DD:HH:MM:SS (days:hours:minutes:seconds). Use this information to detect power failures or to determine whether an intruder brought down the server.
Online Processors	The number of enabled and active processors.
Original Cache Buffers	The original size of the cache buffer pool, which is the number of cache buffers available when the server is booted. All memory not used to load NetWare® (code plus loader) is assigned to the cache buffer pool. Memory is borrowed from this pool as needed. The default size of a cache buffer is a 4096-byte memory page.
Total Cache Buffers	The number of cache buffers currently available for file caching after allocating memory for NetWare. This number decreases as modules are loaded or memory is allocated in other ways. A minimum parameter controls when the server cannot continue to allocate file cache buffers. An alert can be set to report when the number of cache buffers approaches this limit. See SET “File Caching Parameters” on page 237 for a description of these parameters. You can set these parameter values in MONITOR Available Options > Server Parameters > File Caching Parameters. You can also use the SET utility. The Disk Cache Utilization option provides additional file cache buffer statistics for assessing RAM.

Field	Explanation
Dirty Cache Buffers	Number of cache buffers that contain updated data that has not yet been written to disk. The operating system writes the data to disk either as soon as the cache buffer is filled or else when the Dirty Disk Cache Delay Time elapses (default 3.3 seconds). The trade-off is between allowing small writes to wait the delay time or reducing the delay time and performing two writes. See Improving Disk Reads and Improving Disk Writes in the *NetWare Server Disks and Storage Devices Guide*. Also, see SET "File Caching Parameters for the Traditional File System" on page 232 for description of the parameter that controls the delay time. If the number of dirty buffers is frequently above 50% of Total Cache Buffers, install more RAM for cache. A disk I/O bottleneck may be indicated if the number of dirty buffers remains constant and the number of Current Disk Requests remains high. Consider installing a faster hard disk and controller.
Long Term Cache Hits	Cumulative percentage of requests for disk blocks that were already in cache. Use this value to assess overall disk cache utilization. If this value falls below 90%, install more RAM for cache. Another field to check as you assess RAM is LRU Sitting Time. See Tuning File Cache in the *Server Memory Administation Guide.*
Current Disk Requests	Number of pending disk I/O requests that are queued for service. Use this value as a measure of the system load for the disk channel. If this number is consistently high, the disk and controller may be too slow. If the number of Dirty Cache Buffers exceeds 50% of Total Cache Buffers and server performance is slow, consider installing faster hard disks.

Field	Explanation
Packet Receive Buffers	Number of buffers that are available to the file system for holding client requests until they can be processed. Also referred to as communication buffers. The buffer size is fixed and is determined by the network board. The server allocates buffers as needed within minimum and maximum parameter values. For a description of these parameters, see SET "Communications Parameters" on page 192. You can set these parameter values in MONITOR Available Options > Server Parameters > Communications Parameters. You can also use the SET utility.
Directory Cache Buffers	The number of buffers available to the file system to cache the most frequently requested directory entries. The server allocates more directory cache buffers as needed within minimum and maximum parameter values. For a description of these parameters, see SET "Directory Caching Parameters for the Traditional File System" on page 235. You can set these parameter values in MONITOR Available Options > Server Parameters > Disk Caching Parameters. You can also use the SET utility.
Maximum Service Processes	Maximum number of processes (threads or task handlers) the system will allocate to service client NCP™ requests. The server creates more service processes as needed within minimum and maximum parameters. Once memory is allocated for service processes, it remains allocated even when no longer required. Each service process requires 4 KB of RAM. For a description of these parameters, see SET "Miscellaneous Parameters" on page 210. You can increase the value of Maximum Service Processes in MONITOR Available Options > Server Parameters > Miscellaneous Parameters. You can also use the SET utility.

Field	Explanation
Current Service Processes	Number of threads or task handlers that are currently allocated to service client NCP requests. As the number of client requests increases, the server creates more service processes within minimum and maximum parameters. As this value approaches the maximum number that can be created, server performance will be adversely affected. An alert appears when the maximum number is reached. For a description of these parameters, see SET "Miscellaneous Parameters" on page 210. You can increase the value of Maximum Service Processes in MONITOR Available Options > Server Parameters > Miscellaneous Parameters. You can also use the SET utility.
Current Connections	Number of current active connections. This includes both licensed and unlicensed connections. Both licensed and unlicensed connections are considered active connections. A license for a NetWare network permits a user to connect to as many servers in an eDirectory tree as needed. An unlicensed connection doesn't consume a license. Connection licenses are no longer managed at the server level. Under Novell Licensing Services (NLS), the licensable entity is a NetWare network connection rather than a server connection. See Understanding Novell Licensing Services in the *Novell Licensing Services Administration Guide*. You can view a list of active connections from MONITOR Available Options > Connections. All connections described as licensed or unlicensed, authenticated or Not Logged-In, are considered active connections and are tracked by the server
Open Files	Number of files currently being accessed by the server and by other clients. Certain files, such as the hidden files that support eDirectory, are always open.

The following table explains what information can be accessed through MONITOR options.

Menu Option	Use to
Connections	◆ List active connections. ◆ Determine connection status—whether connections are licensed or unlicensed, authenticated or Not-Logged-In, or waiting on a lock. ◆ View client's network address, connection time, number of requests, kilobytes read, kilobytes written, semaphores used, and number of logical record locks. ◆ Determine whether logged-in user has additional rights corresponding to bindery Supervisor rights. ◆ Clear UDP and NCP connections before bringing the server down. Send a message to one or more client user connections. **HINT:** Press F3 to sort the items in the connection list.

Menu Option	Use to
Storage Devices	◆ List system storage devices, including hard disks, controllers, adapters, media, magazines, changers, and slots. ◆ View divisions of the media's capacity given to the operating system, including partitions, Hot Fix™ and Mirror objects. ◆ View dependencies of each object. ◆ View per-device information, such as Media Manager object ID, device type, disk size and capacity, sector size, block size per I/O request, and number of sectors, heads, cylinders. ◆ Determine whether the device is activated, registered with Media Manager, marked read-inhibit, writable or write-protected, reserved by an application, or whether it has associated I/O methods. ◆ Determine the controller number, the device number (LUN), the adapter number (instance of loaded driver), driver used in accessing the device, and driver type (such as NWPA). ◆ Determine the Hot Fix and Mirror status of the NetWare partition. ◆ Change the Read After Write Verify status of the hard disk. ◆ Activate/deactivate a hard disk. ◆ Mount/dismount a removable media device. ◆ Lock/unlock a removable media device. (If locked, the media can be ejected only by using a software switch.)

Menu Option	Use to
Volumes	◆ View per-volume mount status. ◆ See which file system is used on each volume. ◆ View per-volume information on loaded name spaces. ◆ View per-volume information on compression status, suballocation, file migration status, and number of migrated files. ◆ See whether volume is read-only. ◆ View per-volume information on block size, sectors per block, total blocks, and number of free blocks, blocks dedicated to file allocation table, freeable and nonfreeable blocks in the salvage system. ◆ View per-volume number of blocks dedicated to directory entry tables, directory entries, and directory entries in use. ◆ View amount of space allocated to store long names, name spaces, and cookies that provide the location of nearline and offline storage.
LAN/WAN Drivers	◆ List LAN driver instances loaded on the server. ◆ View the LAN driver version, logical board number (LAN driver instance), and the protocols or frame types bound to it. ◆ View node and network address. ◆ View generic per-driver counters for total packets transmitted and received, specific types of receive and transmit failures, adapter resets, and packets queued for transmission. ◆ View per-driver counters associated with a specific method of media access control or topology, such as those for Ethernet, token-ring, or FDDI. ◆ View per-driver custom counters associated with a particular type of model of network board. (Check the documentation that comes with the driver.) For information on each LAN driver counter, see Appendix A, “LAN Driver Statistics,” on page 289.

Menu Option	Use to
Loaded Modules	◆ List modules loaded on the system by name. ◆ Recover unused memory pages (garbage collection) per module. ◆ View major version, minor version, revision number, and creation date of the module. ◆ View bytes of memory required to load this module (code, data, and messages). ◆ View amount of memory requested by the NLM™ for its use in bytes and nodes. View the module's load flags. ◆ List resources allocated by the module (resource tags). ◆ View resource tag memory usage. **HINT:** Press F3 to sort the modules by bytes of allocated memory or date of creation, in addition to name.
File Open/Lock Activity	◆ Check a file's lock activity and status. ◆ View number of client connections using this file, whether locked, logged, or open. ◆ Determine number of connections opening this file requesting read access and write access. ◆ Determine number of connections opening this file requesting that other stations not be allowed to read or write to the file. ◆ View which clients have open files. ◆ View mounted volumes and directories on each volume. ◆ View files in a directory.

Menu Option	Use to
Disk Cache Utilization	◆ View disk cache block request statistics, including total cache block requests, the number of times a block request had to wait because there were no available cache blocks, long and short term cache hits and dirty cache hits. ◆ Use the Long Term Cache Hits information (the percentage of time the operating system retrieves the data it needs directly from cache) to assess cache utilization. For explanations and guidelines, see Assessing Server RAM and Tuning File Cache in the *Server Memory Administration Guide*. **HINT:** For more information on these statistics, press F1 for help while in this screen.
System Resources	◆ View server memory usage in bytes for the cache buffer pool, allocated memory in movable and nonmovable memory pools, code and data memory, and total server work memory. ◆ View allocated memory information for the entire system or for one selected system module. ◆ List tracked resource types and determine which modules use the resource. List resource tags and associated modules. ◆ Determine a module's use of resource by type, its owning module, address space, and amount of resource. ◆ Determine resource usage by owning module, address space, and resource type. **HINT:** Press F3 for sort options for Resource Tags.

Menu Option	Use to
Virtual Memory	◆ View virtual memory by address spaces or swap files. ◆ View the number of NLM programs loaded in each address space. ◆ View per-address space information, including number of times the address space faulted and restarted, and elapsed time since the last fault. ◆ View page faults statistics. ◆ View amount of allocated memory the NLM requested, in bytes and nodes. ◆ Recover unused memory pages (garbage collection) in the OS address space. ◆ View amount of mapped physical memory pages backing the OS address space. ◆ View statistics for page-in and page-out requests. ◆ View information and statistics on swap pages, including maximum size, minimum size, current size, free file space, minimum free file space, and used file space.

Menu Option	Use to
Kernel	◆ View kernel information by all threads, processors, interrupts, and busiest threads. ◆ View the list of all threads running on the system In NetWare 5, all threads running on a NetWare server are grouped into two categories called NetWare Application and Java Application. To access NetWare 5 thread information, you select Kernel > Applications > NetWare Application [or] Java Application. In NetWare 6, threads are not categorized on the basis of the application. All threads can be viewed from a common category in MONITOR called All Threads. To view NetWare 6 thread information, you simply select Kernel > All Threads. ◆ See whether a processor is online or offline. ◆ View processing load as a percentage both per-processor and for all processors combined. ◆ View number of threads bound to online processor. ◆ View number of interrupts fired on processor and the amount of time spent processing interrupts. ◆ List all registered interrupts. ◆ List all Interrupt Service Routines registered to a selected interrupt. ◆ View the number of interrupts handled by a specific Interrupt Service Routine, both per-processor or for all processors combined. ◆ Determine interrupt type and number of Interrupt Service Routines executed per-interrupt. ◆ List the busiest threads in the Threads option. ◆ View per-thread information, including parent module, current state, reason thread is suspended, processor execution time, thread's stack size, soft affinity or hard affinity.
Server Parameters	Set values for server parameters. This menu provides the same functionality as the SET command. For descriptions of parameter categories and individual parameters, see "SET" on page 186.

For a description of the MONITOR Server Parameters, see the tables for each parameter category in “SET” on page 186.

Additional Information

Topic	See
Assessing server RAM	Assessing Server RAM
Checking for disk errors	Checking for Disk Errors Checking Server Error Logs
LAN and WAN driver statistics	Appendix A, “LAN Driver Statistics,” on page 289
Clearing workstation connections	Clearing a Workstation Connection “CLEAR STATION” on page 27
Sending a message to a logged-in client	Sending Console Messages to Workstations
Increasing packet receive (communications) buffers	SET “Communications Parameters” on page 192 Increasing Maximum and Minimum Packet Receive Buffers
Setting values of server parameters	“SET” on page 186 Setting Server Parameter Values

MOUNT

Purpose

Use at the server console to make a volume available to users.

Syntax

MOUNT ***volume_name*** **| ALL**

Parameter	Use to
volume_name	Specify the name of the volume you want to mount.
ALL	Mount all volumes not mounted.

Using MOUNT

- If you set up the AUTOEXEC.NCF file to mount all volumes automatically each time the server comes up, then you would use the MOUNT command only if you have dismounted a volume and want to remount it.
- After you replace a removable drive, use this command to mount all volumes residing on the removable drive.
- You can mount and dismount volumes while the server is running.
- You can also use NWCONFIG to mount a volume. Select Installation Options > Volume Options.

Examples

- To mount volume STATISTICS, type

  ```
  MOUNT STATISTICS
  ```

- To mount all unmounted volumes at once, type

  ```
  MOUNT ALL
  ```

NAME

Purpose

Use at the server console to display the server name.

HINT: You can also use the SET parameter, Replace Console Prompt with Server Name = *servername*, in autoexec.ncf to display the server name with the console prompt. See SET "Miscellaneous Parameters" on page 210.

This is very useful where you have multiple server consoles in one location or access several servers from a single management console.

Syntax

NAME

NCS Debug

Purpose

NCS Debug displays and saves a record of all NCS port activity in an ASCII text file named NCSTRACE.LOG in the SYS:SYSTEM directory. The size of the log file is limited to 800 KB. After the file reaches that size, the entries wrap around to the beginning of the file and logging continues.

NDPS Broker

Purpose

The Broker provides three network support services not previously available in NetWare®: the Service Registry Service (SRS), Event Notification Service (ENS), and Resource Management Service (RMS). While these services are invisible to end users, administrators should be aware of them. Novell® Distributed Print Services™ (NDPS®) uses these services in the following ways:

- **Service Registry Service.** The Service Registry allows public access printers to advertise themselves so that administrators and users can find them. This service maintains information about device type, device name,

device address, and device-specific information such as the manufacturer and model number.

- **Event Notification Service.** This service allows printers to send customizable notifications to users and operators about printer events and print job status. The Notification Service supports a variety of delivery methods including NetWare pop-up, log file, e-mail (GroupWise®), and programmatic.
- **Resource Management Service.** This service allows resources to be installed in a central location and then downloaded to clients, printers, or any other entity on the network that needs them. The Resource Management Service supports adding, listing, and replacing resources including printer drivers, printer definition (PDF) files, banners, and fonts.

Additional Information

Topic	See
Service Registry Service	Understanding the Service Registry Service
Event Notification Service	Understanding the Event Notification Service
Resource Management Service	Understanding the Resource Management Service
Customizing the way your brokered services are distributed on the network	Managing the Broker

NDPS Manager

Purpose

A Novell® Distributed Print Services™ (NDPS®) Manager provides a platform for Printer Agents that reside on the server. An NDPS Manager must be created as an object in the eDirectory tree before you can create server-based Printer Agents.

Using NDPS Manager

The NDPS Manager object stores information used by the NetWare Loadable Module™ (NLM) program named NDPSM.NLM. You can manually load this NLM™ program at the server console, or it will be automatically loaded when you create a Printer Agent with NetWare® Administrator.

A single NDPS Manager can control multiple Printer Agents. (There is no hard limit.)

A specific NDPS Manager can be loaded only on one server. If it controls a local printer, it must be loaded on the server the local printer is attached to.

A user creating an NDPS Manager must have at least Read, Write, Modify, and Create rights for the container in which the object will be created.

Additional Information

Topic	See
Creating an NDPS Manager	Creating NDPS Manager
Managing NDPS Manager	Managing Printers

NetWare ConnectView

Purpose

NetWare® ConnectView™ opens a View All window whenever the application is started. The ViewAll window lets you quickly view a list of managed servers, display and control the servers' resources, and view summary information about them. Server resources include the boards/drivers, port groups, ports, and remote access services.

To view this data, you need the Simple Network Management Protocol (SNMP).

NetWare Login

Purpose

Use at a Windows* 3.1*x* or Windows 95 workstation to

- Access an eDirectory tree or a NetWare® server
- Run a login script

Starting NetWare Login

By default, NetWare Login runs when you start Windows. However, you can start NetWare Login any time by choosing its icon in Windows.

Depending on your Windows platform, type the appropriate executable filename: either LOGINW31 or LOGINW95.

Example:

```
loginw95 /a
```

An additional parameter, /A, is provided to cause the advanced tabs to appear in the NetWare Login dialog box.

Open the login window on a Windows 95 workstation by clicking Start > Programs > Novell > NetWare Login.

Using NetWare Login

Use the options provided in the NetWare Login dialog box or in your Client 32™ settings. For more information, see the online Help for NetWare Login.

Additional Information

Topic	See
NetWare Login dialog box	Online Help within the dialog box
Command-line options	“LOGIN” on page 90
Client 32 settings	Online Help within the dialog box

NetWare Remote Manager

Purpose

Use at a workstation through a Web browser to diagnose and manage NetWare® servers. The main tasks that you can complete using this tool are:

- Diagnose Server Problems
- Manage Servers, Applications, Hardware
- Access eDirectory™ management tools.

Additional Information

Topic	See
For complete information about accessing and using NetWare Remote Manager	NetWare Remote Manager Administration Guide

NIASCFG

Purpose

NIASCFG enables you to configure Novell® Internet Access Server 4.1 software. You can set up and customize your internetworking configuration for PPP, IPX™, IP, AppleTalk*, and the source route bridge.

Novell Printer Manager

Purpose

The Novell® Printer Manager allows workstation users to manage all of their Novell Distributed Print Services™ (NDPS®) printing tasks including printer installation, customized printer configuration, and print job management.

Users may also use the Printers folder in Windows* to add NDPS printers and perform certain printer management tasks.

Novell Printer Manager provides a graphical display of all the NDPS printers that are currently installed on a workstation. Through an easy-to-use graphical interface, users can add and configure additional printers for their installed printers list.

When a user adds a printer to the workstation, the corresponding printer driver is automatically installed on that workstation. Administrators can specify printers to be added automatically to workstations through the Remote Printer Management feature of NDPS (see Using Remote Printer Management).

Users can view real-time status and configuration information about their printers and print jobs and receive event notification for their print jobs. Feedback that they can receive includes information about the following:

- A printer's status
- A printer's characteristics and properties
- A printer's features
- Printer events that require operator intervention (such as low toner, empty paper tray, or jammed feed mechanism)
- A print job's status, characteristics, and properties

Additional Information

Topic	See
Using Novell Printer Manager	Using the Novell Printer Manager Workstation Utility (http://www.novell.com/documentation/lg/nw51/ndps_enu/data/htwn0jb2.html)

Novell Migration Wizard

The Novell® Migration Wizard utility lets you copy your NetWare® 3.1*x* server bindery and file system across the wire and place them in a desired location in an existing eDirectory™ tree.

The across-the-wire upgrade (also referred to as a migration) is administered on a Windows* 95 or Windows NT* workstation.

A complete Help system is built into the utility. In addition, procedures for using the Novell Migration Wizard can be found in the *Migration Wizard Administration Guide*.

The Novell Migration Wizard is installed as a self-extracting executable from the following location on the *NetWare 6 Operating System* CD:

\products\upgrdwzd\upgrdwzd.exe

Additional Information

Topic	See
Novell Upgrade Wizard	Chapter 7, Welcome to NetWare 6, in *NetWare 6 Overview and Installation Guide*

NSS

Purpose

Use the Novell® Storage Services™ (NSS™) console commands to do the following:

- Unload NSS
- Display NSS module or volume information
- Check NSS volume statistics
- Change NSS caching
- Modify other NSS tunables

Using NSS

To use the NSS console commands, enter the following at the server console:

- **`nss /help`** or **`nss /?`** opens the NSS console Help facility.
- **`nss /modules`** lists the providers, loadable storage subsystems, and semantic agents.
- **`nss /status`** lists the current NSS status.
- **`volumes`** lists all the NetWare® volumes that are mounted and includes the NSS_Admin volume.
- **`nss volumes`** lists all the NSS volumes, including NSS_Admin.

NSS Load Commands

To use the NSS load commands, enter the following at the server console:

- **`help`** opens the NSS console Help facility.
- **`/?`** opens the NSS console Help facility.
- **`/(No)SkipLoadModules`** prevents autoloading of all the NSS modules.

NSS DOS FAT Commands

Use these NSS DOS FAT commands at the server console:

- **`nss /(No)FATInMemory`** loads the entire FAT into memory for faster access, regardless of its size. The default is OFF.
- **`nss /(No)FATLongNames`** enables long filenames on FAT volumes. The default is ON.
- **`nss /(No)FATLazyWrites`** performs lazy writes of FAT. The default is ON.
- **`nss /FATLazyWriteDelay=`***value* sets the FAT lazy write delay (in seconds). The default is 60. The range is 5 to 180.
- **`nss /FATPartition=`***partition_type_number* supports up to three additional partition types containing 16-bit FATs, such as **`/FATPartition=12,13`**.

PURGE and SALVAGE Commands

Both PURGE and SALVAGE commands are supported and behave almost the same in NSS as in previous versions of NetWare.

The SALVAGE command for the traditional NetWare file system and previous releases of NetWare was either turned on or off for the whole file system. In NSS, you can turn SALVAGE on or off for each NSS volume.

Use SALVAGE at the server console as follows:

- **`nss /salvage=all`** enables SALVAGE on all NSS volumes.
- **`nss /salvage=`***volume_name* enables SALVAGE on the NSS volume you specify.
- **`nss /nosalvage=all`** disables SALVAGE on all NSS volumes.
- **`nss /nosalvage=`***volume_name* disables SALVAGE on the NSS volume you specify.

NSS Buffer Cache Commands

Use these NSS commands at the server console to change your cache buffers:

- **nss /MinBufferCacheSize** sets the minimum buffer size. The default is 512. The range is 256 to 1048576. When NSS is loaded, it requires at least 512 cache buffers.
- **nss /MinOSBufferCacheSize** sets the minimum size for NetWare. The default is 1024. The range is 1024 to 1048576. We do not recommend that you set this value below 1024.
- **nss /NameCacheSize** sets the number of Name Cache entries. NSS keeps a cache of file and directory entry names it has recently looked up. This speeds up opening files and path searches. The default is 2111. The range is 3 to 65521.
- **nss /(No)NameCache** sets Name Cache to ON or OFF. The default is ON.
- **nss /(No)CacheBalance** sets the buffers to percentages rather than integers for dynamic balancing of free memory for the buffer cache. The default is ON. Use this switch with /MinBufferCacheSize.
- **nss /CacheBalanceTimer** sets the cache balance timer in seconds. NSS checks the total number of cache buffers in the system and determines if the CacheBalance percentage is met. NSS then gives or takes the appropriate number of cache buffers. The default is 30. The range is 1 to 3600.
- **nss /AuthCacheSize** sets the number of Authorization Cache entries. If many trustees have been set on different files and directories, we recommend that you increase this number. The default is 1024. The range is 16 to 50000.
- **nss /BufferFlushTimer** sets the Flush Time for modified cache buffers in seconds. The default is 1 second. The range is 1 to 3600 seconds.
- **nss /CacheStats** shows the cache buffer statistics.

Other NSS Commands

Use these NSS commands at the server console to manage NSS:

- **nss /Activate=***volume_name* activates an NSS volume.
- **nss /Deactivate=***volume_name* deactivates an NSS volume.

- **nss /Maintenance=***volume_name* switches the specified NSS volume to maintenance mode.
- **nss /ForceActivate=***volume_name* forces an NSS volume to become active.
- **nss /VerifyVolume=***volume_name* verifies the specified NSS volume's physical integrity.
- **nss /RebuildVolume=***volume_name* rebuilds the specified NSS volume.
- **nss /RebuildVolume** allows you to select an NSS volume from the menu for rebuild.
- **nss /AutoVerifyVolume=***volume_name* allows you to verify an NSS volume at startup.
- **nss /StorageResetThreshold=***value* allows you to reset the threshold for a low storage space warning. The default is 10. The range is 1 to 1000000.
- **nss /(No)StorageAlertMessages** turns ON or OFF the low storage message to users. The default is ON.
- **nss /NumWorkToDo=***value* sets the number of WorkToDo entries which may be concurrently executing. NSS uses WorkToDo entries for tasks such as flushing file metadata to disk in the background. Increasing the number of WorkToDo entries might be useful on a system that is heavily used. NSS always reserves 20 WorkToDo entries. The default is 40. The range is 5 to 100.
- **nss /FileFlushTimer=***value* sets the Flush Time for modified open files in seconds. Increasing this number might reduce the number of writes to disk; however, it increases the amount of data that will be lost if the system crashes. The default is 10 seconds. The range is 1 to 3600 seconds.
- **nss /OpenFileHashShift=***value* sets the size of the Open File hash table (in powers of 2). If many files are used concurrently on the server, we recommend that you increase this number. The default is 11. The range is 8 to 20.
- **nss /ClosedFileHashShift=***value* sets the number of closed files that can be cached in memory. The default is 512. The range is 1 to 100000.
- **nss /MailBoxSize=***value* sets the size of your mailbox. The default is 228. The range is 64 to 256.

Additional Information

Topic	See
Using the NSS Administration menus	Setting Up and Configuring Novell Storage Services in the *Novell Storage Services Administration Guide*

NSWEB

Purpose

Use NSWEB and NSWEBDN to start and stop the NetWare® Web Manager and NetWare Enterprise Web Server.

Syntax

NVXWEBUP
NVXWEBDN

NVXADM

Purpose

Use NVXADMUP and NVXADMDN to start and stop the NetWare® Web Manager.

Syntax

NVXADMUP
NVXADMDN

NVXWEB

Purpose

Use NVXWEBUP and NVXWEBDN to start and stop the NetWare® Web Manager.

Syntax

```
NVXWEBUP
NVXWEBDN
```

NWBACK32

Purpose

From a Windows* 95 or Windows NT* workstation, use this graphical utility to back up or restore Storage Management Services™ (SMS™) targets such as eDirectory™, binderies, the file system, or hard disks. With this utility, you can do the following:

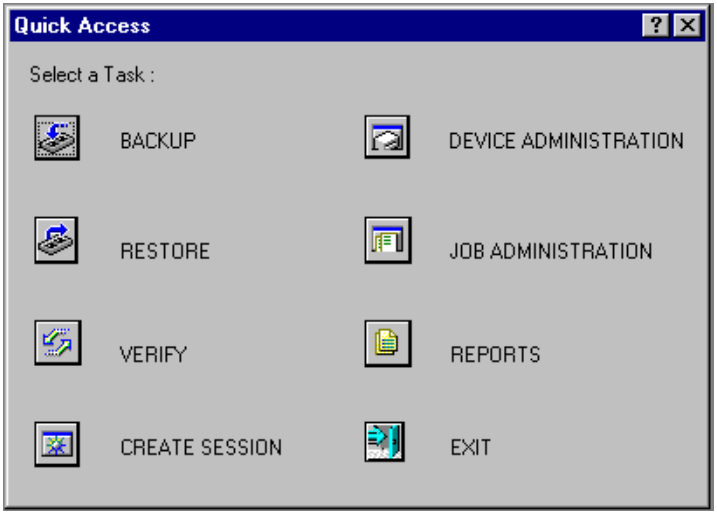
- Back up data
- Restore data
- Verify what you have backed up or restored
- Create new sessions
- Manage your devices
- Manage your backup or restore jobs
- Create log and error reports
- Schedule backup or restore jobs

Starting NWBACK32

Certain prerequisites must be met on the backup server before you can start NWBACK32 on a Windows 95 or Windows NT workstation. Also, if you are loading NWBACK32 for the first time, the steps are different. See *Storage Management Services Administration Guide* in the NetWare® 6 online documentation.

1. Log in to the desired eDirectory tree.
2. Select Network Neighborhood > Novell > Sys:public >Nwback32.

   The Quick Access window appears.



Using NWBACK32

The following sections describe how the elements of NWBACK32 work. There are three methods for using NWBACK32: Quick Access, the toolbar, or the menu bar. Use the Quick Access window to determine what you want to back up or restore. Then Quick Access window does not contain as many features as in the menus or toolbar.

Using the Graphical Interface

Click the preferred button in the Quick Access window:

- **Backup** lets you choose what to back up and where to back up.
- **Restore** lets you choose what to restore and where to restore.
- **Verify** lets you check the data on your media to ensure a successful backup.
- **Create Session** lets you create you log and error file sessions.
- **Device Administration** lets you monitor the properties of a device.

- **Job Administration** lets you view and change jobs.
- **Reports** lets you view the details of session and error reports.
- **Exit** quits NWBACK32.

When you reach your destination, in most instances you can right-click the last item. You may also use the menu bar or the toolbar to complete the task.

Using the Menu Bar

The menu bar displays headings for various menus. The tasks in the menus contains all the features the toolbar uses and more than the Quick Access menu. To complete a task or manage a job, select one of the following if preferred:

- **File** contains options for a new session, changing the context, changing the protocol, or exiting NWBACK32.
- **Backup** contains options for submitting a job, using filters, selecting a backup type, scheduling a backup, or selecting the backup frequency.
- **Restore** contains options for submitting a job, using the filters, and scheduling a restore.
- **Verify** contains an option for submitting a job.
- **Create Session** contains an option for submitting a job.
- **Device Administration** contains options for changing device labels or types, attaching to media, releasing a device, viewing media properties, erasing the media, moving the media, retension the media, or create a new media label.
- **Job Administration** contains options for checking properties of jobs, enabling or deleting jobs, starting or holding jobs, rescheduling a job, or aborting a job.
- **Reports** contains options for creating new log and error reports.

Using the Toolbar

The toolbar displays buttons for various tasks or topics as follows:

- **Start a backup** initializes your backup job.
- **Start restore job** initializes your restore job.
- **Start verify session** initializes verification of data on the media.

- **Start create session** initializes a new session for the job.
- **Job administration** contains options for checking properties of jobs, enabling or deleting jobs, starting or holding jobs, rescheduling a job, or aborting a job.
- **Device administration** contains options for changing device labels or types, attaching to media, releasing a device, viewing media properties, erasing the media, moving the media, retension the media, or create a new media label.
- **Reports** lets you create a log or error report.
- **Run** lets you run a report.
- **Apply filters** lets you use the filters you selected in Backup.
- **Complete differential and incremental backup** lets you run these backup types.
- **Schedule the job** lets you schedule your backup or restore.
- **Frequency of backup** lets you indicate how often to back up.
- **Change the context** lets you change to another context.
- **IP/IPX** lets you change the protocol.
- **Help** displays the Help facility (not yet available).
- **Exit** closes NWBACK32.

Additional Information

Topic	See
Learning how backup and restore works	Overview
Backing up data	Backup Services
Restoring Data	Restore Services
Loading the backup software	Backup Software for eDirectory Before Loading the Backup Software
Administering a job or a device	Administering Jobs

NWCCON

Purpose

Use this utility to configure remote access options. To use this utility, load NIASCFG and select Configure NIAS > Remote Access.

NWCONFIG

Purpose

Use at the server console to

- Modify your NetWare® server's configuration
- Perform server management operations
- Install additional products

Syntax

[LOAD] [*path*]NWCONFIG

Parameter	Use to
path	Specify the path to NWCONFIG if you moved it from the default directory.

Using NWCONFIG

The following table describes each option found on the NWCONFIG main menu.

NOTE: For information about NWCONFIG options, press F1 from any NWCONFIG window.

Table 2 NWCONFIG Installation Options Menu

Menu Option	Use to
Driver Options	Load and unload disk and LAN drivers.
Legacy Disk Options	This functionality has been moved to ConsoleOne.

Menu Option	Use to
NSS Disk Options	This functionality has been moved to ConsoleOne.
License Option	Install and remove licenses and re-create licensing objects in the eDirectory™ tree.
Copy Files Option	Copy NetWare files to various directories on volume SYS:.
Directory Options	Install and remove eDirectory. Upgrade NetWare 3 bindery information to the eDirectory tree. Upgrade mounted volumes into the eDirectory tree. Back up the eDirectory tree; restore the eDirectory tree after a hardware upgrade or failure; restore references to the server after the eDirectory tree is restored.
NCF Files Options	Create and edit the startup.ncf and autoexec.ncf files. Upgrade a NetWare 3.1*x* AUTOEXEC.NCF file to meet NetWare 6 requirements.
Multi CPU Options	Select a Platform Support Module (PSM) appropriate for your multiprocessing server hardware.
Product Options	Install and configure additional NetWare or third-party products; remove additional products from the server.
Exit	Exit NWCONFIG.

Additional Information

Topic	See
LAN drivers	Loading and Binding LAN Drivers
Disk drivers	Loading Disk Drivers
NSS	*Novell Storage Services Administration Guide*
Licensing	Using Novell Licensing Services
eDirectory	Maintaining Novell eDirectory
.NCF files	Overview to Using Server Batch Files
Multiprocessing	NetWare Integrated Kernel

NWCRPAIR

Purpose

NWCRPAIR.NCF is a troubleshooting utility that recovers corrupted Btrieve* files. Corrupted Btrieve files may be the result of a remote access server abend (terminate program execution abnormally).

Use this utility if you receive an initialization failure when you bring up remote access with NWCSTAT.

NWCSTAT

Purpose

Use NWCSTAT to display remote access status. You can use this utility by loading NIASCFG and following this path:

Select View Status for NIAS > Remote Access

ORBCMD

Purpose

Load orbcmd.nlm (the ORB Command utility) at the server console to enable the Novell® Object Request Broker (ORB) on the server. An ORB is necessary to develop and distribute CORBA*-compliant distributed-object applications.

The ORBCMD automatically loads other NLM™ programs on the server, including the Novell JVM, and enables the use of VisiBroker CORBA commands at the server console.

You must load the orbcmd.nlm before you can use any other ORB-based application clients, servers, or tools.

Syntax

```
[LOAD] ORBCMD
```

Using ORBCMD

To use the Novell ORB, you must also start the Smart Agent, which provides the Novell ORB's directory service and failure detection services. After you load ORBCMD, enter the following at the server console:

```
[LOAD] OSAGENT
```

To distribute and run CORBA-compliant applications on the network or to provide a development environment for CORBA applications, you will need the Open Solutions Architecture (OSA) Software Developers Kit (SDK).

The OSA SDK contains the client component of the Novell ORB, development tools, and Visegenic online documentation for developing and administering CORBA-compliant Java*-based applications.

You can download a copy of the OSA SDK free of charge from the Novell DeveloperNet World Wide Web page (http://developer.novell.com) or contact your Novell Authorized Reseller℠ representative.

PING

Purpose

Use at the server console to send an Internet Control Message Protocol (ICMP) echo request packet to an IP node on your internetwork.

PING determines whether an IP node is reachable on your internetwork.

Syntax

```
[LOAD] PING
```

Using PING

- PING sends an ICMP echo request packet to an IP node on your internetwork. If the target node receives the packet, it sends back a reply packet.
- To select an IP node, enter its hostname or IP address in the Host Name field.

  You can also specify the number of seconds between each packet transmission and the size of the packet, in bytes.

- To start sending packets, press Esc. The sending node continues to send request packets and collect response time statistics until you press Esc again to exit PING.
- To select additional IP nodes, press Insert. Enter the hostname or IP address of the node in the Host Name field. Press Esc to start sending packets.

PPPCON

Purpose

Use PPPCON to view Point-to-Point Protocol (PPP) interface configuration and statistical information.

PPPRNCON

Purpose

Use PPPRNCON to configure Point-to-Point Protocol Remote Node Service (PPPRNS) options. You can use this utility by loading NIASCFG and selecting Configure NIAS > Remote Access > Configure Service > PPPRNS.

PPPTRACE

Purpose

The PPPTRACE utility enables you to debug PPP data link problems.

PPPTRACE fully decodes and displays PPP protocol exchanges. You can also examine network protocol data that flows through the PPP link in a partially decoded format.

Because each captured frame is time-stamped to an accuracy of one-tenth of a second, PPPTRACE can also provide valuable timing information.

PROTECT

Purpose

Use at the server console to load NLM™ programs into a protected address space when the commands to load the NLM programs are in a .ncf file. Specify the .ncf file as a parameter to the command.

Syntax

PROTECT ***filename***

Using PROTECT

Use this command when you normally use a .NCF file to load multiple modules at once, and you want the modules to be loaded into the same protected address space.

The command creates a protected address space with the same name as the .ncf file and executes the .ncf file to load all the modules into the space.

For example,

```
protect grpwise
```

creates a protected address space called grpwise and reads GRPWISE.NCF to load modules into the protected space.

IMPORTANT: Remember that not all modules can run in a protected address space. Some modules, such as LAN and disk drivers, MONITOR, and server.exe, must run in the kernel address space. For more information, see Modules Not Allowed in Protected Address Spaces.

PROTECTION

Purpose

Use at the server console to display a list of protected address spaces or to add or remove restart functionality from an existing address space.

Restart functionality means that if the protected address space faults, the memory management system automatically closes the space, cleans up its resources, restarts the space, and reloads modules into it.

Syntax

PROTECTION [RESTART | NO RESTART *address_space*]

Parameter	Use to
no parameter)	Display a list of address spaces and the modules loaded into them.
RESTART *address_space*	Add restart functionality to the designated address space.
NO RESTART *address_space*	Remove restart functionality from the designated address space.

Using PROTECTION

When you execute PROTECTION without parameters, the server displays a list of all loaded address spaces. Each address space name is followed by a list of the modules loaded into the space, with a short description of each module.

If you add restart functionality to an address space, use the Memory Protection No Restart Interval parameter to prevent the address space from repeatedly faulting and then restarting. See "Memory Parameters" on page 207.

PROTOCOL

Purpose

Use at the server console to

- View the protocols registered on your NetWare® server
- Register additional protocols and frame types

Syntax

PROTOCOL [REGISTER *protocol frame id#*]

Parameter	Use to
(no parameter)	Display the protocols registered on your server.

Parameter	Use to
REGISTER	Register a protocol. It is only necessary to use PROTOCOL REGISTER in unusual cases, such as when using a new media.
protocol	Specify the protocol name.
frame	Specify the name representing the frame type that is to be bound to the communication protocol.
id#	Specify the protocol identification number (also called a protocol ID, PID, an Ethernet type or E-type, or an SAP). This number is a unique, assigned hexadecimal number that tells the server how to recognize data coming from a certain network board through a designated communication protocol (such as IPX™).

Using PROTOCOL

- LAN drivers automatically register IPX; other protocol stacks register themselves.
- For approved protocol loadable modules, consult your reseller. For the protocol name, check the documentation that comes with the protocol module.
- LAN drivers automatically register a frame type when they are loaded. If the LAN driver supports more than one frame type, the frame type is registered when you load the driver with that frame type.

Additional Information

Topic	See
Binding protocols to a LAN driver	“BIND” on page 19.

PSERVER

Purpose

A print server is a *software* program that monitors and manages printers and print queues. PSERVER is the native NetWare® print server that takes jobs from a NetWare print queue and directs them (via NPRINTER) to the assigned printer. In NetWare 6 software, PSERVER is available only as a NetWare Loadable Module™ (NLM™) program that can be loaded on a NetWare server.

NOTE: Multiple PSERVER modules cannot run concurrently on the same NetWare server.

Print server functions can be managed through the NetWare Administrator utility or at the server console.

HINT: This utility is for use with Novell® legacy, queue-based print services. iPrint and Novell Distributed Print Services™ (NDPS®) are the default and preferred print system in NetWare 6. Queue-based printing is fully supported in NetWare 6, which allows your users to continue printing as they always have until you complete the transition to NDPS.

For a discussion of NDPS support for legacy printing, see Supporting Queue-Based Client Workstations. For information on migrating to iPrint and NDPS, see Planning the Migration to Novell Distributed Print Services.

Syntax at Server Console

```
[LOAD] PSERVER
  .CN=printservername.OU=container.O=container
```

Additional Information

Topic	See
Using PSERVER	See Setting Up Print Serviers (http://www.novell.com/documentation/lg/nw51/printenu/data/hx6f2l7r.html#hx6f2l7r) in *NetWare 5.1 Queue-Based Printing*

RCONAG6

Purpose

RCONAG6.NLM is the RConsoleJ Agent. Load this NLM™ at the server console to allow remote console access to the server, using RConsoleJ Client.

Syntax

LOAD RCONAG6 [ENCRYPT] [-E*digest* | *password IP_port IPX_port secure_IP_port*]

Parameter	Use to
(no parameter)	Load RCONAG6 without command line parameters. You will be prompted for a password, IP port number, and IPX™ port number, Secure IP port number.
ENCRYPT	Encrypt the password and create a SYS:SYSTEM\LDRCONAG.NCF script file if desired. This script file can be used to load RCONAG6 at startup. (by inserting LDRCONAG.NCF in AUTOEXEC.NCF).
-E*digest*	Specify an encrypted password (*digest*) that will be used at the command line. To use this parameter, you need to load RCONAG6 using the ENCRYPT option. This parameter is used in the LDRCONAG.NCF file (if you create the file using the ENCRYPT option).
password	Specify the password you want administrators of the remote server to use.
IP_port	Specify the IP port number that RCONAG6 will listen for RConsoleJ or a proxy server on. The default is 2034. -1 disables IP listening. 0 allows a dynamically assigned port to be used.

Parameter	Use to
IPX_port	Specify the IPX port number that RCONAG6 will listen for a proxy server on. The default is 16800. -1 disables IPX listening. 0 allows a dynamically assigned port to be used.
secure_ IP_port	Specify the Secure IP port number that RCONAG6 will listen for RConsoleJ on a SSL-based port on. The default is 2036. -1 disables Secure IP listening. 0 allows a dynamically assigned port to be used.

Using RCONAG6

- If the target server runs Streams-based SPX™ services, you must load the spxs.nlm before loading RCONAG6. See Setting Up RConsoleJ in the *Remote Server Management Guide*.
- Before accessing a target server using RConsoleJ, load RCONAG6 on the server. When you load RCONAG6, you establish a password that must be entered when you execute RConsoleJ.

  To optimize security, use an encrypted password when loading RCONAG6.

  To encrypt the password, enter

  `RCONAG6 ENCRYPT`

  The system prompts for a password. Enter the password. The password is encrypted and two options are provided:

  - (Recommend) Create LDRCONAG.NCF, containing the script, to load RCONAG6.NLM with the encrypted password. This ensures that your password is in clear text. Additionally, you need not remember the password to load RCONAG6.NLM with the encrypted password.
  - Load the RCONAG6.NLM without creating LDRCONAG.NCF

- If you want to connect to an SPX server using RConsoleJ, you must also create a proxy server using RCONPRXY.NLM.
- To make RConsoleJ sessions available whenever you boot the server, enter the following command in the AUTOEXEC.NCF file. (This assumes you have encrypted the password and created the SYS:SYSTEM\LDRCONAG.NCF file.)

  LDRCONAG

Additional Information

Topic	See
Loading RCONPRXY	"RCONPRXY" on page 146
Setting up a target server	Setting Up RConsoleJ in *Remote Server Management*
Using RConsoleJ	"RConsoleJ" on page 148

RCONPRXY

Purpose

Load at the server console to create an RConsoleJ proxy server on a NetWare® 6 server. RConsoleJ proxy servers allow RConsoleJ to access target servers using an IPX™ (or IP) connection.

Syntax

[LOAD] RCONPRXY *TCP_Port*

Parameter	Use to
(no parameter)	Start RCONPRXY without command line parameters. You will be prompted for a TCP port number.

Parameter	Use to
TCP Port	This is the TCP port number on which RCONPRXY will listen for RConsoleJ. The default is 2035. 0 allows a dynamically assigned port to be used.

Using RCONPRXY

- Use RCONPRXY.NLM to allow RConsoleJ to communicate with an NetWare 6 server IPX-only.

  RCONPRXY creates a proxy server through which RConsoleJ can communicate with the IPX-only server.

- The proxy server must run both IP and Streams-based SPX™ services.

  To load Streams-based SPX services on the proxy server, use the SPXS NLM™ program.

Additional Information

Topic	See
Loading RCONAG6	“RCONAG6” on page 144
Setting up a proxy server	See Loading the RConsoleJ Proxy Agent on a Proxy Server in Setting Up RConsoleJ in the *Remote Server Management Administration Guide*
Using RConsoleJ	“RConsoleJ” on page 148

RConsoleJ

Purpose

Use at a workstation or server to remotely control a NetWare® server.

IMPORTANT: For security reasons, this version of RConsoleJ must be used only inside firewalls.

Using RConsoleJ

NetWare 6 provides Java*-based remote console utility (RConsoleJ) that lets you control a NetWare server from a workstation and perform the following tasks:

- Use console commands as you would at the server console
- Use NLM™ programs as you would at the server console (for example, EDIT.NLM to edit files)
- Send console commands in the server's native language from the RConsoleJ Client using Buffer Input
- Control the server from another server using RConsoleJ
- Upgrade a NetWare server (text-based UI only)
- Run a Secure Socket Layer (SSL)-based secure session

You can use the following keystrokes during a remote console session. All other keys function as if you were at the server console.

To	Press
Access the drop-down list of target server console screens	Alt+F1
Cycle to the next target server console screen	Alt+F2
Cycle to the previous target server console screen	Alt+F3

Additional Information

Topic	See
RConsoleJ	*Remote Server Management*
Using RCONAG6	“RCONAG6” on page 144
Using RCONPRXY	“RCONPRXY” on page 146

REBUILD

Purpose

Use REBUILD to recover corrupted Novell® Storage Services™ (NSS) volumes. The REBUILD utility salvages the data it finds on your corrupted NSS volume and recovers it.

NetWare® users may be used to using VREPAIR to repair and rebuild NetWare volumes. VREPAIR still works for traditional NetWare volumes, but it does not work on NSS volumes. For NSS, you must use REBUILD.

Rebuild verifies and uses the existing leaves of an object tree to rebuild all the other trees in the system. The NSS volumes that are verified and rebuilt are placed in maintenance mode. This means the NSS volumes are unusable until this process is finished, and the volume is remounted.

After running REBUILD, you must run the VERIFY utility. VERIFY accounts for all blocks in the system. If errors are found, they are reported to the screen, and the NSS volume is left in maintenance mode. Run REBUILD again until no errors are found. If errors are not found, the volume is placed back in the active state. You may have to mount the volume.

NOTE: This utility only protects against system failures, not hardware failures.

Starting and Using REBUILD

Use REBUILD either in the NSS Administration utility or at the command line.

NOTE: Always back up your data. If an NSS volume exists on several hard disks and one of the hard disks becomes corrupted, you must create a new NSS volume or restore your old NSS volume from backup.

Rebuild NSS Volumes Using the NSS Administration Menus

To rebuild NSS volumes, do the following.

1. Load NSS.
2. Open the NSS Administration menus, by entering

   nss /me
3. Select Utilities > Rebuild NSS Volume.
4. Select the volume to rebuild.
5. Return to Utilities at the main menu and select Verify NSS Volume to check your volume's integrity.

Rebuild NSS Volumes Using the Server Console

To rebuild NSS volumes at the server console, do the following.

1. Load NSS.
2. Rebuild your NSS volume.

   Select one of the following options:

   - To rebuild a single volume, specifying the name, enter

     nss /rebuild=*NSS volume_name*

     The volume you specify will be rebuilt.
   - To rebuild a single volume by selecting from a list of volume names, enter

     nss /rebuild

     A list of volumes appears. Select the preferred volume. You must enter this command for each volume you want to rebuild.
   - To rebuild more than one NSS volume at a time, enter

     nss /rebuild=*NSS volume_name, NSS volume_name*

     A process runs for each volume up to five NSS volumes.
3. Check the output screen.

   This screen indicates the time elapsed, the time remaining, the total elapsed time, the number of objects processed, etc.
4. Verify your rebuilt NSS volume, by entering

   nss /verify=[*NSS volume_name*]

If you don't enter the NSS volume name parameter, you will be prompted to select it.

Additional Information

Topic	See
Maintaining NSS volumes	Viewing Storage Objects
Setting up NSS volumes	Setting Up and Configuring Novell Storage Services in the *Novell Storage Services Administration Guide*

RECORD

Purpose

Use at the server console to record command sequences that you enter at the console over and over. The RECORD command creates a temporary batch file on the server. You can then save the temporary batch file as an .NCF file or delete it from memory.

Syntax

RECORD [*ACTION*] | [*temporary batch file name*]

For example:

To	Enter
Begin recording console commands into a memory batch file called MYLIST1	RECORD START MYLIST1
Close the recording session for the temporary batch file named MYLIST1	RECORD STOP
Type the command sequences in the session named MYLIST1	RECORD TYPE MYLIST1
Remove the recorded session named MYLIST1 from server memory	RECORD KILL MYLIST1

To	Enter
Close the recording session and save it as SYS:SYSTEM\MYLIST1.NCF	RECORD STOP NCF
Execute the list of commands in the MYLIST1 session	REPLAY MYLIST1
Save the MYLIST1 session that has already been closed to SYS:SYSTEM\MYLIST1.NCF.	RECORD SAVE MYLIST1

Additional Information

For information, see "REPLAY" on page 162.

REGISTER MEMORY

Purpose

Use at the server console to configure the operating system to recognize installed memory above the amount of memory that is automatically registered. NetWare® 6 can address up to 4 GB.

IMPORTANT: Use the REGISTER MEMORY command only if absolutely necessary. Manually registering memory can cause memory fragmentation. Ideally, you should upgrade the system board so that NetWare's automatic memory registration will work.

Before using REGISTER MEMORY, try the following:

- Review the CONFIG.SYS or AUTOEXEC.BAT files to make sure nothing is being loaded on the server that prevents memory recognition: sometimes a real mode driver or a memory manager stops NetWare from registering memory above 64 MB.
- If your server contains an older network board, such as many ISA and MCA devices, upgrade to a newer board.
- If you have access to the World Wide Web, search the knowledge base at http://support.novell.com for Register Memory topics.

Syntax

```
REGISTER MEMORY start_address amount
```

Parameter	Use to
start_address	Specify the hexadecimal address where the memory you're adding will start. This is the amount of RAM your server currently recognizes and addresses. This number is usually 16 MB (1000000h); however, the default varies depending on the machine type. To obtain the start address, use the MEMORY command and convert its output to hexadecimal.
amount	Specify an amount of memory, expressed in hexadecimal, that is installed beyond the start address. This number must be divisible by 10h. Up to 1 GB can be registered at one time.

NOTE: In the preceding table and in the following sections, the h after the number denotes a hexadecimal number. The d denotes a decimal number.

For example, 1000000h is 1 million in hexadecimal, and 1000000d is 1 million in decimal.

The hexadecimal numbers A through F correspond to the decimal numbers 10 through 15, respectively.

Using REGISTER MEMORY

- NetWare registers all memory that it recognizes according to bus type. On an ISA bus, NetWare recognizes up to 16 MB. On an EISA or MCA bus, NetWare recognizes all of the memory that is present. On a computer with a Peripheral Component Interconnect (PCI) bus, NetWare 6 recognizes up to 4 GB.
- To have the additional memory registered automatically when the server boots, add the REGISTER MEMORY line to the STARTUP.NCF file.

  IMPORTANT: Place the REGISTER MEMORY command before the command to load disk drivers in the STARTUP.NCF file so that the registered memory will be available to the SYS: volume.

  Failure to register memory before volume Sys is mounted can result in error messages indicating that the cache memory allocator is out of available memory, or that there is insufficient memory to mount volumes.
- If the memory does not register, check for the following possible errors:

- An incorrect hexadecimal value was specified for *start address* or *amount*.
- The *amount* value exceeds the total installed memory. Use the setup or reference diskette that came with the computer to determine the total amount of installed memory.

NOTE: You must avoid memory address conflicts. A conflict occurs if an adapter board uses 16- or 24-bit DMA or Bus-Master DMA.

To resolve this conflict, upgrade to 32-bit bus adapters or use drivers that are modified and certified to compensate for memory-addressing limitations. Or use the machine's configuration program to move system memory around the adapter if the program allows.

- In some cases, the ISA (16-bit) host adapter driver must be loaded in memory below 16 MB. To do so, add the following to the startup.ncf file:

  ```
  LOAD disk_driver
  REGISTER MEMORY amount of memory to add
  ```

  For more information, consult the driver documentation.

Determining the Amount of Memory

The following table lists common start address and amount values for standard computers.

In the table, total memory = start address + amount of memory to add.

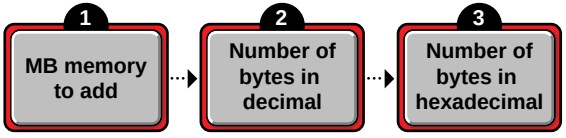
Total Memory	Start Address	Amount of Memory to Add
20 MB	16 MB = 1000000h	4 MB = 400000h
24 MB	16 MB = 1000000h	8 MB = 800000h
28 MB	16 MB = 1000000h	12 MB = C00000h
32 MB	16 MB = 1000000h	16 MB = 1000000h
36 MB	16 MB = 1000000h	20 MB = 1400000h
40 MB	16 MB = 1000000h	24 MB = 1800000h
64 MB	16 MB = 1000000h	48 MB = 3000000h
112 MB	16 MB = 1000000h	96 MB = 6000000h
128 MB	16 MB = 1000000h	112 MB = 7000000h

Total Memory	Start Address	Amount of Memory to Add
256 MB	16 MB = 1000000h	240 MB = F000000h
400 MB	16 MB = 1000000h	384 MB = 18000000h
1 GB (1000 MB)	16 MB = 1000000h	984 MB = 3D800000h
3 GB (3000 MB)	16 MB = 1000000h	2984 MB = BA800000h
3 GB (3000 MB)	64 MB = 4000000h	2936 MB = B7800000h

REGISTER MEMORY requires that the amount of memory to be registered is stated in hexadecimal format. If you are adding an amount of memory that is not in the preceding table, then you need to calculate the amount.

Calculating the Amount of Memory

The following figure illustrates how to calculate the amount of memory you are adding:



1. Start with the amount of memory you are adding stated in decimal MB.

   Obtain this number from the documentation that came with the memory you are adding.

2. Convert the memory value from MB to bytes.

   NOTE: A megabyte of memory is more than a million bytes. One megabyte equals 1,048,576 bytes in decimal.

3. Convert the number of bytes from decimal to hexadecimal notation.

   To do this calculation, you can either use a calculator that converts decimal numbers to hexadecimal, or you can convert manually.

   For example, 1 megabyte = 1,048,576d, which is the same as 100000h.

   So 1,048,576 bytes in decimal equals 100000 in hexadecimal.

   To convert manually, consult a specialized manual.

Examples

- To add 4 MB of memory above 16 MB, type

  ```
  REGISTER MEMORY 1000000 400000
  ```

- To add 24 MB of memory above 16 MB, type

  ```
  REGISTER MEMORY 1000000 1800000
  ```

Additional Information

Topic	See
Editing the startup.ncf file	Using Server Batch Files
Displaying the total amount of memory the server is addressing	“MEMORY” on page 98

REINITIALIZE SYSTEM

Purpose

Use at the server console to enable configuration changes made since the commands in the NETINFO.CFG file were executed.

Syntax

```
REINITIALIZE SYSTEM
```

Using REINITIALIZE SYSTEM

- REINITIALIZE SYSTEM compares the current NETINFO.CFG file with the previous one, which became effective the last time you ran the INITIALIZE SYSTEM or REINITIALIZE SYSTEM command. If REINITIALIZE SYSTEM finds any new commands in the current NETINFO.CFG file, it executes them.
- REINITIALIZE SYSTEM also informs any Simple Network Management Protocol (SNMP)-registered NLM™ file that it is executing. This is a call-back mechanism that enables NLM files that store configuration information outside the NETINFO.CFG file to know that changes to the configuration have taken place.

Limitations of REINITIALIZE SYSTEM

- REINITIALIZE SYSTEM unloads any NLM affected by a configuration change. If REINITIALIZE SYSTEM cannot unload the NLM because of interdependencies with other modules, the configuration change will not take effect. Additionally, not all NLM files register with SNMP for notification of REINITIALIZE SYSTEM.
- When you create a new configuration or delete an existing configuration, REINITIALIZE SYSTEM recognizes the change. However, REINITIALIZE SYTEM may not recognize changes to an already configured NLM that involve more than loading, unloading, binding, or unbinding protocol stacks.

  IMPORTANT: If you are changing an existing configuration, the most effective way to ensure the changes are recognized is to bring down the server. Alternatively, if you know which NLM files have been changed by your modifications, you can unload them, then execute REINITIALIZE SYSTEM.

Additional Information

Topic	See
netinfo.cfg file	“INETCFG” on page 69
INITIALIZE SYSTEM	“INITIALIZE SYSTEM” on page 72

REMIRROR PARTITION

Purpose

Use at the server console to start the remirroring of a logical partition.

Because the server remirrors partitions automatically, you should use REMIRROR PARTITION only if you have stopped remirroring by using the ABORT REMIRROR command or something has caused your server to cease remirroring.

Syntax

```
REMIRROR PARTITION logical_partition_number
```

Parameter	Use to
number	Specify the number of the logical partition you want to start remirroring.

Example

To start remirroring for logical partition 4, type

```
REMIRROR PARTITION 4
```

Additional Information

Topic	See
Stopping remirroring	“ABORT REMIRROR” on page 11
Mirroring and unmirroring partitions	Mirroring and Duplexing Partitions

REMOVE NETWORK ADAPTER

Purpose

Use at the server console to unload one LAN driver when the LAN driver has been loaded multiple times to support multiple boards.

Syntax

```
REMOVE NETWORK ADAPTER filename, [board_instance]
```

Parameter	Use to
filename	Specify the LAN driver name, such as ne2000.lan

Parameter	Use to
board_instance	Specify the instance number of the board if there is more than one board of the same type in the server. Find the instance number in MONITOR by selecting LAN/WAN Drivers and highlighting the driver name. The information window at the top of the screen displays information about the driver, including Board Instance Number.

Using REMOVE NETWORK ADAPTER

If there is only one instance of the network board in the server, you do not need to use REMOVE NETWORK ADAPTER. You can simply unload the LAN driver using the UNLOAD command or the NWCONFIG utility. Unloading the LAN driver releases the memory resources used by the board and driver.

Example

```
REMOVE NETWORK ADAPTER NE2000, 2
```

REMOVE NETWORK INTERFACE

Purpose

Use at the server console to unload one frame type when there are multiple frame types loaded with one LAN driver. Each instance of one frame type loaded with one LAN driver is called a *logical board*.

When you use REMOVE NETWORK INTERFACE to unload a frame type, the associated LAN driver with its other frame types remains loaded and active.

Syntax

REMOVE NETWORK INTERFACE ***board_number*** **|** ***board_name***

Parameter	Use to
board_number	Specify the logical board number. Find the logical board number in MONITOR by selecting LAN/WAN Drivers and highlighting the driver name. The information window at the top of the screen displays information about the driver, including Logical Board Number.
board_name	Specify the logical board name. A name can be assigned to a logical board when the board is loaded using the LOAD command. If no name was assigned to the board, use the logical board number.

REMOVE STORAGE ADAPTER

Purpose

Use at the server console to remove one instance of a storage driver.

Syntax

REMOVE STORAGE ADAPTER A*n*

Parameter	Use to
A*n*	Specify the driver instance you want to remove. Find the number by entering the LIST STORAGE ADAPTERS command at the console. The A*n* number is enclosed in square brackets to the left of the storage adapter name. For example: [V312-A0] ADAPTEC PCI Host Adapter Module To unload the instance of the driver in the example, you would enter the following: REMOVE STORAGE ADAPTER A0

Using REMOVE STORAGE ADAPTER

If only one instance of the driver is currently loaded, the entire driver is unloaded.

If multiple instances of the driver are loaded, only the selected instance is unloaded.

REPLACE

Purpose

Use at the server console to unload and reload a specific module in one step. Entering this command unloads the module and reloads it using the current search path order.

To view the ordering of current search paths on the server, enter **SEARCH** at the server console.

Syntax

REPLACE *MODULE_name*

For example, if you have a new MONITOR NLM program that you have copied to SYS:\SYSTEM, rather than entering

```
UNLOAD MONITOR
```

```
LOAD MONITOR
```

you only need to enter

```
REPLACE MONITOR
```

REPLAY

Purpose

Use at the server console, to execute a list of commands that were recorded in and saved in a session using the RECORD command.

Syntax

REPLAY [*session_name*]

For example, if the session was named MYLIST1, enter

REPLAY MYLIST1

Additional Information

For information, see "RECORD" on page 151.

RESET ENVIRONMENT

Purpose

Use at the server console to reset server parameters that have been modified to their default values. You can reset all modified parameters or you can confirm only those resets that you want.

Syntax

RESET ENVIRONMENT

Using RESET ENVIRONMENT

RESET ENVIRONMENT lists the first server parameter with the option of resetting the current value to the default value or of retaining the modified value. You can also reset all parameters that have modified settings to their default values, or else quit the utility.

The following example illustrates part of the command display:

```
Reset variable TIMESYNC Hardware Clock
       (Y)es, (N)o, (A)ll, (Q)uit ?
```

Additional Information

Topic	See
List server parameters with current settings	“DISPLAY ENVIRONMENT” on page 41
List server parameters with modified settings	“DISPLAY MODIFIED ENVIRONMENT” on page 44
Print server parameters with current settings to a file.	“MONITOR” on page 103 MONITOR Available Options > Server Parameters

RESET NETWORK ADAPTER

Purpose

Use at the server console to reset a network adapter manually.

WARNING: Resetting a network adapter stops whatever work the adapter is doing and resets it to a clean state.

Syntax

RESET NETWORK ADAPTER ***filename*****,** **[*****board_instance*****]**

Parameter	Use to
filename	Specify the LAN driver name, such as ne2000.lan
board_instance	Specify the instance number of the board if there is more than one board of the same type in the server. Find the instance number in MONITOR by selecting LAN/WAN Drivers and highlighting the driver name. The information window at the top of the screen displays information about the driver, including Board Instance Number.

Using RESET NETWORK ADAPTER

You might want to reset an adapter manually if you suspect a problem with the hardware. Resetting the adapter also resets the logical boards associated with the adapter.

Network adapters reset themselves automatically if something goes wrong. About one reset a day is normal. A great number of resets, such as one reset a minute, usually indicates a hardware problem.

Resets are included in the LAN statistics displayed in MONITOR. Select LAN/WAN Drivers and highlight a driver name. Press Tab to expand the information window at the top of the screen. Look for Adapter Resets in the Generic Counters section of the screen.

Example

```
RESET NETWORK ADAPTER NE2000, 2
```

RESET NETWORK INTERFACE

Purpose

Use at the server console to restart a logical board that has been shut down using the SHUTDOWN NETWORK INTERFACE command. See "SHUTDOWN NETWORK INTERFACE" on page 250. (A *logical board* is an instance of one frame type associated with one LAN driver.)

RESET NETWORK INTERFACE restarts the logical board without requiring you to reload and bind the LAN driver.

NOTE: Resetting the logical board does not reset the adapter.

Syntax

```
RESET NETWORK INTERFACE board_number | board_name
```

Parameter	Use to
board_number	Specify the logical board number. Find the logical board number in MONITOR by selecting LAN/WAN Drivers and highlighting the driver name. The information window at the top of the screen displays information about the driver, including Logical Board Number.
board_name	Specify the logical board name. A name can be assigned to a logical board when the board is loaded using the LOAD command. If no name was assigned to the board, use the logical board number.

RESET ROUTER

Purpose

Use at the server console to reset the router table in the server if the table becomes inaccurate or corrupted.

Syntax

```
RESET ROUTER
```

Using RESET ROUTER

- If several servers or bridges go down, packets sent to or through their routers are lost. Use RESET ROUTER to update router tables on active servers.
- Normally, the router updates its tables every minute. This command updates the router table immediately.

RESTART SERVER

Purpose

Use at the server console to bring down the server and then to restart it immediately after.

Syntax

RESTART SERVER [*-parameter*]

Parameter	Use to
(no parameter)	Restart the server and invoke all .ncf files.
-ns	Restart the server without invoking the startup.ncf file. For example, type: **RESTART SERVER -ns**
-na	Restart the server without invoking the AUTEXEC.NCF file.

Using RESTART SERVER

RESTART SERVER is useful when troubleshooting requires that you bring down the server frequently. (If you need to bring the server down to reboot it with new parameters, use "DOWN" on page 49.)

Additional Information

Topic	See
Restarting the server from DOS	"SERVER" on page 184

RIGHTS

Purpose

Use at a workstation to

- View or modify user or group rights for files
- View or modify user or group rights for directories and volumes

Syntax

RIGHTS *path* [[+ | -] *rights*] [/*option*...] [/? | /VER]

Parameter	Use to
path	Specify the path to the file, directory, or volume you want to modify or view rights to (you must always specify a path).
+ | -	Add or delete the specified rights. See "Using RIGHTS" on page 169.
rights	Specify one or more file or directory rights. See "File and Directory Rights" on page 168.
/*option*	Replace *option* with any available option. See "RIGHTS Options" on page 167.
/?	View online help. All other parameters are ignored when /? is used.
/VER	View the version number of the utility and the list of files it uses to execute. All other parameters are ignored when /VER is used.

RIGHTS Options

Option	Use to
/C	Scroll continuously through output.
/F	View the Inherited Rights Filter (IRF).

Option	Use to
/I	View the trustee and group rights that created the inherited rights, and view where the inherited rights came from.
/NAME=*username*	View or modify rights for the user or group listed. Replace *username* with the name of the user or group whose rights you want to view or modify.
/S	View or modify subdirectories below the current level.
/T	View trustee assignments in a directory.

File and Directory Rights

The following table lists the rights, the letter to use for each right, and what the right is used for.

Right	Use to
S (Supervisor)	Grant all rights to the file or directory.
R (Read)	Open and read files in the directory.
W (Write)	Open and write to files in the directory.
C (Create)	Create files and subdirectories.
E (Erase)	Erase files and directories.
M (Modify)	Rename files and directories, and change file attributes.
F (File Scan)	View and search on file and directory names in the file system structure.
A (Access Control)	Add and remove trustees and change trustee rights to files and directories.
N (No Rights)	Remove all rights.
REM (Remove)	Remove the user or group as a trustee of the specified file or directory.
ALL	Add All rights except Supervisor.

Using RIGHTS

- If you use + (plus) to add rights, the rights you list are added to the existing rights.
- If you use - (minus) to remove rights, the rights you list are deleted from the existing rights.
- If you add and delete rights in the same command, group all added rights together and all deleted rights together.
- If you list rights without using + or -, the rights you list replace the existing rights.
- You must always specify a path. You can use a period (.) to represent your current directory.
- You can use wildcard characters.

Examples

- To set the trustee rights in the current directory for user JANICE to Read, Write, and File Scan, type

  ```
  RIGHTS . R W F /NAME=JANICE
  ```

- To remove user ERNESTO from ALICE/SYS:USERS, type

  ```
  RIGHTS ALICE/SYS:USERS REM /NAME=ERNESTO
  ```

- To see where user PATRICK's inherited rights came from for SYS:USERS/HOME, type

  ```
  RIGHTS SYS:USERS/HOME /NAME=PATRICK /I
  ```

ROUTE

Purpose

Use at the server console on a token ring cabling system to pass frames (packets) from NetWare® through IBM*-compatible source route bridges.

ROUTE enables the operating system to

- Keep track of the source routing information in the frames
- Configure the source routing information in the frames according to the parameters with which ROUTE is loaded

  NOTE: You must load the token ring LAN driver before you load ROUTE.

ROUTE and most ROUTE parameters can also be configured using the INETCFG utility. See "Configuring Source Route End Station Parameters with INETCFG" on page 174.

Syntax

```
[LOAD] [path]ROUTE [BOARD=number] [NAME=board_name]
  [DEF|GBR|MBR] [TIME=number] [RSP=AR|NR] [CLEAR] |
  [REMOVE=number] [XTX=number] [UNLOAD [BOARD=number]]
```

Parameter	Use to
path	Specify the path to ROUTE.NLM if you moved it from the default directory.
BOARD=*number*	Specify the board you want to change parameters on or load ROUTE for. Replace *number* with the board number. If you don't specify a board number, the default is board number 1, or the board name specified in the NAME parameter. The system numbers the boards, using 1 for the first driver loaded. (Check the order in the autoexec.ncf file.)
NAME=*board_name*	Specify the board name.
DEF (Default)	Specify that all Unknown Unicast frames are to be sent as All Routes Broadcast frames. If DEF is specified, all frames with addresses not in the server's Source Routing table are forwarded as All Routes Broadcast frames. If DEF is not specified, all frames with addresses not in the server's Source Routing table are forwarded as Single Route Broadcast frames. If ROUTE is already loaded with the DEF parameter, reloading ROUTE with DEF sends all Unknown Unicast frames as All Routes Broadcast frames.

Parameter	Use to
GBR (General Broadcast frames)	Specify that all General Broadcast frames are to be sent as All Routes Broadcast frames. If this parameter is not specified when ROUTE is loaded, all General Broadcast frames are broadcast as Single Route Broadcast frames. If ROUTE is already loaded with the GBR parameter, reloading ROUTE with GBR broadcasts all General Broadcast frames as All Routes Broadcast frames.
MBR (Multicast Broadcast frames)	Specify that all Multicast frames are to be sent as All Routes Broadcast frames. If the parameter is not specified when ROUTE is loaded, all Multicast frames are broadcast as Single Route Broadcast frames. If ROUTE is already loaded with the MBR parameter, reloading ROUTE with MBR broadcasts all Multicast frames as All Routes Broadcast frames.
TIME=*number*	Specify how often the Source Routing table should be updated. Replace *number* with a value from 3 to 255 seconds. The default is 10 seconds. This parameter forces the table to be updated with a new route if the route isn't used during the specified time. It enables ROUTE to determine alternate routes dynamically when an IBM bridge goes down.

Parameter	Use to
RSP=*value* (Respond)	Specify how the server should respond to a broadcast request. Replace *value* with one of the following: NR: Specifies that all Broadcast Requests are to be responded to directly; a Broadcast Response isn't required. AR (the default): Specifies that all Broadcast Requests are to be responded to with an All Routes Broadcast frame.
CLEAR	Clear the Source Routing table. Use when an IBM bridge has gone down and an alternate route is available. CLEAR forces a dynamic rebuilding of the table by sending a default frame to each specific node in the network. Use CLEAR to completely clear the Source Routing table, or use REMOVE to clear only one node address from the Source Routing table.
REMOVE=*number*	Remove a specified node address from the server's Source Routing table. Replace *number* with a 12-digit (6-byte) hexadecimal number. If you enter fewer than nine digits, ROUTE prefixes the address with 4000 in hexadecimal. For example, REMOVE=2 becomes REMOVE=400000000002. Use REMOVE when a bridge has gone down. When you remove the node from the Source Routing table, you force the server to determine an alternate route.
XTX=*number*	Specify the number of times to transmit on a timed-out route, using the old route. Replace *number* with a value between 00 and 255 seconds. The default is 02 times.

Parameter	Use to
UNLOAD [BOARD=*number*]	Use to remove source routing support for a specified board. If you don't specify a board number, the default is 1. **Example:** **`LOAD ROUTE UNLOAD BOARD=2`** **Note:** This parameter does not unload ROUTE.NLM, but disables source routing only for the board that you specify.

Using ROUTE

- No parameters are required. However, you can load ROUTE a second time with a specified parameter to change the configuration.
- Most of the parameters have default values that should work with simple configurations for IBM bridges.

  If you have parallel IBM bridges, you can change some of the parameters to reduce traffic on some of the paths.
- As frames pass through an IBM bridge, source routing information is added to the frame header at the Media Access Control (MAC) layer. The operating system's bridging is done above this layer.
- ROUTE can be loaded reentrantly.
  - If you have two token ring boards in the server, load ROUTE twice. The second time you load it, use the BOARD or NAME parameter to specify a particular board.
  - To change the configuration, load ROUTE with the parameter that needs to be changed.

Configuring Source Route End Station Parameters with INETCFG

You can use INETCFG to load ROUTE and configure many source route end station parameters.

To use INETCFG, follow these steps.

1. Load INETCFG.
2. Select Internetwork Configuration > Boards to load a token-ring board.
3. Return to the Internetwork Configuration menu and use the Protocols option to enable Source Route End Station.
4. Return to the Internetwork Configuration menu and select Bindings.

   A list of bindings appears.
5. Select an existing binding or press Insert to add a new binding.

   A list of enabled protocols appears.
6. Select Source Route End Station.

   A list of boards is displayed.
7. Select the token ring board you configured with the Boards option.

   The Attach Source Route End Station to an Interface menu appears.

   The Source Route End Station parameters are listed in the following table.

Table 3 Source Route End Station Parameters

Parameter	Use to
Interface Name (same as NAME=*board_name* command line parameter)	View the name of the interface to which the end station source router is bound. This field is read-only.
Frame Type	View or modify the source route end station list of frame types. Press Enter to see the list. Press Insert to select a frame type. Press Delete to remove a frame type.

Parameter	Use to
Send Frames with Unknown Address (same as DEF [Default] command line parameter)	Specify the type of explorer frame the end station source router sends to an unknown node address. **Options:** Single Route Explorer Frame, All Routes Explorer Frame **Default:** Single Route Explorer Frame
Send Broadcast Frames (same as GBR command line parameter)	Specify the type of explorer frame the end station source router sends to a broadcast destination address. **Options:** Single Route Explorer Frame, All Routes Explorer Frame **Default:** Single Route Explorer Frame
Send Multicast Frames (same as MBR command line parameter)	Specify the type of explorer frame the end station source router sends to a multicast, group, or functional address. **Options:** Single Route Explorer Frame, All Routes Explorer Frame **Default:** Single Route Explorer Frame
Respond to Broadcast Request (same as RSP command line parameter)	Specify how the end station source router responds to a single route explorer frame. **Options:** Specifically Routed Frame, All Routes Explorer Frame **Default:** All Routes Explorer Frame
Route Update Interval (same as TIME=*number* command line parameter)	Specify the minimum delay in seconds before the end station source router updates the route for a given node. **Range:** 0 to 65,535 seconds (0=infinite) **Default:** 10

NOTE: To remove source route bridge support for the specified board, disable the binding.

Additional Information

Topic	See
INETCFG	“INETCFG” on page 69
Source routing and broadcast frames	*IBM Token-Ring Network Architecture Reference*

SCAN ALL

Purpose

Use at the server console to scan all LUNs of all SCSI adapters in the server or all LUNs associated with a designated SCSI adapter.

IMPORTANT: SCAN ALL forces a scan and takes an order of magnitude longer to execute than SCAN FOR NEW DEVICES does. SCAN ALL should be used only when you know that there is an undetected device on a LUN other than LUN0.

Syntax

SCAN ALL A*n*

Parameter	Use to
(no parameter)	Scan all LUNs of all SCSI adapters in the server.
A*n*	Specify the SCSI adapter you want to scan. Find the A*n* number by entering the LIST STORAGE ADAPTERS command at the console. The A*n* number is enclosed in square brackets to the left of the storage adapter name, for example: [V312-A0] ADAPTEC PCI Host Adapter Module To scan all LUNs associated with the adapter in the example, you would enter: **SCAN ALL A0**

Using SCAN ALL

Several utilities perform much the same operation, but they each differ in some respects.

- LIST STORAGE ADAPTERS displays a list of registered storage adapters and the devices they drive. The information is read from the Media Manager database.
- LIST DEVICES forces a scan for devices , displays the return list of storage devices, and registers any new devices with the Media Manager database. This command does not simply read the database.

- SCAN FOR NEW DEVICES forces a scan on LUN0 of SCSI adapters and registers new devices with the Media Manager so that they are available to the operating system. This command scans only SCSI devices.

Additional Information

Topic	See
Read the Media Manager database and display a list of registered storage devices and controllers	“LIST STORAGE ADAPTERS” on page 83
Scan devices and register new devices with Media Manager	“LIST DEVICES” on page 81
Scan for new SCSI devices and register them with the Media Manager	“SCAN FOR NEW DEVICES” on page 177
Storage device drivers	Drivers for Host Adapters and Storage Devices
Determine the operating status of a storage device	Activating and Deactivating a Hard Disk
Mounting and dismounting a CD-ROM device	Managing Removable Media Devices

SCAN FOR NEW DEVICES

Purpose

Use at the server console to force a scan on LUN0 of SCSI adapters and to register new devices with the Media Manager so that they are available to the operating system.

Syntax

```
SCAN FOR NEW DEVICES
```

Using SCAN FOR NEW DEVICES

- Use this utility if you add new devices after you boot your server and the devices do not then appear with the LIST DEVICES command.
- If devices have been added, but the drivers aren't loaded in startup.ncf, use SCAN FOR NEW DEVICES after loading the drivers to register the devices with the system.
- After you boot the server, if NetWare® detects new devices, SCAN FOR NEW DEVICES registers the devices with the operating system. It does not return a message to the screen.
- This command scans only LUN0 of SCSI adapters. To scan all LUNs of SCSI adapters, use SCAN ALL. However, SCAN ALL should be used only when you know that there is an undetected device on a LUN other than LUN0. SCAN ALL may take far more time for to execute than does SCAN FOR NEW DEVICES. See "SCAN ALL" on page 176.
- SCAN FOR NEW DEVICES does not produce any output.
- If you remove a Hot Plug mirrored disk without bringing down the server, you must execute SCAN FOR NEW DEVICES as soon as you remove the disk. This lets the system know that the remaining disk in the mirrored pair is no longer synchronized with a mirrored partner. If you unmirror the disk before removing it, you do not need to run SCAN FOR NEW DEVICES.

Additional Information

Topic	See
Read the Media Manager database and display a list of registered storage devices and controllers	"LIST STORAGE ADAPTERS" on page 83
Scan devices and register new devices with Media Manager	"LIST DEVICES" on page 81
Scan for all SCSI devices or a specified SCSI device and register new devices with the Media Manager.	"SCAN ALL" on page 176

Topic	See
Storage device drivers	Drivers for Host Adapters and Storage Devices
Determine the operating status of a storage device	Activating and Deactivating a Hard Disk
Mounting and dismounting a CD-ROM device	Managing Removable Media Devices

SCRSAVER

Purpose

Use to lock the server console and to activate a screen saver for the console display.

NOTE: The screen saver and the console-locking features were formerly part of MONITOR. Separating them from monitor.nlm allows the new utility to protect the console by using the stronger security of eDirectory authentication.

Syntax

SCRSAVER [*option*][;*option*][;*option*] [...]

When SCRSAVER is loaded, you can use any of the following command options as console commands.

Command options	Use to
(no parameters)	Default to SCRSAVER AUTO CLEAR DELAY=60; DELAY=600; ENABLE; ENABLE AUTO CLEAR; ENABLE LOCK.
ACTIVATE	Override the delay interval and activate the screen saver immediately. ACTIVATE also overrides both DISABLE and ENABLE modes. This means that if you enter ACTIVATE when the screen saver has been disabled, the DISABLE mode is changed to ENABLE so that the screen saver can appear.

Command options	Use to
AUTO CLEAR DELAY	Set the number of seconds to wait before clearing the unlock dialog box. The range is 1 to 300 and the default is 60, or one minute.
DELAY	Set the number of seconds to wait before activating the screen saver. The range is 1 to 7000 and the default is 600, or 10 minutes.
DISABLE	Disable the screen saver, thereby preventing it from activating and saving the console display.
DISABLE AUTO CLEAR	Disable the automatic clearing of the unlock dialog box. When this command is executed, the unlock dialog box remains on the screen until it is cleared by user input.
DISABLE LOCK	Disable the console lock. When the locking feature is disabled, you can retrieve the console display without a username or password simply by pressing any key.
ENABLE	Enable the screen saver. When enabled, the screen saver displays after the keyboard has been inactive for the number of seconds specified in the DELAY command option.
ENABLE AUTO CLEAR	Enable the automatic clearing of the unlock dialog box after the number of seconds of keyboard inactivity specified in the AUTO CLEAR DELAY command option
ENABLE LOCK	Enable the console locking feature. When enabled, the screen saver requires the username and password before restoring the console display. The user object must have appropriate rights
HELP	Display information about command options and their use.
NO PASSWORD	Unlock the console without requiring a password in the event that eDirectory becomes unavailable. You must set this option when you load SCRSAVER. Otherwise, the console cannot be unlocked when eDirectory is unavailable.
STATUS	Display the current status of screen saver features and command options.

Using SCRSAVER

When the screen saver is displayed, a snake-like figure—one for each online processor—appears on the blank console screen. The snake for processor 0 is red and the snake for processor 1, blue, etc. The snakes move randomly on the screen, and as processor utilization increases, the snakes move faster and their tails lengthen.

When scrsaver.nlm is loaded, the server console can be in one of three states.

- **Active.** The console is active—you can enter console commands and monitor server activity.
- **Screen Saver.** The console can be locked or unlocked.

  If the console is not locked, the screen saver appears by default after 10 minutes of inactivity. To retrieve the console display, press any key.

  If the console is locked, the screen saver appears by default after one minute of inactivity. To retrieve the console display, the console must first be unlocked.
- **Verifying.** SCRSAVER verifies rights to the console through eDirectory authentication.

  To unlock the console, you must supply an eDirectory username and password. SCRSAVER verifies that the user object has write rights to the ACL attribute of this particular server.

The chance of eDirectory™ becoming unavailable is very slim, but you can load SCRSAVER with the NO PASSWORD option to ensure that you can (if necessary) unlock the console without a password. (Of course, a password would still be required when eDirectory was available.)

For example, you might decide to run DSREPAIR in manual mode. In such a case, the eDirectory database would be locked until there was manual intervention. If SCRSAVER were also active and locked the console on schedule, you would have a deadlock situation—unlocking the console would be dependent on eDirectory authentication—and making eDirectory available for authentication would be dependent on unlocking the console.

If you first load SCRSAVER with NO PASSWORD, you avoid having to power off the machine or break into the debugger to exit NetWare®. To ensure that SCRSAVER is loaded when the server is started, you can use place SCRSAVER in the autoexec.ncf file.

SEARCH

Purpose

Use at the server console to

- Tell the server where to look for loadable module files and .ncf files
- Add other search paths or delete current search paths
- View the current search paths for the operating system

Syntax

SEARCH [ADD [*number*] *path*]

or

SEARCH DEL [*number*]

Parameter	Use to
(no parameter)	View the current search paths.
number	Specify the number of the search drive you want to add or remove.
path	Specify the complete path of the directory you want searched. (The default is sys:system.) Begin the path with a DOS drive letter or a NetWare® volume name.

Using SEARCH

- To set search paths each time the server comes up, place the SEARCH commands in the autoexec.ncf file.
- If you execute SECURE CONSOLE, SEARCH is disabled to prevent modules from being loaded from directories other than the boot directory. The sys:system search path remains in effect, but you cannot create new search paths.

  Once you execute SECURE CONSOLE, you must bring down the server and reboot it to create additional search paths.

  NOTE: When the server comes up and volume SYS: is mounted, the search path to the boot partition is deleted.

Example

- To display the current server search paths, type

  SEARCH

- To add vol1:ncf (a network directory) as a search path, type

  SEARCH ADD VOL1:NCF

Additional Information

Topic	See
Search drives	Network Search Drive Mappings

SECURE CONSOLE

Purpose

Use at the server console to increase network security by

- Preventing loadable modules from being loaded from any directory other than the boot directories—SYS:SYSTEM or C:\NWSERVER
- Preventing keyboard entry into the operating system debugger
- Preventing the server date and time from being changed

Syntax

SECURE CONSOLE

Using SECURE CONSOLE

- When you execute SECURE CONSOLE, path specifiers are disabled. The sys:system search path remains in effect, but you cannot create new search paths.
- Use of SECURE CONSOLE is recommended, especially in security-sensitive environments. SECURE CONSOLE prevents the following types of breaches in security:

- **Trojan Horse modules.** If you don't use SECURE CONSOLE, a module can be loaded from a DOS partition, a diskette drive, or any directory on a NetWare® volume.

  If you allow modules to be loaded from all these drives, anyone who has access to the server console can load a loadable module. An intruder could create a module to access or alter any information on the server, or to change user account information at the server security level.

- **Date and Time Modifications.** Some security and accounting features (such as password expiration, time restrictions, intruder detection, and lockout intervals) depend on date and time for their enforcement.

  If you don't use SECURE CONSOLE, an intruder can change the date and time at the server and bypass these time-dependent features.

- To disable SECURE CONSOLE, use DOWN to bring down the server in an orderly way, and then reboot the server.

Additional Information

Topic	See
Server console	The Server Console
Screen saver and console lock	"SCRSAVER" on page 179

SERVER

Purpose

Use at the server console from the DOS prompt to

- Boot the NetWare® operating system on your server
- Automatically load bound-in modules
- Execute the startup.ncf file
- Mount volume SYS:
- Execute the AUTOEXEC.NCF file

Syntax

SERVER [*parameter*]

Parameter	Use to
-s [*path*]*filename*.NCF	Specify an alternative to STARTUP.NCF. Replace *filename* with the name of the alternate file. (The file extension must be .NCF) The system looks for the file in the current boot directory, unless you specify a path.
-na	Prevent the autoexec.ncf file that you created in INSTALL from executing. This parameter is useful if you are changing drivers or other commands in your AUTOEXEC.NCF file.
-ns	Prevent the STARTUP.NCF and AUTOEXEC.NCF files created in INSTALL from executing. This parameter is useful for changing the boot process.
-nl	Prevent the logo (server splash graphic) from displaying while server components are loading in the background.

Using SERVER

- SERVER is an executable file containing bound-in modules. SERVER uses DOS as a cold boot loader to boot the NetWare operating system. From then on, NetWare is in control and loads modules.
- If neither of the .ncf files exists, SERVER prompts you for a server name and an IPX™ internal network number; SERVER then brings up the console prompt (:).

  IMPORTANT: The internal net number is used as a server ID in IP networks as well as IPX networks. Do not delete it from .ncf files.
- To automatically bring up the server when you boot up the machine, you can place the SERVER command in the autoexec.bat file in your boot partition.

- SERVER executes startup.ncf and autoexec.ncf, if they exist.
- To prevent the Novell® logo (server splash screen) from displaying, you can load SERVER with the -nl (no logo) command option. Otherwise the graphics screen displays for about 10 seconds while server components are loading in the background.

  HINT: To substitute a different image for the current logo screen, place a file called NWLOGO.BMP (for machines using a 256-color palette) or NWLOGO16.BMP (for machines using a 16-color palette) in the same directory as server.exe (must be in .BMP format).

  BIOS limitations on the size and resolutions of the image are 640x480 pixels. The server will display the 256-color version, if possible; otherwise, the server will use the 16-color image. If neither is found in the directory, the default logo screen is displayed.

Additional Information

Topic	See
Restarting server execution from the console prompt	"RESTART SERVER" on page 166
Bringing the server down	Starting and Stopping the Server
Editing .ncf files	Using Server Batch Files

SET

Purpose

Use at the server console to view and configure operating system parameters.

HINT: You can also modify server parameter values from MONITOR's Available Options, and then Server Parameters or using NetWare Remote Manager's, Set Parameters link.

The default SET parameter values give maximum performance for most systems. Server parameter values should seldom need to be modified.

Syntax

SET [*parameter*] = [*value*]

Parameter categories:

Using SET

Although most default values of the server parameters don't need to be modified, you might increase the performance of your system by adjusting the values of certain parameters. Suggestions for improving server performance can be found in Optimizing the NetWare Server and Setting Server Parameter Values in the *Server Operating System Administration Guide*.

Server parameter settings are persistent in NetWare®. If the server goes down, any settings that you have made to tune your server for performance will not be lost.

Displaying and Changing Current Settings

- If you type SET without a parameter, a list of numbered categories appears. When you select a category, the current settings for the server parameters in that category appear, along with a brief description of each parameter, the range of valid values, and the default value.
- If you type SET with a parameter but no value, the current setting, range of valid values, and a brief description of the parameter are displayed.
- If you type SET with a parameter and a value, the operating system is reconfigured according to the specified value.

You can also use the MONITOR utility to modify server parameter values. See "MONITOR" on page 103.

Entering Parameters

- You can modify the values of most SET parameters at the console prompt. The system is immediately configured to that setting. Any setting in the AUTOEXEC.NCF file is overridden.
- You can enter SET commands that you execute at the console prompt in the AUTOEXEC.NCF file. When a parameter value is set in this file, the server configures itself to that setting each time the server is booted—unless the value is modified.
- Some commands can be also saved in the STARTUP.NCF file. Use NWCONFIG to edit both the AUTOEXEC.NCF and the STARTUP.NCF file.

Parameters that Control the Allocation of Services

Some SET parameters control how the system dynamically allocates services. Three types of parameters interact to control the allocation of a service:

- Maximum limits control the amount of server resources the operating system can allocate for a particular service.
- Minimum limits allow the operating system to allocate a minimum amount of resources as soon as a request is received.

  Low minimum limits slow the growth of a particular service. High minimum limits allow rapid growth.

  For example, if the minimum number of directory cache buffers is set to 20, the system allocates another buffer resource as soon as a request is made—until 20 cache buffers have been allocated.

  When 20 directory cache buffers are allocated, the system waits 2.2 seconds (default) when a request comes in, and then allocates another buffer if the request is still active.

  However, if the minimum number of directory cache buffers is set to 40, the system allocates 40 directory cache buffers before it starts slowing the growth by waiting 2.2 seconds after each request.
- Wait time limits control how rapidly the operating system can allocate a new resource.

Common File System Parameters

Common File System Parameters contain parameters that apply to both the NSS file system and the traditional file system. For a description of file system parameters, see the following table.

Table 4 Common File System Parameters

Parameter	Use to
Maximum Transactions = *number*	Specify how many transactions can occur at the same time. **Supported values:** 100 to 10000 *Default*: 10000
Maximum Concurrent Directory Cache Writes = *number*	Specify how many write requests from directory cache buffers are put in the elevator before the disk head begins a sweep across the disk. **Supported values:** 5 to 500 *Default*: 75 A high number creates more efficient write requests. A low number creates more efficient read requests.
Minimum File Delete Wait Time = *time*	Specify how long a deleted file remains salvageable on the volume. **Supported values:** 0 seconds to 7 days *Default*: 1 minute 5.9 seconds Files deleted for less than this minimum aren't automatically purged even if the volume is full and users can't create new files.
Immediate Purge of Deleted Files = *value*	**Supported values:** ON, OFF *Default*: OFF If this parameter is set to ON, all files are purged immediately when they are deleted.
Compression Daily Check Stop Hour = *number*	Specify the hour when you want the file compressor to stop scanning enabled volumes for files that need to be compressed. **Supported values:** 0 to 23 *Default*: 6 Hours are specified by a 24-hour clock: 0 = midnight; 23 = 11 p.m. This parameter can be set in the STARTUP.NCF file.

Parameter	Use to
Compression Daily Check Starting Hour = *number*	Specify the hour when you want the file compressor to start scanning enabled volumes for files that need to be compressed. **Supported values:** 0 to 23 *Default*: 0 Hours are specified by a 24-hour clock: 0 = midnight; 23 = 11 p.m. **Note:** If the Compression Daily Check Stop Hour parameter is the same as the Compression Daily Check Starting Hour, then the file compressor starts checking every day at the Compression Daily Starting Hour time and runs as long as necessary to finish all files that meet the compressible criteria. This parameter can be set in the STARTUP.NCF file.
Minimum Compression Percentage Gain = *number*	Set the minimum percentage a file must compress to remain in a compressed state. **Supported values:** 0 to 50 *Default*: 20 This parameter can be set in the STARTUP.NCF file.
Enable File Compression = *value*	Specify whether file compression is suspended. **Supported values:** ON, OFF *Default*: ON ON allows file compression on compression-enabled volumes. OFF suspends compression; immediate compress requests are queued until value is reset to ON, when the files meeting criteria will be compressed. This parameter can be set in the STARTUP.NCF.
Maximum Concurrent Compressions = *number*	Specify the maximum concurrent or simultaneous compressions allowed. **Supported values:** 1 to 8 *Default*: 2 Concurrent compressions can occur only if there are multiple volumes. This parameter can be set in the STARTUP.NCF file.

Parameter	Use to
Convert Compressed to Uncompressed Option = *value*	Specify what the file system does with an decompressed version of a file after the server has decompressed it. **Supported values:** 0 = Always leave the file compressed. 1 = Leave the file compressed until second access if it is read only once during the time specified by the Days Untouched Before Compression parameter. 2 = Always leave the file decompressed. *Default*: 1 This parameter can be set in the STARTUP.NCF file.
Decompress Percent Disk Space Free to Allow Commit = *number*	Specify the percentage of free disk space required on a volume for file decompression to permanently change compressed files to decompressed. **Supported values:** 0 to 75 *Default:* 10 This parameter prevents newly decompressed files from filling up the volume. This parameter can be set in the STARTUP.NCF file.
Decompress Free Space Warning Interval = *number*	Specify the time between alerts when the file system is not changing compressed files to decompressed because of insufficient disk space. Setting the interval to 0 turns off the alert. **Supported values:** 0 seconds to 29 days 15 hours 50 minutes 3.8 seconds *Default:* 30 minutes 57.2 seconds This parameter can be set in the STARTUP.NCF file.
Deleted Files Compression Option = *number*	Specify whether and when deleted files are compressed. **Supported values:** 0 = Don’t Compress deleted files 1 = Compress deleted files the next day 2 = Compress deleted files immediately **Default:** 1 This parameter can be set in the STARTUP.NCF file.

Parameter	Use to
Days Untouched Before Compression = *number*	Specify the number of days the system waits after a file was last accessed before it is compressed. **Supported values:** 0 to 100000 *Default:* 14 This parameter can be set in the STARTUP.NCF file.

Communications Parameters

Communication parameters control settings for communication buffers. Four parameters configure packet receive buffers; four control the watchdog.

- Packet Receive Buffers are areas in the server's memory that are set aside to hold data packets. The packets remain in the buffers while the server processes them.

  You can monitor the current number of allocated packet receive buffers in MONITOR's General Information screen.

- Watchdog Packets are used to make sure stations are connected. If the server doesn't receive a packet from a station within a set time (Delay Before First Watchdog Packet), a watchdog packet is sent to the station.

  If the station doesn't respond within a configurable amount of time (Delay Between Watchdog Packets), another packet is sent.

  If the station doesn't respond to a set number of packets, the server assumes that the station is no longer connected and clears the station's connection.

For a description of communications parameters, see Table 5 on page 193.

Table 5 Communications Parameters

Parameter	Use to
Maximum Packet Receive Buffers = *number*	Specify the maximum number of packet receive buffers the operating system can allocate. **Supported values:** 50 to 25000 *Default:* 5000 Before increasing this parameter, use MONITOR to view the server's use of packet receive buffers and service processes. If the number of packet receive buffers is at maximum, increase this parameter in increments of 10 until you have one packet receive buffer per workstation. If you have EISA or microchannel bus master boards in your server, increase this parameter to provide at least five buffers per board. If the board is producing No ECB available count errors, provide 10 buffers per board. Use MONITOR (LAN/WAN Drivers) to determine if the board is producing errors. If the number of allocated service processes is at maximum, you can increase the Maximum Service Processes parameter to decrease the need for more packet receive buffers. The value of this parameter should be greater than the value of the Minimum Packet Receive Buffers parameter. If it is less, the system increases the value to match that of the Minimum Packet Receive Buffers parameter. This parameter can be set in the appropriate startup file.

Parameter	Use to
Minimum Packet Receive Buffers = *number*	Specify the minimum number of packet receive buffers the operating system can allocate. The operating system allocates this number of buffers as soon as the server boots. You must add this command to the startup.ncf file. You cannot change the setting at the console prompt. **Supported values:** 10 to 20000 *Default:* 500 Before increasing this parameter, use NetWare Remote Manager or MONITOR to view the server's use of packet receive buffers. If you have EISA or microchannel bus master boards in your server and are receiving No ECB available count errors (see LAN/WAN Drivers in "MONITOR" on page 103) right after the server boots, increase this parameter so that each board can have at least five packet receive buffers. If the allocated number is higher than 10 and the server doesn't respond immediately after booting, increase this parameter. The value of this parameter must be less than the value of the Maximum Packet Receive Buffers parameter. If it is greater, the system increases the value of the Maximum Packet Receive Buffers parameter to match that of the Minimum Packet Receive Buffers parameter.
Maximum Physical Receive Packet Size = *number*	Specify the maximum size of packets that can be transmitted on the network. You must add this command to the STARTUP.NCF file. You cannot change the setting at the console prompt or using any other utilties. **Supported values:** 618 to 24682 *Default:* 4202 The default allows 2 KB (data with the packet header). If you use token ring or Ethernet boards, the default is acceptable. If some of your network boards transmit more than 512 bytes of data per packet, set this parameter for the largest packet size.

Parameter	Use to
IPX NetBIOS Replication Option = *number*	Specify how the IPX™ router handles replicated NetBIOS broadcasts. **Supported values:** 0 = Do not replicate NetBIOS broadcasts 1 = Duplicate broadcasts when there are redundant routes 2 = Suppress duplicate broadcasts **Default:** 2
Maximum Interrupt Events = *number*	Specify the maximum number of interrupt time events (such as IPX routing) allowed before a thread switch is guaranteed to have occurred. **Supported values:** 1 to 1000000 *Default:* 10
Reply to Get Nearest Server = *value*	Specify whether the server responds to Get Nearest Server requests from stations trying to locate directory and file servers. This parameter can be set in the startup.ncf file. **Supported values:** ON, OFF *Default:* ON
Number of Watchdog Packets = *number*	Specify the number of unanswered watchdog packets that the server sends to a workstation before closing its connection. **Supported values:** 5 to 100 *Default:* 10
Delay Between Watchdog Packets = *time*	Specify the amount of time between watchdog packets. **Supported values:** 9.9 seconds to 10 minutes 26.2 seconds *Default:* 59.3 seconds After a server sends out the first watchdog packet, it waits the specified time before sending out succeeding packets if it receives no reply.
Delay Before First Watchdog Packet = *time*	Specify the amount of time the server waits without receiving a request from a workstation before sending out the first watchdog packet to that station. **Supported values:** 15.7 seconds to 14 days *Default:* 4 minutes 56.6 seconds

Parameter	Use to
New Packet Receive Buffer Wait Time = *time*	Specify how long the operating system waits after receiving a request for a packet receive buffer before granting a new buffer. **Supported values:** 0.1 second to 20 seconds *Default:* 0.1 second This parameter prevents the system from granting too many buffers during a sudden peak in usage. If you have an EISA bus master board in your server, don't change this parameter.
Console Display Watchdog Logouts = *value*	Specify whether a console message is displayed when a connection is cleared. **Supported values:** ON, OFF *Default:* OFF If your network is running smoothly, you don't need to display watchdog logouts. If your workstations are having connection problems, the watchdog logout messages can help you isolate which stations aren't receiving or sending watchdog packets.

Directory Services Parameters

Directory services parameters allow you to do the following:

- Control the Novell® eDirectory™ trace file.
- Set time intervals for maintenance processes that reclaim disk space, remove external references, and check the consistency of backlinks.
- Set eDirectory synchronization intervals and restrictions.
- Specify the number of NCP™ retries before timeout.
- Mark the status of other servers in the namebase as UP or DOWN.
- Specify bindery services contexts.
- Handle security issues.

For descriptions of directory services parameters, see Table 6 on page 197.

Table 6 Directory Services Parameters

Parameter	Use to
eDirectory Trace to Screen = *value*	Enable the eDirectory trace screen; this displays information about eDirectory events on the monitor. **Supported values:** ON, OFF *Default:* OFF
eDirectory Trace to File = *value*	Send messages about eDirectory events to the eDirectory trace file on volume SYS. The default file is SYSTEM:\DSTRACE.DBG. **Supported values:** ON, OFF *Default:* OFF The file path and name can be changed with the eDirectory Trace Filename parameter. The file is circular; it grows to a maximum length of approximately 500 KB and then starts to overwrite itself at the beginning of the file. If this parameter is set to ON, the trace information is also scrolled on the screen.
eDirectory Trace Filename = *path\name*	Specify the path and name of the eDirectory trace file on volume Sys. **Maximum length:** 254 *Default:* SYSTEM:\DSTRACE.DBG
eDirectory External Reference Life Span = *number_in_hours*	Specify the number of hours unused external references are allowed to exist before being removed. **Supported values:** 1 to 384 hours *Default:* 192 External references are local IDs assigned to users when they access other servers. When users no longer have access, the external references should be removed.

Parameter	Use to
eDirectory Inactivity Synchronization Interval = *number_in_minutes*	Specify the maximum elapsed time between exhaustive synchronization checks. As soon as you change this value, the system executes the synchronization check. Synchronization checks then recur at the specified interval. **Supported values:** 2 to 1440 minutes *Default:* 30 If the system has replicas across a WAN link, this value should be set as high as 240 minutes (4 hours) to reduce WAN traffic.
eDirectory Synchronization Restrictions = *value*, *version_number_list*	Specify which versions of eDirectory the server can synchronize with. **Supported values:** OFF, ON, *list of version numbers* (Maximum length of version number list: 131 characters) **Default:** OFF To determine what version is currently loaded on a server, type MODULES at the server prompt. The eDirectory version number is displayed under the heading DS.NLM. If this parameter is set to OFF, the server synchronizes with all versions available. If this parameter is set to ON, the server synchronizes only with those versions specified as parameters to the ON value. **Example:** ON,420,421
eDirectory Servers Status = *value*	Mark the status of all server objects in the local namebase as UP or DOWN. **Supported values:** UP, DOWN Use this parameter to reset the status of all the servers if the status of one server isn't accurately recognized by the system. For example, if a server is up but the system recognizes it as down, set this parameter to mark all servers as up. Subsequently, the system would reassess the status of all servers and change the status to down for those servers that were truly down.

Parameter	Use to
eDirectory Janitor Interval = *number_in_minutes*	Specify the interval in minutes at which the janitor process is executed. The janitor process is executed as soon as you change this value and then recurs at the specified interval. **Supported values:** 1 to 10080 minutes *Default:* 60 The janitor process cleans up unused records, reclaims disk space, and purges objects flagged for deletion.
eDirectory Backlink Interval = *number_in_minutes*	Specify the interval in minutes at which backlink consistency checking is performed. Backlink consistency checking is executed as soon as you change this value. It then recurs at the specified interval. **Supported values:** 2 to 10080 minutes *Default:* 780 A backlink indicates that an object in a replica has an ID on a server where the replica doesn't exist. This process creates needed backlinks and deletes unnecessary ones.
eDirectory Distributed Reference Link Interval = *number_in_minutes*	Specify the interval in minutes at which distributed reference link consistency checking is performed. Distributed reference link consistency checking is executed as soon as you change this value. It then recurs at the specified interval. **Supported values:** 2 to 10080 minutes *Default:* 780 A distributed reference link indicates that an object in a partition has an ID in that partition where the actual object doesn't exist. This process creates needed distributed reference links and deletes unnecessary ones.
eDirectory Trace File Length to Zero = *value*	Delete the contents of the trace file. This parameter does not delete the file itself. As soon as the file is cleared, the value of the parameter resets to OFF. **Supported values:** ON, OFF *Default:* OFF To use this parameter, you must also set the eDirectory trace to file parameter to ON, because the trace file must be open for the system to delete its contents.

Parameter	Use to
Check Equivalent to Me = *value*	Enforce checking of the Equivalent To Me attribute on eDirectory authentication. **Supported values:** ON, OFF *Default:* OFF If this parameter is set to ON, DSREPAIR must be used to synchronize the Equivalence attribute and the Equivalent To Me attribute. Setting this parameter to ON might adversely affect communication performance.
Bindery Context = *context*;*context*	Specify one or more containers to be used by eDirectory when it provides bindery services. **Maximum:** 2047 characters, 16 contexts Multiple contexts are separated by semicolons. Whatever string it specified is set. To make that string effective for all valid contexts the container you specify in the context must be present on that server. **Example:** SET BINDERY CONTEXT = OU=SALES_LA.OU=SALES.O=NOVELL_US;OU=ACCOUNTING.O=NOVELL This parameter can be set in the startup.ncf file.
eDirectory Bootstrap Address = *address*	Allow eDirectory to operate properly in the absence of SLP. When SLP is not available to advertise servers and partitions, the local server uses this value to set the bootstrap address that the server would use to find its tree and authenticate to it. **Format for IP Address:** Use the standard IP format of four decimal values delimited by periods. **Example:** 123.45.67.89 <:524> or 137.65.62.144 (port number is optional) This number is used for both TCP and UDP connections. **Format for IPX Address:** Use the standard IPX format of hexadecimal digits representing Network, Node, and Socket. **Example:** 12345678:23456789ABCD:0451 or 01010480:00001B1E983A:0451 Defaults apply to any field not present, where default is current values.

Disk Parameters

Disk parameters control Hot Fix™ redirection, as well as other aspects of disk reads and writes.

For a description of disk parameters, see the following table.

Table 7 Disk Parameters

Parameter	Use to
Sequential Elevator Depth = *number*	Set the maximum elevator depth for sequential requests. Media Manager sends the number of sequential requests up to this value to the same device. When the device contains this number of requests and another device in the mirror group is empty, Media Manager begins sending requests to the idle device. **Supported values:** 0 to 4294967295 *Default:* 8 You can set this parameter in the STARTUP.NCF file.
Enable IO Handicap Attribute = *value*	Enable drivers and applications to inhibit read requests from one or more devices. **Supported values:** ON, OFF. *Default:* OFF. Setting this parameter to ON enables the inhibit attribute to function. Setting this parameter to OFF prevents the attribute from functioning. Do not set this attribute to ON unless instructed to do so by a device manufacturer. You can set this parameter in the STARTUP.NCF file.
Mirrored Devices Are Out of Sync Message Frequency = *time*	Set the frequency (in minutes) for checking out-of-sync devices. **Supported values:** 5 to 9999 minutes *Default:* 28 minutes You can set this parameter in the STARTUP.NCF file.

Parameter	Use to
Remirror Block Size = *value*	Set the remirror block size in 4 KB increments. (1=4 KB, 2=8 KB, 8=32 KB, etc.) **Supported values:** 1 to 8 *Default:* 1
Concurrent Remirror Requests = *value*	Set the number of remirror requests per mirror object. **Supported values:** 2 to 32 *Default:* 32
Ignore Disk Geometry = *value*	Create nonstandard and unsupported partitions. **Supported values:** ON, OFF *Default:* OFF If you set this parameter to ON before modifying or creating a partition, the software ignores disk geometry when creating the partition. This allows you to create nonstandard partitions. **Caution:** Setting this parameter to ON may harm other file systems contained on the disk. You can set this parameter in the STARTUP.NCF file.
Enable Hardware Write Back = *value*	Enable hardware write back, if supported. Hardware write back means that I/O write requests may be cached at the device and succeeded before data is committed to the media. Hardware write back usually improves write performance. **Supported values:** ON, OFF *Default:* OFF You can set this parameter in the STARTUP.NCF file.

Parameter	Use to
Enable Disk Read After Write Verify = *value*	Control whether information written to disk is read back and compared with the original data. **Supported values:** ON, OFF *Default:* OFF Setting this parameter to ON may decrease performance significantly. To set this value for currently loaded disks, use the Storage Devices option of "MONITOR" on page 103. You can set this parameter in the STARTUP.NCF file.

Error Handling Parameters

Error handling parameters control the size of error logs and specify what happens when logs exceed the specified size. They also control how the server responds to an abend or to an NLM™ that does not unload from a protected address space.

For descriptions of error handling parameters, see the following table.

Table 8 Error Handling Parameters

Parameter	Use to
Server Log File State = *number*	Control what happens when the SYS$LOG.ERR file is larger than the size specified by the Server Log File Overflow Size parameter. **Supported values:** 0 = Leave SYS$LOG.ERR as is 1 = Delete SYS$LOG.ERR 2 = Rename SYS$LOG.ERR *Default*: 1 You can set this parameter in the STARTUP.NCF file.
Server Log File Overflow Size = *number*	Specify the maximum size of the SYS$LOG.ERR file before the action specified by the Server Log File State parameter occurs. **Supported values:** 65536 to 4294967295 *Default:* 4194304 You can set this parameter in the STARTUP.NCF file.

Parameter	Use to
Boot Error Log File State = *number*	Control what happens when the BOOT$LOG.ERR file is larger than the size specified by the Boot Error Log Overflow Size parameter. **Supported values:** 0 = Leave BOOT$LOG.ERR as is 1 = Delete BOOT$LOG.ERR 2 = Rename BOOT$LOG.ERR 3 = Start a new log file whenever the server is restarted *Default*: 3 You can set this parameter in the STARTUP.NCF file.
Boot Error Log File Overflow Size = *number*	Specify the maximum size to which the BOOT$LOG.ERR file can grow before the action specified by the Boot Error Log File State parameter occurs. **Supported values:** 65536 to 4294967295 *Default:* 4194304 You can set this parameter in the STARTUP.NCF file.
Boot Error Log = *value*	Specify which error messages from the console will be saved in the BOOT$LOG.ERR file. **Supported values:** ON, OFF *Default:* ON If you set this parameter to ON, all error messages displayed on the console will be saved in BOOT$LOG.ERR. If you set this parameter to OFF, only error messages displayed during the boot procedure will be saved in BOOT$LOG.ERR. You can set this parameter in the STARTUP.NCF file.
Hung Unload Wait Delay = *number*	Specify the amount of time the server waits for an NLM to be unloaded from a protected address space after the UNLOAD ADDRESS SPACE command is executed. If the NLM is not successfully unloaded within this interval, the server displays a prompt to kill the address space. **Supported values:** 0 seconds to 1 minute 58.3 seconds *Default:* 30 seconds You can set this parameter in the STARTUP.NCF file.

Parameter	Use to
Auto Restart Down Timeout = *number*	When the server tries to go down after an abend, it sets a timeout just in case there is a problem going down. Specify the amount of time (in seconds) that the server will wait before automatically restarting. **Supported values:** 0 to 600 seconds *Default:* 180 seconds
Auto Restart After Abend Delay Time = *number*	Specify the amount of time (in minutes) before the server is brought down after an abend, if the Auto Restart After Abend parameter is in effect. **Supported values:** 2 to 60 minutes *Default:* 2 minutes Regardless of what time is set, the server sends a message every two minutes to warn users that the server will be brought down.

Parameter	Use to
Auto Restart After Abend = *value*	Specify the system's automatic response to an abend. **Supported values:** 0 = The system does not respond to the abend. 1 = After an abend, the system determines the source of the abend. Based on findings, the system either keeps the computer running or shuts down the computer and attempts to restart it. 2 = After an abend, the system attempts to recover from the problem and restart the computer after the time specified by the Auto Restart After Abend Delay Time parameter. 3 = After an abend, the system immediately restarts the computer. *Default*: 1 For values 1, 2, or 3 to take effect, the Developer Option parameter described in "Miscellaneous Parameters" on page 210 must be set to OFF. If the server is to be shut down, the system sends a message every 2 minutes to warn all connections. To configure the amount of time the system waits before shutting down the server, use the Auto Restart After Abend Delay Time parameter. After an abend, the screen displays information about the abend. This information is sent to the ABEND.LOG file on the C: drive. After the server is shut down and restarted, the ABEND.LOG file is transferred to SYS:SYSTEM. **Important:** Because the server can abend and be restarted automatically, you should determine whether any abends have occurred. Periodically check either the ABEND.LOG file or the Server Up Time field in MONITOR's General Information screen.

Licensing Services Parameters

Licensing service parameters control Novell Licensing Service diagnosis features.

For a description of licensing parameters, see the following table.

Table 9 Licensing Service Parameters

Parameter	Use to
NLSDIAG	**Supported values:** 19 (string length) *Default:* 19
NLS Search Type	Specify the scope of a license certificate search. **Supported values:** 0, 1 *Default:* 0 0 = Search to the root of the tree 1 = Search to the root of the partition You can set this parameter in either the STARTUP.NCF or AUTOEXEC.NCF files.
Store NetWare 5 Conn SCL MLA usage in NDS	**Supported Values:** ON, OFF *Default:* ON

Memory Parameters

Memory parameters control garbage collection, corruption checking, the amount of memory below 16 MB available to device drivers, and aspects of protected and virtual memory.

For a description of memory parameters, see Table 10 on page 208.

Table 10 Memory Parameters

Parameter	Use to
Average Page In Alert Threshold = *value*	Specify the point at which the server sends an alert to the console because excessive memory swapping indicates the server might be low on memory. **Supported values:** 0 to 4294967295 *Default:* 2000 The value of the parameter is the average number of pages swapped from disk to memory per second, calculated over the last five seconds. If the average page-in rate is high, it means a large amount of data is being swapped to and from disk, indicating that the server might be running low on memory. You can set this parameter in the STARTUP.NCF file.
Memory Protection No Restart Interval = *value*	Prevent a server from restarting a protected address space that continues to fault. **Supported Values:** 0 to 60 minutes *Default:* 1 minute If the address space faults, but has already been restarted within the time period specified by this parameter, the server will not restart the address space. Restart functionality is disabled for the address space. A restartable address space that continues to fault consumes server resources because the server is forced to continually shut down and restart the space. Setting the value to 0 disables the parameter so that the address space will always be restarted if it faults. You can set this parameter in the STARTUP.NCF file.

Parameter	Use to
Memory Protection Fault Cleanup = *value*	Enable the server to clean up a protected address space that has faulted. **Supported Values:** ON, OFF *Default:* ON If this parameter is ON and a protected address space faults, the server removes the address space and its NLM™ programs and returns the resources to the system. If this parameter is OFF and a protected address space faults, the server does not remove the address space or return resources to the system. The situation is left to the abend recovery mechanism. You can set this parameter in the STARTUP.NCF file.
Garbage Collection Interval = *number*	Specify the maximum time between garbage collections. **Supported values:** 1 minute to 1 hour *Default:* 5 minutes You can set this parameter in the STARTUP.NCF file.
Alloc Memory Check Flag = *value*	Specify whether the server will check for corruption in the alloc memory nodes. **Supported values:** ON, OFF *Default:* OFF You can set this parameter in the STARTUP.NCF file.
Reserved Buffers Below 16 Meg = *number*	Specify the number of file cache buffers reserved for device drivers that can't access memory above 16 MB. **Supported values:** 8 to 2000 *Default:* 300 You must set this parameter in the startup.ncf file. You cannot set the value at the command line.

Miscellaneous Parameters

Miscellaneous parameters do not fit aptly or neatly into other categories. The functionality is listed below and described in Table 11.

Default response to optional commands
Adding the server's name to the console prompt
Configuring alerts
Controlling alerts for lost or spurious interrupts
Specifying response when invalid parameters are detected
Enabling developer options
Controlling allocation of service processes
Password security
Enabling execution of secure.ncf at startup
Controlling aspects of the kernel, scheduler, and threads

Table 11 Miscellaneous Parameters

Parameter	Use to
Allow Unencrypted Passwords = *value*	Control the use of unencrypted passwords. This parameter provides for backward compatibility with networks services that do not support encrypted passwords in the NetWare authentication protocol. **Supported values:** ON, OFF *Default:* OFF We strongly recommend that you retain the default OFF setting. NetWare 3.1*x* and later versions support encrypted passwords. If servers on your network run earlier versions of NetWare, set the value of this parameter to ON. **Warning:** Because the use of unencrypted (plaintext) passwords represents a significant security risk, you should update your servers, utilities, print servers and NetWare clients to versions that support encrypted passwords. If you cannot update or upgrade to a newer version and are willing to assume the security risk, use the ON setting.
New Service Process Wait Time = *number*	Specify how long the system should wait to make an allocation when it receives a request for another service process. **Supported values:** 0.3 second to 20 seconds *Default:* 2.2 seconds

Parameter	Use to
Maximum Service Processes = *number*	Specify the maximum number of service processes that the operating system can create. (View the number of service processes in MONITOR.) **Supported values:** 5 to 1000 *Default:* 40 Decrease this parameter temporarily if the server is low on memory. If the server is always low on memory, add more RAM for memory. Increase this parameter if the number of service processes is at the maximum. Increasing this number helps only if more than 20 requests are being delayed simultaneously for a disk I/O to be completed.
Minimum Service Processes = *number*	Specify the minimum number of service processes the operating system can create without having to wait for the time that is specified by the New Service Process Wait Time parameter to elapse. **Supported values:** 10 to 500 *Default:* 10
Global Pseudo Preemption = *value*	Specify whether or not all threads on the server that use the Traditional File System will also use pseudo preemption. **Supported values:** ON, OFF *Default:* ON Set this parameter to ON if you rely on pseudo preemption to enforce blocking for threads.
Pseudo Preemption Count = *number*	Specify the number of times threads are allowed to make file read or write system calls before a relinquish is forced. **Supported values:** 1 to 4294967295 *Default:* 40 If you increase the value too much, the thread could run for its lifetime. If you decrease the value too much, every read or write call that normally would not block might, in fact, end up blocking.

Parameter	Use to
Display Lost Interrupt Alerts = *value*	Control alert messages about lost interrupts. **Supported values:** ON, OFF *Default:* ON A lost interrupt occurs when a driver or board requests a service with an interrupt call and then drops the request before the processor can respond. Lost interrupts generate the following message: Interrupt controller detected a lost hardware interrupt. This message indicates a hardware or driver problem that could degrade performance. Unload all drivers and then reload them one at a time to determine which driver has a problem. Then contact the vender of the driver. Set the parameter to OFF while you are waiting for a resolution. You can set this parameter in the STARTUP.NCF file.
Display Spurious Interrupt Alerts = *value*	Control alert messages about spurious interrupts. **Supported values:** ON, OFF *Default:* ON A spurious interrupt occurs when hardware in the server creates an interrupt that is defined and reserved for another device. Spurious interrupts generate the following message: Spurious hardware interrupt <*number*> detected. This message indicates a serious error in the hardware. If your server console displays this message, remove all add-on boards and run SERVER. If the message doesn't appear, add the boards one at a time to determine which hardware is creating the spurious interrupt. Then contact the vendor. Set the parameter to OFF while you are waiting for a resolution. You can set this parameter in the STARTUP.NCF file.

Parameter	Use to
Display Lost Interrupts Threshold = *value*	Specify the minimum number of lost interrupts per second that must be detected before a lost interrupt alert message will be displayed on the system console. **Supported values:** ON, OFF *Default:* OFF **Note:** Set Display Spurious Interrupt Alerts must also be set to ON. You can set this parameter in the STARTUP.NCF file.
Display Spurious Interrupts Threshold = *value*	Specify the minimum number of spurious interrupts per second that must be detected before a spurious interrupt alert message will be displayed on the system console. **Supported values:** ON, OFF *Default:* OFF **Note:** Set Display Spurious Interrupt Alerts must also be set to ON. You can set this parameter in the STARTUP.NCF file.
Developer Option = *value*	Control whether options associated with a developer environment are enabled. **Supported values:** ON, OFF *Default:* OFF You can set this parameter in the STARTUP.NCF file.
CPU Hog Timeout Amount = *value*	Specify the amount of time in seconds to wait before terminating a thread that has not relinquished control of the processor. **Supported values:** 0 to 1 hour *Default:* 1 minute A value of 0 (zero) disables this option. You can set this parameter in the STARTUP.NCF file.

Parameter	Use to
Display Old API Names = *value*	Control messages about obsolescent API functions from earlier versions of NetWare. This parameter can be used as a debugging tool. **Supported values:** ON = Use if you write your own modules and you are upgrading your NetWare modules to use newer APIs. OFF = Use if you aren't upgrading modules. **Default:** OFF The following types of messages appear when a module is loaded that uses the obsolescent APIs: Module is using old API: SetInterruptVector Module is using old API: ReturnPermanentMemory Module is using old API: AllocateReturnablePermMemory If you receive messages such as these, contact the vender of the module. You can set this parameter in the STARTUP.NCF file. **Note:** Old API functions are those that have been replaced with newer, more efficient functions. The old functions work—they are not obsolete—but they work more slowly. Old API functions are not limited to NetWare 3 versions. Nor have all older API functions been replaced—many of them are still in use.

Parameter	Use to
Display Relinquish Control Alerts = *value*	Control whether messages about processor control are sent to the server console. This parameter can be used as a debugging tool. **Supported values:** ON = Use if you're writing your own loadable modules. OFF = Use if you're not writing your own loadable modules. *Default*: OFF If a module uses the processor for more than 0.4 second without relinquishing control to other processes, the following types of messages appear: *process_name* Process did not relinquish control frequently. Module: *module_name* Code offset in module: *memory_address* You can set this parameter in the STARTUP.NCF file.
Halt System on Invalid Parameters = *value*	Specify whether to stop the system when invalid parameters are detected. **Supported values:** ON, OFF *Default:* OFF ON = You want the system to halt when an invalid parameter or condition is detected. OFF = You want the system to display an alert and continue running when an invalid parameter or condition is detected. You can set this parameter in the STARTUP.NCF file.
Worker Thread Execute In a Row Count = *number*	Specify the number of times the scheduler consecutively dispatches new work before allowing other threads to run. **Supported values:** 1 to 20 *Default:* 10 Worker threads are created by the kernel to perform work for the kernel itself.

Parameter	Use to
Alert Message Nodes = *number*	Specify the number of alert message nodes that have been previously allocated. **Supported values:** 10 to 256 *Default:* 20 You can set this parameter in the startup.ncf file.
Classic Work to do Pre-check Flag	When a classic work to do is scheduled, this flag causes the scheduler to verify if the work to do is scheduled. If it's on the scheduled list, the operating system will trap.
Replace Console Prompt with Server Name = *value*	Control whether the console prompt is replaced with the NetWare server name. **Supported values:** ON, OFF *Default:* ON You can set this parameter in the STARTUP.NCF file.
Sound Bell for Alerts = *value*	Control whether a bell sounds when an alert message appears on the console. **Supported values:** ON, OFF *Default:* ON
Command Line Prompt Time Out = *time*	Specify how long an .ncf file waits before executing the default response to an optional command. An optional command in an. ncf file is preceded by a question mark (?). The question mark causes the file to prompt you to execute the command. For information about optional commands in .ncf files, see Using Server Batch Files. **Supported Values:** 0 to 4294967295 seconds *Default:* 10 seconds

Parameter	Use to
Command Line Prompt Default Choice = *value*	Specify a default response to an optional command in an .ncf file. An optional command in an .ncf file is preceded by a question mark (?). The question mark causes the file to prompt you to execute the command. For information about optional commands in .ncf files, see Using Server Batch Files. **Supported Values:** ON, OFF *Default:* ON ON means the default response to the command prompt is Y (Yes). If the user does not respond to the prompt within a specified time period, the command is executed by default. OFF means the default response to the command prompt is N (No). If the user does not respond to the prompt within a specified time period, the command is not executed. To specify the time period before the response is executed, use the Command Line Prompt Timeout parameter.
Allow Audit Passwords = *value*	Specify whether passwords can be used to identify auditors. **Supported values:** ON, OFF *Default:* OFF
Enable SECURE.NCF=*value*	Execute the secure.ncf file at server startup. **Supported values:** ON, OFF *Default:* OFF You can set this parameter in the AUTOEXEC.NCF or STARTUP.NCF file.
Display Incomplete IPX Packet Alerts = *value*	Specify whether alert messages are displayed when IPX receives incomplete packets. This parameter can be used as a debugging tool. **Supported values:** ON, OFF *Default:* ON You can set this parameter in the STARTUP.NCF file.

Multiprocessor Parameters

Multiprocessor parameters allow you to

- Set the threshold for load balancing across multiple processors.
- Start secondary processors automatically on startup.
- Control whether interrupt statistics are removed from memory when a processor is taken offline or an interrupt handler is removed.

Multiprocessor parameters are described in the following table.

Table 12 Multiprocessor Parameters

Parameter	Use to
System Threshold = *number*	Adjust the load balancing threshold for multiprocessor servers. This number controls the main value used in calculating thread shedding for load balancing across multiple processors. The optimum value has been preset by Novell. **Supported values:** 0 to 102400 *Default:* 1536 **Important:** The default value is the optimum value. We recommend that you retain it. If after careful consideration you decide to change the setting, experiment only in a nonproduction environment. You can set this parameter in the STARTUP.NCF file.
Auto Start Processors = *value*	Start secondary processors on startup. **Supported values:** ON, OFF *Default:* ON ON = Secondary processors are automatically started when the Platform Support Module (PSM) is loaded. OFF = Secondary processors are not automatically loaded on bootup. When this is the case, the command START PROCESSORS must be used at the console prompt to activate secondary processors. This parameter is preferably set in the STARTUP.NCF file.

Parameter	Use to
Auto Clear Interrupt Statistics = *value*	Specify whether interrupt statistics are removed from memory at the time a processor is taken offline or an interrupt handler (ISR) is removed. **Supported values:** ON, OFF *Default:* ON To retain per-processor interrupt handler statistics for offline processors or to retain the total interrupt contribution from a previously loaded handler (ISR), set the parameter to OFF. This parameter is preferably set in the STARTUP.NCF file.

NCP Parameters

With NetWare Core Protocol™ (NCP™) parameters, you can

- Control NCP packets
- Control boundary checking
- Assign the NCP Server Packet Signature levels

For a description of NCP parameters, see Table 13 on page 220.

Table 13 NCP Parameters

Parameter	Use to
NCP Packet Signature Option = *number*	Control the NCP packet signature level on the server. **Supported values:** 0 = Server doesn't sign packets (regardless of the client level) 1 = Server signs packets only if the client requests it (client level is 2 or higher) 2 = Server signs packets if the client is capable of signing (client level is 1 or higher) 3 = Server signs packets and requires all clients to sign packets (or logging in will fail) *Default*: 1 NCP Packet Signature prevents packet forgery on servers and clients using NCP by requiring server and client to sign each NCP packet. **Note:** Because Packet Signature consumes processor resources and slows performance on both client and server, NCP Packet Signature is optional. After starting the server, you can only increase the level of packet signature. To decrease the level, you must add the SET command to the startup.ncf file and restart the server. You can set this parameter in the STARTUP.NCF file.
Enable IPX Checksums = *number*	Enable IPX™ checksums. **Supported values:** 0 = No checksums 1 = Checksum if enabled at the client 2 = Require checksums *Default*: 1 You can set this parameter in the STARTUP.NCF file.

Parameter	Use to
Enable UDP Checksums on NCP Packets	Enable checksumming of NCP UDP packets. **Supported values:** 0 = No checksums 1 = Checksum if enabled at client 2 = Require checksums *Default*: 1 You can set this parameter in the STARTUP.NCF file.
Client File Caching Enabled	This parameter allows or disallows the client side ecaching of opened files. This parameter is also settable in the STARTUP.NCF file.
NCP Protocol Preferences = *value*	When multiple protocols are supported, specify the order in which eDirectory selects a protocol to use when communicating with other servers in the replica. **Supported values:** IPX, TCP, UDP, none *Default:* None For example, the following command instructs eDirectory™ to try TCP first and IPX second when it communicates with another server: SET NCP PROTOCOL PREFERENCES = TCP IPX If only one protocol is supported, that protocol is used by eDirectory, no matter what values are specified for this parameter. If multiple protocols are supported, but no value is specified for this parameter, eDirectory uses the protocols in the order in which they are loaded.
NCP File Commit = *value*	Control whether applications can flush pending file writes to disk. **Supported values:** ON, OFF *Default:* ON If the value is set to ON then when a File Commit NCP is issued, a file is sent from cache to disk immediately, instead of waiting for the cache manager to send it to disk later.

Parameter	Use to
Display NCP Bad Component Warnings = *value*	Control whether NCP bad component alert messages are displayed. **Supported values:** ON, OFF *Default:* OFF You can set this parameter in the STARTUP.NCF file.
Reject NCP Packets with Bad Components = *value*	Specify whether NCP packets that fail component checking are rejected. **Supported values:** ON, OFF *Default:* OFF You can set this parameter in the STARTUP.NCF file.
Display NCP Bad Length Warnings = *value*	Control whether NCP bad length alert messages are displayed. **Supported values:** ON, OFF *Default:* OFF You can set this parameter in the STARTUP.NCF file.
Reject NCP Packets with Bad Lengths = *value*	Specify whether NCP packets that fail boundary checking are rejected. This parameter can be used as a debugging tool. **Supported values:** ON, OFF *Default:* OFF You can set this parameter in the STARTUP.NCF file.
Maximum Outstanding NCP Searches = *number*	Specify the maximum number of NCP directory searches that can be processed simultaneously. **Supported values:** 10 to 1000 *Default:* 51 Normally, only one NCP directory search occurs at a time. Increase the default only if you use applications that support multiple outstanding directory search operations *and* you have problems with corrupted or invalid directory information.

Parameter	Use to
Allow Change to Client Rights = *value*	Control whether a job server can assume the rights of a client for NCP packet signatures. **Supported values:** ON, OFF *Default:* ON **Note:** Some job servers and third-party applications can't function without changing to client rights. Using OFF might prevent some job servers from getting access to the files they need, but it prevents the forging of a packet through the job or print server. You can set this parameter in the STARTUP.NCF file.
Allow LIP = *value*	Set Large Internet Packet (LIP) support. **Supported values:** ON, OFF *Default:* ON You can set this parameter in the STARTUP.NCF file.

Novell Storage Service Parameters

For Novell Storage Service set parameters, see "NSS Load Commands" on page 126, "NSS DOS FAT Commands" on page 127, "PURGE and SALVAGE Commands" on page 127, "NSS Buffer Cache Commands" on page 128, and "Other NSS Commands" on page 128.

Service Location Protocol Parameters

The service location protocol parameters define how SLP locates and distributes information about services that are available on the network.

For descriptions of service location protocol parameters, see Table 14 on page 224.

Table 14 Service Location Protocol Parameters

Parameter	Use to
SLP TCP = *value*	Use TCP packets instead of UDP packets when possible. **Supported values:** OFF, ON *Default:* OFF This parameter can be set in the STARTUP.NCF file.
SLP Debug = *value*	Enable SLP debug mode. ◆ Bit 0x01 = COMM ◆ Bit 0x02 = TRAN ◆ Bit 0x04 = API ◆ Bit 0x08 = DA ◆ Bit 0x10 = ERR ◆ Bit 0x20 = SA **Supported values:** 0 to 4294967255 *Default:* 0 This parameter can be set in the STARTUP.NCF file.
SLP DA Discovery Options = *value*	Use multicast DA advertisements. ◆ Bit 0x01 = Use multicast Directory Agent advertisements ◆ Bit 0x02 = Use DHCP discovery ◆ Bit 0x04 = Use static file SYS:ETC\\SLP.CFG ◆ Bit 0x08 = Scopes Required. These bits can be ordered together for multiple values. **Supported values:** 0 to 8 *Default:* 3 This parameter can be set in the STARTUP.NCF file.
SLP Multicast Radius = *value*	Specify an integer describing the multicast radius. **Supported values:** 0 to 32 *Default:* 32 This parameter can be set in the STARTUP.NCF file.

Parameter	Use to
SLP Broadcast = *value*	Use broadcast packets instead of multicast packets. **Supported values:** OFF, ON *Default:* OFF This parameter can be set in the STARTUP.NCF file.
SLP MTU Size = *value*	Specify an integer describing the maximum transfer unit size. **Supported values:** 0 to 4294967255 *Default:* 1472 This parameter can be set in the STARTUP.NCF file.
SLP Rediscover Inactive Directory Agents = *value*	Specify the minimum time period in seconds that SLP will wait to issue service requests to rediscover inactive Directory Agents. **Supported values:** 0 to 4294967255 *Default:* 60 This parameter can be set in the STARTUP.NCF file.
SLP Retry Count = *value*	Specify an integer value describing the maximum number of retries. **Supported values:** 0 to 128 *Default:* 3 This parameter can be set in the STARTUP.NCF file.
SLP Scope List = *value*	Specify a comma-delimited scope policy list. **Max Length:** 1023 *Default:* 1023 This parameter can be set in the STARTUP.NCF file.
SLP SA Default Lifetime = *value*	Specify an integer value describing the default lifetime in seconds of service registers. **Supported values:** 0 to 4294967255 *Default:* 900 This parameter can be set in the STARTUP.NCF file.

Parameter	Use to
SLP Event Timeout = *value*	Specify an integer value describing the number of seconds to wait before timing out multicast packet requests. **Supported values:** 0 to 4294967255 *Default:* 53 This parameter can be set in the STARTUP.NCF file.
SLP DA Heart Beat Time = *value*	Specify an integer value describing the number of seconds before sending the next Directory Agent heartbeat packet. **Supported values:** 0 to 4294967255 *Default:* 10800 This parameter can be set in the STARTUP.NCF file.
SLP Close Idle TCP Connections Time = *value*	Specify an integer value describing the number of seconds before idle TCP connections should be terminated. **Supported values:** 0 to 4294967255 *Default:* 300 This parameter can be set in the STARTUP.NCF file.
SLP DA Event Timeout = *value*	Specify an integer value describing the number of seconds to wait before timing out Directory Agent packet requests. **Supported values:** 0 to 429 *Default:* 5 This parameter can be set in the STARTUP.NCF file.

Time Parameters

Time parameters control time synchronization, the TIMESYNC.CFG file, and time zone settings to ensure that the time reported by all servers is consistent, or synchronized. For more information, see the *Network Time Management Administration Guide*.

For a description of time parameters, see Table 15 on page 227.

Table 15 Time Parameters

Parameter	Use to
TIMESYNC ADD Time Source = *server name*	Specify a server as a time source. Use EDIT, rather than this parameter, to add a server to the time source list in the TIMESYNC.CFG file. **Maximum:** 48 characters
TIMESYNC Configuration File = *path*	Specify the path where the TIMESYNC.CFG configuration file is located. **Maximum:** 255 characters **Example:** SET TIMESYNC CONFIGURATION FILE = SYS:SYSTEM\TIMESYNC.CFG
TIMESYNC Configured Sources = *value*	Specify what time sources the server listens to. **Supported values:** ON = The server ignores SAP time sources and relies on time sources custom-configured with the TIMESYNC Time Source parameter OFF = The server listens to any advertising time source *Default*: OFF
TIMESYNC Directory Tree Mode = *value*	Control the use of SAP packets in the eDirectory™ tree. **Supported values:** ON = Time synchronization ignores SAP packets that don't originate from within the eDirectory tree the server is on OFF = The server can receive SAP packets from any time source on the network *Default*: ON Don't set this parameter to OFF if SAP is set to ON. Using OFF could corrupt the time synchronization for this server's eDirectory tree.

Parameter	Use to
TIMESYNC Hardware Clock = *value*	Controls hardware clock synchronization. **Supported values:** ON = The primary and secondary time servers set the hardware clock, and the single reference and reference time servers set their time from the hardware clock at the beginning of each polling interval OFF = Use *only* if this server uses an external time source (such as a radio clock) *Default*: ON
TIMESYNC Polling Count = *number*	Specify how many time packets to exchange while polling. Increasing the number of packets adds unnecessary traffic to the network. **Supported values:** 1 to 1000 *Default:* 3
TIMESYNC Polling Interval = *number*	Specify the long polling interval, in seconds. **Supported values:** 10 to 2678400 seconds (31 days) *Default:* 600 seconds (10 minutes) All servers in the same tree must use the same setting.
TIMESYNC REMOVE Time Source = *server_name*	Delete a server as a time source. Use EDIT, rather than this parameter, to delete a server from the time source list in the TIMESYNC.CFG file. **Maximum:** 48 characters
TIMESYNC RESET = *value*	Reset time synchronization and clear the time source list. Use EDIT, rather than this parameter, to reset values in the TIMESYNC.CFG file and to remove the time source list from the file. **Supported values:** ON = Selected internal values are reset and the configured server list is cleared. Flag automatically resets to OFF. **Default:** OFF

Parameter	Use to
TIMESYNC Restart Flag = *value*	Control restarts of time synchronization. **Supported values:** ON, OFF *Default:* OFF Set this parameter to ON only if you want to reload TIMESYNC without rebooting the server.
TIMESYNC Service Advertising = *value*	Control time source advertising. **Supported values:** ON = The single reference, reference, and primary time source servers advertise using SAP OFF = Use only if you are using a custom-configured list of time sources **Default:** ON **Note:** Secondary time services do not advertise.
TIMESYNC Synchronization Radius = *number*	Control the maximum time adjustment (in milliseconds) a server is allowed while still being considered synchronized. **Supported values:** 0 to 2147483647 milliseconds *Default:* 2000 Increase this parameter to allow a wider margin of error for time synchronization between servers. **Important:** Lowering the synchronization radius increases the chance of servers losing synchronization due to randomness between clocks. Setting the synchronization radius for under 2000 milliseconds (2 seconds) is not recommended. Set the synchronization radius for under two seconds only if you are using an application that uses synchronized time stamps which do not tolerate a two-second deviation between time sources.

Parameter	Use to
TIMESYNC Time Adjustment = [+ or -] *hour*:*minute*:*second* [at *month*/*day*/*year hour*:*minute*:*second* AM or PM]	Specify when a time adjustment will take place. **Note:** You cannot use this parameter on a secondary time server. **Maximum:** 99 characters *Default:* None scheduled Use this parameter sparingly to correct network-wide time errors. Default date and time is six polling intervals or 1 hour (whichever is longer) from the current time. Misuse of this parameter can corrupt time synchronization and the order of events on your network.
TIMESYNC Time Source: *server_name*	Specify a server as time source. If no server name is entered, the parameter displays the list of configured servers. Use EDIT, rather than this parameter, to add a server to the configuration list in the TIMESYNC.CFG file. **Maximum:** 48 characters
TIMESYNC Type = *type_of_time_source*	Specify the default time source type. Use EDIT, rather than this parameter, to specify the default time source type in the TIMESYNC.CFG file. **Supported types:** reference, primary, secondary, single reference *Default:* Single reference
TIMESYNC Write Parameters = *value*	Specify whether parameters specified by the TIMESYNC Write Value parameter are written to the configuration file. **Supported values:** ON, OFF *Default:* OFF
TIMESYNC Write Value = *number*	Control which parameters are written by TIMESYNC Write parameters. **Supported values:** 1 = Write internal parameters only 2 = Write configured time sources only 3 = Write both parameters and configured time sources *Default*: 3

Parameter	Use to
Time Zone = *time_zone_string*	Specifies the time zone string, which indicates: ◆ The abbreviated time zone name ◆ The offset from Coordinated Universal Time (UTC) ◆ The alternate abbreviated time zone name to be used when daylight saving time is in effect **Maximum:** 80 characters *Default:* No Time Zone This parameter causes UTC time to be recalculated from local time. You can set this parameter in the STARTUPCF file.
Default Time Server Type = *type_of_time_source*	Specify the default time synchronization server type. This parameter can be overridden by other time synchronization parameters. Supported types: Reference, primary, secondary, single reference. **Supported types:** Reference, primary, secondary, single reference *Default:* Secondary You can set this parameter in the STARTUPCF file.
Start of Daylight Savings Time = *date_and_time*	Specify the local date and time when the change to daylight saving time should occur. **Maximum:** 79 characters **IMPORTANT:** You must set both the start and end of daylight saving time before either date is actually scheduled.
End of Daylight Savings Time = *date_and_time*	Specify the local date and time when the change from daylight saving time should occur. **Maximum:** 79 characters. **IMPORTANT:** You must set both the start and the end of daylight saving time before either date is actually scheduled.

Parameter	Use to
Daylight Savings Time Offset = [+ or -] *hour*:*minute*:*second*	Control the offset applied to time calculations when daylight saving time is in effect. **Default:** +1:00:00 This parameter causes UTC time to be recalculated from local time. You can set this parameter in the STARTUP.NCF file.
Daylight Savings Time Status = *value*	Indicate whether daylight saving time is in effect. **Supported values:** ON, OFF *Default:* OFF If this parameter is set to ON, you should also use the Daylight Savings Time Offset parameter. Changing the daylight saving time status does not change the local time. You can set this parameter in the STARTUP.NCF file.
New Time With Daylight Savings Time Status = *value*	Control the adjustment of local time when daylight saving time is in effect. **Supported values:** ON, OFF *Default:* OFF ON = Adjust the local time by adding or subtracting the Daylight Savings Time Offset parameter.

Traditional File Parameters

Traditional file parameters now contain parameters that were previously designated as Directory Caching, File Caching, Error Handling, File System, Locks, and Transistion Tracking

File Caching Parameters for the Traditional File System

File caching allows faster access to frequently used files by holding a file (or a portion of it) in disk cache memory. Files being read from or written to are kept in file cache buffers. When the requested data is already in cache, disk reads are unnecessary.

The number of files kept in memory depends on the number of file cache buffers allowed. This is determined by the amount of disk cache memory available and the value of the Minimum File Cache Buffers parameter.

Disk cache memory not only speeds up access to file data, it is used to cache portions of the eDirectory database. If you want to tune your NetWare server in general, or eDirectory in particular, tune the file caching parameters. The key to optimizing cache utilization is to monitor both Long Term Cache Hits and LRU Sitting Time statistics. Both parameters are found in MONITOR's Available Options > Disk Cache Utilization. (File caching parameters can also be set from MONITOR's Available Options > Server Parameters.)

File caching and directory caching work together, however. In tuning the server, directory caching and file caching need to be balanced for maximum performance. See "How Directory Caching and File Caching Work Together" on page 236.

Remember also that the file and directory caching parameters in SET apply only to NetWare servers using the Traditional File System. In contrast, the Novell® Storage Services™ (NSS™) file system provides improved resource use, requiring less memory to mount multiple volumes.

For information about NSS directory caching parameters, see "NSS Buffer Cache Commands" on page 128 and NSS Features and Benefits.

For a description of file caching parameters, see Table 16 on page 233.

Table 16 File Caching Parameters for the Traditional File System

Parameter	Use to
Read Ahead Enabled = *value*	Specify whether the system conducts background reads to cache in advance of blocks soon to be requested. **Supported values:** ON, OFF *Default:* ON Read-aheads can happen only when sequential file accesses are occurring.
Read Ahead LRU Sitting Time Threshold = *number*	Specify the minimum cache LRU (least recently used) sitting time for read-aheads to take place. **Supported values:** 0 seconds to 1 hour *Default:* 10 seconds

Parameter	Use to
Minimum File Cache Buffers = *number*	Set the minimum number of cache buffers the operating system can allow for file caching. **Supported values:** 20 to 1000 *Default:* 20 All memory not allocated for other processes is given to disk cache memory to use for file and directory caching. As memory is requested for other processes, the server gives up cache buffers. This limit specifies when the server must stop giving file cache buffers to other processes. If you set the minimum too high, other processes might not be able to allocate necessary memory resources. For example, a module could fail to load because the server is out of available memory.
Maximum Concurrent Disk Cache Writes = *number*	Specify the number of write requests for changed file data that can be put in the elevator before the disk head begins a sweep across the disk. **Supported values:** 10 to 4000 *Default:* 50 A high number creates more efficient write requests. A low number creates more efficient read requests. Monitor the number of Dirty Cache Buffers displayed on the Cache Utilization Statistics screen in MONITOR. If this number is above 70 percent of total cache buffers, optimize the write speed by increasing this parameter.
Dirty Disk Cache Delay Time = *time*	Specify how long the system keeps a write request (that does not fill a cache buffer) in memory before writing the request to disk. **Supported values:** 0.1 second to 10 seconds *Default:* 3.3 seconds Increasing the time makes disk writing more efficient if your users make many small write requests. Decreasing the time can reduce performance drastically, and reduces the chances of losing data only slightly.

Parameter	Use to
Minimum File Cache Report Threshold = *number*	Specify how few cache buffers can be available before the operating system warns you that the number of buffers is getting low. **Supported values:** 0 to 1000 *Default:* 2 For example, if the value of the Minimum File Cache Buffers parameter is set to 20 and this parameter is set to 25, you are warned when all but 45 cache buffers are allocated for other processes. Regardless of how this parameter value is set, the operating system will issue a warning when it reaches the minimum number of cache buffers. You receive the following message: Cache memory allocator exceeded minimum cache buffer left limit.

Directory Caching Parameters for the Traditional File System

Directory caching allows fast access to frequently used directories. A directory cache buffer is a portion of NetWare® server memory (disk cache memory) that holds entries from the directory table.

A directory entry stays in a cache buffer as long as it is accessed frequently (default=33 seconds). The system can overwrite the directory entry if the allocated directory cache buffers are accessed more frequently.

Directory caching and file caching work together, however. In tuning the server, directory caching and file caching need to be balanced for maximum performance.

Remember also that the directory and file caching parameters in SET apply only to NetWare servers using the Traditional File System. In contrast, the Novell Storage Services (NSS) file system provides improved resource use, requiring less memory to mount multiple volumes.

For information about NSS caching parameters, see NSS Features and Benefits and “NSS Buffer Cache Commands” on page 128.

For a description of directory caching parameters, see Table 17 on page 237.

Allocation of Directory Cache Buffers

When the server boots, the system allocates a minimum number of directory cache buffers (default=20). It creates these buffers immediately when it receives a request for a new buffer.

The server obtains directory cache buffers by removing a minimal set of file cache buffers from the file cache during server startup. Additional directory cache buffers are obtained from the file cache later on if they are needed.

When the minimum number of buffers is allocated and another is needed, the system must wait a specified amount of time before allocating another buffer.

If necessary, the system allocates buffers until it reaches the maximum. If enough directory cache buffers are allocated and enough memory is available for directory caching, all directory tables can be cached in memory.

How Directory Caching and File Caching Work Together

As directory cache buffers increase, file cache buffers decrease. Thus, a tradeoff exists between directory caching and file caching, and .directory caching and file caching must be balanced for maximum performance.

If you adjust the system to use too much memory for directory caching, you can leave too little memory for file caching, and vice versa.

For a description of file caching parameters, see Table 16 on page 233. For a description of directory caching parameters, see Table 17 on page 237.

Table 17 Directory Caching Parameters for the Traditional File System

Parameter	Use to
Dirty Directory Cache Delay Time = *time*	Specify how long the system keeps a directory table write request in memory before writing it to disk. **Supported values:** 0 to 10 seconds *Default:* 0.5 second Increasing the delay time gives slightly quicker performance but increases the probability of the directory tables becoming corrupted. Decreasing the delay time slightly reduces the chance of directory tables becoming corrupted, but can reduce performance slightly. A zero setting reduces performance dramatically.
Directory Cache Allocation Wait Time = *number*	Specify how long the system must wait after allocating a new directory cache buffer before it can allocate another buffer. **Supported values:** 0.5 second to 2 minutes *Default:* 2.2 seconds During this time, all requests for a new directory cache buffer are ignored. If the wait time is too low, peak usage requests cause more resources than necessary to be allocated to directory caching. If the wait time is too high, the system is very slow in allocating the directory cache buffers necessary to service the usual number of directory requests. If directory searches seem slow even after the server has been running for 15 minutes, you should decrease this parameter.
Directory Cache Buffer NonReferenced Delay = *time*	Specify how long a directory entry must be cached before it can be overwritten by another directory entry. **Supported values:** 1 second to 5 minutes *Default:* 5.5 seconds Increasing this parameter speeds up directory access. The system allocates more directory cache buffers, and a directory is more likely to be cached in memory. Decreasing this parameter slows directory access but also reduces the need for directory cache buffers.

Parameter	Use to
Maximum Directory Cache Buffers = *number*	Specify the maximum number of cache buffers that the system can allocate for directory caching. **Supported values:** 20 to 4000 *Default:* 500 This parameter keeps the system from allocating too many directory cache buffers so that memory is available for other server processes. Increase this limit if the server responds slowly to directory searches. Decrease this limit if too much memory is being allocated for directory caching. If users are warned that the server is low on memory, this parameter should be one of the first to be reduced. (Reboot the server to return the memory to the cache buffer memory pool.) When a directory cache buffer is allocated, the allocation is permanent until the server reboots; the buffers don't return to file caching when the need for directory cache buffers decreases. This parameter can be set in the STARTUP.NCF file.
Minimum Directory Cache Buffers = *number*	Specify the minimum number of cache buffers that the system can allocate for directory caching. **Supported values:** 10 to 2000 *Default:* 20 The number needs to be high enough that directory searches can be done quickly, but no higher than necessary. If the system doesn't need the minimum number of directory cache buffers, the buffers can't be reallocated to file caching. The unneeded portion remains unused. If the server responds slowly to directory searches after it is booted, monitor the number of directory cache buffers usually allocated for directory caching. If the number is significantly higher than this limit, consider increasing the limit to remove the delay time that normally occurs while the server is self-configuring. Use MONITOR to view the current statistics. This parameter can be set in the STARTUP.NCF file.

Parameter	Use to
Maximum Number of Internal Directory Handles = *number*	Specify the maximum number of directory handles available for internal NLM programs that use connection 0. **Supported values:** 40 to 1000 *Default:* 100 A directory handle is a version of the directory access rights that is held in cache memory. Caching the access rights speeds mapping to the rights. Connection 0 (zero) is the connection number reserved for use by the server itself and by NLM™ programs operating within the server. Each time an NLM using connection 0 accesses a file or directory, a directory handle is allocated (up to the total specified by this parameter). This value represents the total number of handles available to be shared by all NLM programs using connection 0.
Maximum Number of Directory Handles = *number*	Specify the maximum number of directory handles available for each connection. **Supported values:** 20 to 1000 *Default:* 20 A directory handle is a version of the directory access rights that is held in cache memory. Caching the access rights speeds mapping to the rights. Each time a connection accesses a file or directory, a directory handle is allocated (up to the total specified by this parameter).

File Parameters for the Traditional File System

- Three parameters control warnings about volumes that are almost full.
- Three parameters control file purging. File-purging parameters influence other parameters, which in turn control warnings about almost-full volumes.

  All deleted files remain on the disk for a specified minimum amount of time. The system calculates a volume's remaining space by subtracting the following from the total space:

  - Actual files
  - Salvageable files that can't be purged because their Minimum File Delete Wait Times have not expired

- One parameter controls the reuse of turbo FATs.
- Ten parameters control file compression.

For a description of file system parameters, see the following table.

Table 18 File Parameters for the Traditional File System

Parameter	Use to
Automatically Repair Bad Volumes = *value*	Specify whether VREPAIR runs automatically on a volume that fails to mount. **Supported values:** ON, OFF *Default:* ON You can set this parameter in the STARTUP.NCF file.
File Delete Wait Time = *time*	Specify when a salvageable file can be purged to create free space on a volume. **Supported values:** 0 seconds to 7 days *Default:* 5 minutes 29.6 seconds Set this parameter as high as is useful for your users, but this parameter doesn't guarantee that a file remains salvageable. The system tries to keep at least 1/32 of available space on the volume free for new files. This parameter guarantees only that files aren't purged to maintain this free disk space. Files that haven't met this time limit are purged if the volume is full and the system needs space for a user to create a new file. When a deleted file remains on the server longer than the File Delete Wait Time parameter setting, the system marks the file as purgeable. When the volume is full of purgeable files and needs free space, the oldest purgeable files are purged.
Allow Deletion of Active Directories = *value*	Specify whether a directory can be deleted when another connection has a drive mapped to it. **Supported values:** ON, OFF *Default:* ON

Parameter	Use to
Maximum Percent of Volume Space Allowed for Extended Attributes = *percentage*	Limit the portion of volume space used for extended attribute storage. The setting takes effect only when the volume is being mounted. **Supported values:** 5 to 50 *Default:* 10
Maximum Extended Attributes per File or Path = *number*	Limit the number of extended attributes that can be assigned to a file or path (subdirectory). This limit applies to all volumes on the server. **Supported values:** 4 to 512 *Default:* 16
Fast Volume Mounts	Increase the speed at which volumes are mounted. **Supported values:** ON, OFF *Default:* ON The operating system checks only the most important fields during the mounting process. Use this parameter only if volumes were dismounted normally. This parameter can be set in the STARTUP.NCF file.
Maximum Percent of Volume Used by Directory = *percentage*	Limit the portion of a volume that can be used as directory space. **Supported values:** 5 to 85 *Default:* 13
Maximum Subdirectory Tree Depth = *number*	Specify how many levels of subdirectories the system supports. **Supported values:** 10 to 100 *Default:* 25 This parameter can be set in the STARTUP.NCF or in the AUTOEXEC.NCF file, or at the server console. Increase the number if your applications support trees deeper than 25. Decrease the number if your applications support only shallow tree structures. (Some DOS applications can’t support more than 10 levels if the subdirectories have 11-character names.)

Parameter	Use to
Volume Low Warn All Users = *value*	Have the system notify users when a volume is almost full. **Supported values:** ON, OFF *Default:* ON If you choose not to have your server warn users, monitor volume statistics at least daily with MONITOR.
Volume Low Warning Reset Threshold = *number*	Control how much disk space must be freed up before a second warning is issued that the volume is almost full. (The first warning is controlled by the Volume Low Warn All Users parameter.) **Supported values:** 0 to 100000 blocks *Default:* 256 blocks When a volume is almost full, it can hover at its warning threshold as users create and delete files. This parameter controls the minimum amount of space that must be made available above the threshold before the warning message disappears. **Example:** Assume the volume block size is 4 KB, the Volume Low Warning Reset Threshold is set to 256, the Volume Low Warning Threshold is set to 256, and the volume has less than 1 MB of free space. Given these conditions, the volume must gain at least 1 MB of free space (for a total of 2 MB of free space) and then dip below the 1 MB threshold before the system sends another warning that the volume is almost full.

Parameter	Use to
Volume Low Warning Threshold = *number*	Specify the number of blocks of free disk space that can remain on a volume before the system issues a warning. **Supported values:** 0 to 1000000 blocks *Default:* 256 blocks Consider the following: A block is the minimum space allocated to a file.; a file can grow only in multiples of the block size. The block's physical size is determined when the volume is created. A volume can be assigned these block sizes: 4 KB, 8 KB, 16 KB, 32 KB, or 64 KB. For example, if you enter 256 blocks for this parameter and the volume's block size is 4 KB, the system warns you that the volume is full when about 1 MB of space is left. If your volumes are assigned different block sizes, each volume has a different amount of free space when the warning is issued.
Purge Files On Dismount = *value*	Have the system purge deleted files on a volume when it is dismounted. **Supported values:** ON, OFF *Default:* OFF

Parameter	Use to
Turbo FAT Re-Use Wait Time = *time*	Specify how long a turbo FAT buffer remains in memory after an indexed file is closed. **Supported values:** 0.3 second to 1 hour 5 minutes 54.6 seconds *Default:* 5 minutes 29.6 seconds Once the wait-time value has passed, the system can allocate the buffer to another indexed file. Increase the wait time if ◆ You want the turbo FAT index to remain in memory for long periods of time, even when the file is closed. ◆ You frequently reopen the same file after a specific delay and know that another file opened during that delay will reuse the index. Decrease the wait time if you want the memory released immediately to service the next file that needs to be indexed. When a program randomly accesses a file that contains more than 64 FAT entries, the system builds a turbo FAT index for the file so that information is accessed quickly. (NetWare indexes any randomly accessed file with 64 FAT entries.) The system doesn't immediately delete the index from its buffer when the file is closed. Having the turbo FAT index in memory makes reopening the file and accessing information faster.
Compression Daily Check Stop Hour = *number*	Specify the hour when you want the file compressor to stop scanning enabled volumes for files that need to be compressed. **Supported values:** 0 to 23 *Default:* 6 Hours are specified by a 24-hour clock: 0 = midnight; 23 = 11 p.m. This parameter can be set in the STARTUP.NCF file.
Allow Unowned Files To Be Extended = *value*	Specify whether files can be modified when the owner has been lost or deleted. **Supported values:** ON, OFF *Default:* ON This parameter can be set in the STARTUP.NCF file.

Locks Parameters for the Traditional File System

Locks parameters control

- How many open files each workstation can have
- How many open files the system can handle
- How many record locks each connection can have
- How many record locks the system can handle

There are three types of locks:

- File locks secure the file and prevent other stations from accessing it.
- Physical record locks control data access by multiple users. They prevent other users from accessing or changing a range of bytes (a record) in a file. They are sometimes referred to as byte-range locks.

  Physical record locks are enforced by the system. If a user tries to access a range of bytes that is physically locked, the user receives an Access Denied error message.
- Logical record locks also control data access by multiple users. The application assigns a name to each section of data that needs to be locked. The application then locks this name whenever it accesses the data.

  Logical locks are enforced only to the extent that the application checks the name each time it needs access to data.

For a description of locks parameters, see the following table.

Table 19 Locks Parameters for the Traditional File System

Parameter	Use to
Maximum Record Locks Per Connection = *number*	Control how many record locks a client connection can use at one time. (Use MONITOR to view how many record locks each connection is using.) **Supported values:** 10 to 100000 *Default:* 500 Increase the value of this parameter when an application can't lock enough records and fails. Decrease the value of this parameter if one or more client connections are using an excessive amount of server resources.

Parameter	Use to
Maximum File Locks Per Connection = *number*	Control how many opened and locked files a client connection can use at one time. (Use MONITOR to view how many opened and locked files a connection is using.) **Supported values:** 10 to 1000 *Default:* 250 Increase the value of this parameter when an application can't open enough files and fails. Decrease the value of this parameter if client connections are using an excessive amount of server resources.
Maximum Record Locks = *number*	Control how many record locks the operating system can handle. (Use MONITOR to view how many record locks each client connection is using on that server.) **Supported values:** 100 to 400000 *Default:* 20000 Increase the value of this parameter if users have problems running applications and receive messages indicating that not enough record locks are available. Decrease the value of this parameter if client connections are using an excessive amount of server resources.
Maximum File Locks = *number*	Control how many opened and locked files the operating system can handle. (Use MONITOR to view the number of files that are open during peak usage.) **Supported values:** 100 to 100000 *Default:* 10000 Increase the value of this parameter if the number of open files is near or equal to the default. Decrease the value of this parameter to restrict the amount of available server resources.

Error Handling Parameters for the Traditional File System

Error handling parameters control the size of error logs and specify what happens when logs exceed the specified size. They also control how the server responds to an abend or to an NLM™ that does not unload from a protected address space.

For descriptions of error handling parameters, see the following table.

Table 20 Error Handling Parameters for the Traditional File System

Parameter	Use to
Volume Log File State = *number*	Control what happens when the VOL$LOG.ERR file is larger than the size specified by the Volume Log File Overflow Size parameter. **Supported values:** 0 = Leave VOL$LOG.ERR as is 1 = Delete VOL$LOG.ERR 2 = Rename VOL$LOG.ERR *Default*: 1 You can set this parameter in the STARTUP.NCF file.
Volume TTS Log File State = *number*	Control what happens when the TTS$LOG.ERR file is larger than the size specified by the Volume TTS Log File Overflow Size parameter. **Supported values:** 0 = Leave TTS$LOG.ERR as is 1 = Delete TTS$LOG.ERR 2 = Rename TTS$LOG.ERR *Default*: 1 You can set this parameter in the STARTUP.NCF file.
Volume Log File Overflow Size = *number*	Specify the maximum size of the VOL$LOG.ERR file before the action specified by the Volume Log File State parameter occurs. **Supported values:** 65536 to 4294967295 *Default:* 4194304 You can set this parameter in the STARTUP.NCF file.
Volume TTS Log File Overflow Size = *number*	Specify the maximum size of the TTS$LOG.ERR file before the action specified by the Volume TTS Log File State parameter occurs. **Supported values:** 65536 to 4294967295 *Default:* 4194304 You can set this parameter in the STARTUP.NCF file.

Transaction Tracking Parameters for the Traditional File System

- A *transaction* is a set of write operations that must be completed together to maintain file and database integrity.
- *Write operations* consist not only of data and data records, but also of changes to the index and the key structures that are important to an application's continual operation.
- Transaction Tracking System™ (TTS™) software guarantees that a transaction is written to disk in its complete form or is backed out if incomplete. This ensures database integrity in case a failure occurs before a transaction is completed.

For a description of transaction tracking parameters for the Traditional File System, see the following table.

Table 21 Transaction Tracking Parameters for The Traditional File System

Parameter	Use to
Auto TTS Backout Flag = *value*	Specify whether a server with transactional files will automatically back out of incomplete transactions when the server is restarted. **Supported values:** ON = The server backs out incomplete transactions when booting OFF = The server waits for you to answer a prompt before it backs out of transactions *Default*: ON You must set this parameter in the STARTUP.NCF file. You cannot set the parameter at the command line.
TTS Abort Dump Flag = *value*	Specify whether a file is created to log transactional backout data. **Supported values:** ON = The information is saved in TTS$LOG.ERR OFF = The information backed out is not saved *Default*: OFF If the parameter is set to ON, the backed-out information is written to file TTS$LOG.ERR on volume SYS:. You can print the file or view it with a text editor.

Parameter	Use to
TTS UnWritten Cache Wait Time = *time*	Specify how long a block of transactional data can be held in memory. **Supported values:** 11 seconds to 10 minutes 59.1 seconds *Default:* 1 minute 5.9 seconds Some blocks of transactional data wait for other transactional blocks to be written first. If one of these blocks reaches its maximum time limit, other write requests are held up and this block is written to disk.
TTS Backout File Truncation Wait Time = *time*	Specify how long allocated blocks remain available for the TTS backout file when these blocks are not in use. **Supported values:** 1 minute 5.9 seconds to 1 day 2 hours 21 minutes 51.3 seconds *Default:* 59 minutes 19.2 seconds

Additional Information

Topic	See
Using NetWare Remote Manager to set server parameters	Server Parameters option in the *NetWare Remote Manager Administration Guide*
Using MONITOR to set server parameters	Server Parameters option in MONITOR
Improving server performance	*Server Operating System Administration Guide* > Optimizing the NetWare Server
Editing .NCF files	*Server Operating System Administration Guide*
Time synchronization and the TIMESYNC.CFG file	*Network Time Management Administration Guide*

SHUTDOWN NETWORK INTERFACE

Purpose

Use at the server console to shut down a logical board without removing its resources. (A logical board is an instance of one frame type associated with one LAN driver.)

After you shut down the logical board, you can restart the board, if needed, without reloading and binding the LAN driver. See "RESET NETWORK INTERFACE" on page 164.

Syntax

SHUTDOWN NETWORK INTERFACE ***board_number*** **|** ***board_name***

Parameter	Use to
board_number	Specify the logical board number. Find the logical board number in MONITOR by selecting LAN/WAN Drivers and highlighting the driver name. The information window at the top of the screen displays information about the driver, including Logical Board Number.
board_name	Specify the logical board name. A name can be assigned to a logical board when the board is loaded using the LOAD command. If no name was assigned to the board, use the logical board number.

SPEED

Purpose

Use at the server console to display the speed at which the processor is running.

HINT: The CPUCHECK command provides additional information as well as processor clock speed. See "CPUCHECK" on page 36.

Syntax

SPEED

About Processor Speed

- Processor speed rating is determined by
  - Processor clock speed (90 MHz, 100 MHz, 200 MHz, 233 MHz, etc.)
  - Processor type (80486, Pentium*, Pentium Pro, Pentium II, etc.)
  - Number of memory wait states (0, 1, 2, etc.)
- If your computer has a slower rating than you expected, use SPEED to check the processor's speed rating.

  For example, entering SPEED for a Pentium II processor running at 333 MHz got the following rating:

  ```
  Processor speed: 26288
  ```
- Some computers have an Auto or Common processor speed mode that can reduce the clock speed to as little as 6 MHz.
- For NetWare® 6 operation, the processor or processors should be set to the highest speed. If your machine has a slower rating than expected, check the processor speed setting. For instructions on how to set the processor speed, see your computer's documentation.

SPFCON

Purpose

The SPFCON utility enables you to monitor Sequenced Packet Exchange™ (SPX™) spoofing statistics.

Spoofing is the process of preserving the transport end point connection by imitating keep alive packets and responding to watchdog request packets without passing this traffic across on-demand WAN links.

Using SPX spoofing can help you maintain lower costs over on-demand WAN links.

SPXCONFG

Purpose

Use at the server console to configure certain SPX™ parameters.

NOTE: These parameters can also be configured from the INETCFG utility.

Syntax

[LOAD] SPXCONFG [*option*[=*value*]]

Parameter	Use to
(no parameter)	Load SPXCONFG and display configuration menu.
option	Replace option with any available option. See "SPXCONFG Options" on page 252.
value	Specify a numerical value for an option. For information on setting these values, see "INETCFG" on page 69.

SPXCONFG Options

Option	Use to
A=	Specify SPX Watchdog Abort timeout (in ticks).
V=	Specify SPX Watchdog Verify timeout (in ticks).
W=	Specify SPX Ack Wait timeout (in ticks).
R=	Specify SPX Default Retry count.
S=	Specify maximum concurrent SPX sessions.
Q=1	Specify quiet mode (suppresses display of changed settings).
H	Display SPXCONFG help screen.
I=	Specify IPX™ maximum socket table size.

Using SPXCONFG

- You can use SPXCONFG in your autoexec.ncf file, as a console command, as a menu utility, or as a configuration file that is invoked by INETCFG.
- If you don't specify a parameter, the following menu appears:

  ```
  SPX Configuration Control Program

  1. SPX Watchdog Abort timeout 540

  2. SPX Watchdog Verify timeout 54

  3. SPX Ack wait timeout 108

  4. SPX Default Retry count 10

  5. Maximum concurrent SPX sessions 2048

  6. IPX maximum socket table size 1200
  ```

  You can then select parameters to change.
- SPXCONFG changes the configuration of SPX as well as the STREAMS-based SPXS (SPXII).
- If you enabled TCP/IP or AppleTalk* on the server, you can use either INETCFG or SPXCONFG to set SPX parameters.

  When you set the parameters using INETCFG, a load line for SPXCONFG is automatically added to the NETINFO.CFG file so it runs each time you bring up the server.
- If you have only IPX/SPX™ enabled on the server (and not TCP/IP or AppleTalk) and you want to use the SPXCONFG parameters each time you boot the server, place the following command in your autoexec.ncf file:

  [LOAD] [*path*]SPXCONFG [*option*[=*value*]]

Examples

To set SPX options to 1000 ticks for the SPX Watchdog Abort timeout and suppress the display of changed settings, type

```
[LOAD] SPXCONFG A=1000 Q=1
```

Additional Information

Topic	See
Setting SPX parameters with INETCFG	“INETCFG” on page 69

SPXS

Purpose

Use at the server console to provide STREAMS-based SPX™ protocol services.

Syntax

[LOAD] [*path*]SPXS [LDFILE = [*path*]*filename*[*ext*]]

Parameter	Use to
path	Specify the path to SPXS if you moved it from the default directory.
LDFILE = [*path*]*filename*[.*ext*]	Load the data file that contains the SPX timer defaults and physical packet size tables. If you don’t specify a filename, SPXS sets the parameters defined in the IPXSPX.CFG file. If you don’t specify a file extension, the default is .CFG.

Using SPXS

- When you load SPXS, the parameters in the IPXSPX.CFG file are set, unless you specify an alternate configuration filename.

  NOTE: The IPXSPX.CFG file is modified from the INETCFG utility when you set SPX/IPX parameters.

- You can create multiple configuration files in addition to IPXSPX.CFG. Use this feature if you frequently alternate between two or more IPX/SPX configurations.

To create multiple configuration files, copy the IPXSPX.CFG file to a new filename (IPXSPX2.CFG, for example). Then you can change the IPXSPX.CFG file (by using INETCFG) and still preserve the original configuration in the IPXSPX2.CFG file.

- To load a configuration file other than the default IPXSPX.CFG file, use the LDFILE option.

  For example, if you have a second configuration file called IPXSPX2.CFG, you can load that configuration by typing

  `[LOAD] SPXS LDFILE = IPXSPX2`

- When you load SPXS, STREAMS is autoloaded.

Additional Information

Topic	See
Setting SPX parameters using SPXCONFG	"SPXCONFG" on page 252
Setting SPX parameters using INETCFG	"INETCFG" on page 69

START PROCESSORS

Purpose

Use START PROCESSORS at the server console prompt to start one or more secondary processors when the NetWare® 6 server is running on a multiprocessor computer.

NOTE: Because NetWare is running on processor 0, the boot processor, START PROCESSORS affects only secondary processors.

Syntax

`START PROCESSORS [`*`n`*`...]`

Parameter	Use to
(no parameters)	Start all secondary processors.

Parameter	Use to
n...	Specify by processor number the secondary processors to start.

Using START PROCESSORS

- To bring a specific secondary processor online, enter at the console prompt:

  START PROCESSORS 1

  A confirmation message is displayed:

  ```
  Processor 1 is ONLINE.
  ```

- To bring all secondary processors online, enter at the console prompt:

  START PROCESSORS

  A confirmation message is displayed:

  ```
  Processor 1 is ONLINE.
  Processor 2 is ONLINE.
  Processor 3 is ONLINE.
  ```

- If you choose to start secondary processors when NetWare boots, use Set Auto Start Processors = OFF in the startup.ncf file (see "Multiprocessor Parameters" on page 218).
- To stop secondary processors, see "STOP PROCESSORS" on page 257.
- For more information, see Starting and Stopping Processors.

STATICON

Purpose

You use the Static Routing Configuration utility (STATICON) to open a connection to a remote IPX™ router and configure static routes and services at each end of the connection.

STOP PROCESSORS

Purpose

Use STOP PROCESSORs at the server console prompt to stop one or more secondary processors in a multiprocessor computer.

NOTE: Because Processor 0, the boot processor, cannot be taken offline while the server is running, STOP PROCESSORS affects only secondary processors.

Syntax

STOP PROCESSORS [*n*...]

Parameter	Use to
(no parameters)	Stop all secondary processors.
n...	Specify by number the secondary processors to stop.

Using STOP PROCESSORS

Run the DISPLAY PROCESSORS command before stopping a secondary processor to determine the processor's status and its number. (See "DISPLAY PROCESSORS" on page 46.)

When you stop a processor, the threads that were running on the processor are automatically migrated to another processor.

If you run STOP PROCESSORS without specifying the identifying number or numbers of the processors, all secondary processors will be stopped.

For more information, see Starting and Stopping Processors.

Examples

- To stop secondary processors 1 and 3, enter

  STOP PROCESSORS 1 3

  A confirmation message is displayed:

  ```
  Processor 1 is OFFLINE.
    Processor 3 is OFFLINE.
  ```

- To start secondary processors , see "START PROCESSORS" on page 255.

SWAP

Purpose

Use at the server console to display information about swap files, to add or delete swap files, and to specify the parameters of swap files.

Syntax

SWAP [ADD *vol_name* [*parameter* = *value*]] [DEL *vol_name*]
[PARAMETER *vol_name parameter* = *value*]

Parameter	Use to
(no parameter)	Display a screen containing information about swap files.
ADD *vol_name parameter* = *value*	Create a swap file on the designated volume. You can specify the following optional parameters when you create a swap file: MIN=, MAX=, and MIN FREE=. These parameters specify the minimum and maximum size of the swap file and the minimum free space that must be left on the volume. Values are in millions of bytes. If parameters are not included, the following default values are used: MIN = 2 MAX = Free volume space MIN FREE = 5

Parameter	Use to
DEL *vol_name*	Delete a swap file from the designated volume. If you are using protected address spaces, the Novell® JVM for NetWare® product, or any other application that uses virtual memory, be sure to keep at least one swap file. By default a swap file is created on the Sys volume whenever you start the server. If you do not want a swap file on Sys, place the SWAP DEL command in the startup.ncf file before the command to mount volumes.
PARAMETER = *vol_name parameter = value*	Change the parameter values for a swap file on the designated volume. You can specify the following parameters: MIN=, MAX=, and MIN FREE=. These parameters specify minimum and maximum size of the swap file and the minimum free space that must be left on the volume. Values are in millions of bytes.

Using SWAP

- If a swap file is being used when it is deleted, then the swapped data is moved to another swap file. If there is no other swap file, an error message is displayed and the file is not deleted.
- You can create one swap file per volume. The swap file for the Sys volume is created by default; you can delete it if necessary.
- Data moved to disk by virtual memory will be stored in any available swap file; it does not matter which volume the swap file is on. Generally, you will place swap files on the fastest volume or the one with the most available space.
- You can add a swap file to a volume by executing the SWAP ADD command, even if the volume is not mounted. Once you've added the swap file, the file will be created when you mount the volume.
- When you dismount a volume, the swap file is deleted. To keep a swap file on that volume, you must create the swap file again. The exception is the SYS: volume swap file, which is created by default. For convenience,

place the commands to create swap files into the AUTOEXEC.NCF file so the files will be created each time the server is started.

- Swap files are dynamic; they change size as data is swapped in and out of memory.

Additional Information

Topic	See
Virtual Memory	Virtual Memory

TCPCON

Purpose

Use at the server console to

- Monitor activity in the TCP/IP network segments of your internetwork
- View configuration and statistics information about the following TCP/IP protocols: IP, ICMP, UDP, TCP, OSPF, and EGP
- View IP routes known to a TCP/IP node
- View network interfaces supported by a TCP/IP node
- Access the trap log maintained by SNMPLOG (local systems only)
- Use Simple Network Management Protocol (SNMP) over TCP/IP or IPX™ to access TCP/IP information in any remote protocol stack supporting the TCP/IP Management Information Base (MIB)

Syntax

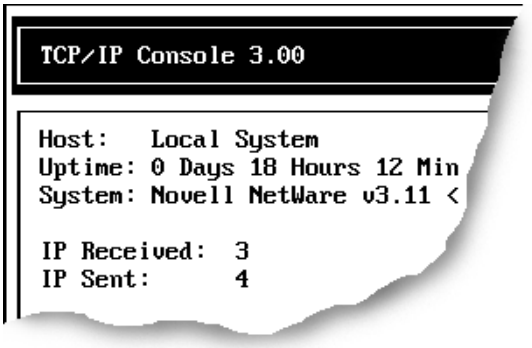
```
[LOAD] TCPCON
```

Using TCPCON

- By default, TCPCON monitors and gathers information from the local NetWare® TCP/IP node.

  You can, however, access another TCP/IP node on your internetwork if you know the symbolic hostname or host IP address of that node.

- When you load TCPCON, the TCPCON main screen appears:



- The top of the main screen displays a summary of statistics for the selected host, as follows:

Field	Explanation
Host	Symbolic host name or IP address of the selected TCP/IP host (or server name if accessing a remote node using IPX™) being queried. This is the host specified in SNMP Access Configuration in the Available Options menu.
Uptime	Amount of time that has elapsed since the selected host was last initialized.
System	Brief description of the selected host.
IP Received	Number of IP datagrams received from all interfaces, including those received in error.
IP Sent	Number of datagrams sent to IP for transmission. This number does not include datagrams forwarded by this host.
IP Forwarded	Number of IP packets forwarded from one node to another. This field displays the value Disabled if this host is not configured to be an IP router.
TCP Received	Number of TCP segments received, including those received in error.

Field	Explanation
TCP Sent	Number of TCP segments sent, excluding those containing retransmitted data.
TCP Connections	Number of currently established TCP connections.

- The Available Options menu on the main screen allows access to additional features of TCPCON, as follows:

Option	Use to
SNMP Access Configuration	View and modify TCPCON options.
Protocol Information	View protocol information for the selected host.
IP Routing Table	View IP routers known to the selected host.
Statistics	View TCP/IP statistics.
Interfaces	View the network interfaces supported by the selected host.
Display Local Traps	View the local SNMP trap log maintained by SNMPLOG.NLM.

TECHWALK

Purpose

Use at the server console to record NetWare® configuration information.

Syntax

[LOAD] TECHWALK [*console_NLM_name*]

Parameter	Use to
(no parameter)	Record configuration information for the NetWare MultiProtocol Router 3.1 INETCFG NLM™ program.
console_NLM_name	Record configuration information for the specified NLM program.

Using TECHWALK

TECHWALK saves the configuration information for INETCFG (or the specified NLM program) to a file named SYS:ETC\TECHWALK.OUT. All enabled items and summary lists are recorded.

You might prefer to exit INETCFG (or the specified NLM program) before you run TECHWALK. Running TECHWALK takes from 5 to 60 minutes, depending on your configuration and the network traffic, and dedicates your machine to the process during that period.

TIME

Purpose

Use at the server console to display

- Date and time kept by the NetWare® server's clock
- Daylight saving time status
- Time synchronization information

Syntax

```
TIME
```

Using TIME

When you execute TIME, information similar to the following appears on the console screen.

NOTE: The output is formatted according to your locale configuration.

Figure 2 TIME Output

```
SALES:time
  Time zone string: "MST7MDT"
  DST status:  OFF
  DST start:   Sunday, April 4, 1993   2:00:00 am MST
  DST end:     Sunday, October 31, 1993   2:00:00 am MDT
  Time synchronization is active.
  Time is synchronized to the network.
Monday, June 11, 1993   7:06:59 pm UTC
Monday, June 11, 1993  12:06:59 pm MST
```

TIMESYNC

Purpose

Use at the server console to monitor the internal time on a server to ensure that the time reported by all servers across the network is consistent, or synchronized.

TIMESYNC autoloads when the server boots. Under very few circumstances will you ever load or unload TIMESYNC. You may, however, want to load TIMESYNC to use an alternate configuration (.CFG) file.

Syntax

[LOAD] [*path*] TIMESYNC

Parameter	Use to
path	Specify the path to TIMESYNC.NLM if you moved it from the default directory.

You can set TIMESYNC parameters in the configuration file (TIMESYNC.CFG) or with the SET utility.

Additional Information

Topic	See
Setting time synchronization parameters	SET “Time Parameters” on page 226
Network time synchronization	"Guidelines for Time Synchronization" in *Network Time Management Administration Guide*

TLI

Purpose

Use at the server console to provide Transport Level Interface (TLI) communication services.

Syntax

[LOAD] [*path*]TLI

Parameter	Use to
path	Specify the path to TLI.NLM if you moved it from the default directory.

Using TLI

- To use TLI, you must have one or more protocol service modules loaded, such as SPXS or IPXS.
- TLI also requires STREAMS, CLIB, and CLIB-related modules and autoloads them if they are not already loaded.

TPING

Purpose

Use at the server console to send an Internet Control Message Protocol (ICMP) echo request packet to an IP node on your internetwork.

TPING is a command line utility that determines whether an IP target node on your internetwork is reachable.

Syntax

[LOAD] TPING *host* [*packet_size* [*retry_count*]]

Parameter	Use to
host	Specify the symbolic host name or IP address of a TCP/IP system on the network.
packet_size	Specify the size, in bytes, of the ICMP packet.
retry_count	Specify the number of times you want to resend an ICMP packet to the host system if a reply is not received (default = 5).

Using TPING

TPING sends an ICMP echo request packet to the IP target node. If the target node receives the request packet, it sends back a reply packet.

If TPING doesn't receive a reply, it resends the request packet the specified number of times.

When TPING receives a reply, it stops sending requests and displays a message indicating that the target node is reachable. (If it doesn't receive a reply, TPING also notifies you.)

TRACK OFF

Purpose

Use at the server console to prevent the server from displaying the RIP Tracking Screen. This screen displays Router Information Protocol (RIP) traffic on the server.

Syntax

```
TRACK OFF
```

Additional Information

Topic	See
RIP Tracking Screen	“TRACK ON” on page 267

TRACK ON

Purpose

Use at the server console to view the RIP Tracking Screen and make it the active screen. This screen displays Router Information Protocol (RIP) traffic on the server.

Syntax

```
TRACK ON
```

Using TRACK ON

- TRACK ON signals the router to display all server and network routing (RIP) packets that are received or sent.
- TRACK ON displays information about servers, networks, and connection requests.

This information is formatted according to whether the NetWare® server is

- Receiving incoming information (IN)
- Broadcasting outgoing information (OUT)
- Receiving a connection request

Incoming Information

Incoming information looks similar to the following:

```
IN [00D0C200:00001B026C09] 10:53:01am 010123C5 11/22 5300DEEF
  3/4 00001EF0 5/365

FADE2401 12/98 00001EEE 2/3 C9008617 5/11
```

The packet is incoming from network address 00D0C200 and from the server at node address 0001B026C09. The packet was sent at 10:53 a.m.

The columns of data that follow the line labeled IN are network numbers that the sending server knows about. For example, 010123C5 and 5300DEEF are the network numbers recognized by the server at address 00001B026C09.

The numbers 11/22 and 3/4 indicate routing information about that network. For example, the 11/ and 3/ indicate the hop count, or number of hops (gateways or routers) from the sending server to this network.

NOTE: The maximum number of hops a RIP packet travels is 16.

The /22 and /4 indicate the number of ticks (1/18th of a second) that a packet took to reach this network from the sending server.

Outgoing Information

Outgoing information looks similar to the following:

```
OUT [1986DAD0:8941A801] 11:00:01am

00001EEE 2/3 5300DEEF 3/4 00001EF0 5/365

FADE2401 2/3 FEED00BB 4/5 ACCCDDD 5/11
```

The packet is outgoing from network address 1986DAD0 and from the server at node address 8941A801. The packet was sent at 11:00 a.m.

The columns of data that follow the line labeled OUT are network numbers that the sending server knows about. The associated hop and tick count information is listed after each network. For an explanation of these, see “Incoming Information” on page 268.

Connection Request

When a client boots and loads a NetWare® Requester™ (such as DOS Requester or OS/2* Requester), a Get Nearest Server request is broadcast on the network the station is cabled to.

Any connected server can receive the message and respond to the station with a Give Nearest Server response.

The station initially attaches to the first server that responds to the Get Nearest Server request.

Additional Information

Topic	See
Turning off the RIP Tracking Screen	“TRACK OFF” on page 267
Displaying advertised networks (SAP traffic)	“DISPLAY NETWORKS” on page 45
Displaying advertised servers (SAP traffic)	“DISPLAY SERVERS” on page 48
Resetting routers	“RESET ROUTER” on page 165

UNBIND

Purpose

Use at the server console to

- Remove a communication protocol from the LAN driver of a network board
- Disable communication on a specific board

Syntax

```
UNBIND protocol [FROM] LAN_driver | board_name
  [[driver_parameter/]]
```

Parameter	Use to
protocol	Specify the name of the protocol you want to unbind.
LAN_driver | *board_name*	Specify the name of the LAN driver or the network board from which you are unbinding the protocol.
driver_parameter	Specify one or more driver parameters if you have more than one network board of the same type in your server. See "UNBIND Driver Parameters" on page 270. **NOTE:** Enclose driver parameters in square brackets.

UNBIND Driver Parameters

Driver parameter	Use to
[DMA=*number*]	Specify the DMA channel for the board. Use the same channel you did when you loaded the driver.
[FRAME=*number*]	Specify the frame type for the board. Use the same frame type you did when you loaded the driver.
[INT=*number*]	Specify the interrupt for the board. Use the same interrupt you did when you loaded the driver.
[MEM=*number*]	Specify the memory address for the board. Use the same memory address you did when you loaded the driver.
[PORT=*number*]	Specify the I/O port for the board. Use the same I/O port you did when you loaded the driver.

Driver parameter	Use to
[SLOT=*number*]	Specify the network board by the slot that it was installed in. Use this parameter with microchannel and EISA computers. Use the same slot number you did when you loaded the driver.
[NODE=*number*]	Specify the node number of the board.

Using Driver Parameters

- You must tell the operating system which network board or LAN driver to unbind the communication protocol from.
- If you have multiple boards or LAN drivers, you must unbind each one separately.
- If your server has more than one instance of the LAN driver loaded, use one or more driver parameters to specify the particular board you are unbinding.
- To prevent a driver from binding automatically when the server boots, delete the following line from the AUTOEXEC.NCF file:

  BIND IPX TO *LAN_driver* NET=*number*

Examples

- To unbind IPX™ from an NE3200™ driver that has been loaded only once, type

  UNBIND IPX FROM NE3200

- To unbind IPX from an NE3200 driver that has been loaded more than once, using driver parameters to specify the particular network board, type

  UNBIND IPX FROM NE3200 [SLOT=3, FRAME=ETHERNET_II]

Additional Information

Topic	See
Viewing a list of communication protocols	“PROTOCOL” on page 141

UNLOAD

Purpose

Use at the server console to

- Unload a module that was previously loaded with the LOAD command
- Unload outdated NLM™ programs so that updated modules can be loaded

You can also use UNLOAD at workstations running Novell® Client™ software for client modules that have been previously linked with LOAD.

Syntax

UNLOAD *NLM_name*
UNLOAD ADDRESS SPACE=*address_space* [*NLM_name*]
UNLOAD KILL ADDRESS SPACE=*address_space*

Parameter	Use to
NLM_name	Specify the module you want to unload.
ADDRESS SPACE= *address_space*	Specify the address space you want to unload. This command unloads all modules from the address space, removes the space, and returns its resources to the system.
ADDRESS SPACE= *address_space NLM_name*	Specify the module you want to remove from the designated address space. This command unloads the specified module from the address space, but does not remove the address space.
KILL ADDRESS SPACE= *address_space*	Remove the specified address space, but without unloading modules from it first. Use this command only if you know the address space can't be unloaded any other way.

IMPORTANT: Before you unload a module, be sure to read the next section, "Unloading Modules."

Unloading Modules

The UNLOAD command unlinks a loadable module from the operating system that was previous linked to the operating system with the LOAD command. (See “LOAD” on page 86.) When you unload a module, all resources are returned to the system.

To unload a module from an address space, you can specify its address space.

NOTE: If an address is specified without a module, all modules in that address space will be unloaded.

Keep the following information in mind when unloading LAN drivers, name space modules, or disk drivers.

- LAN Drivers

  When you unload a LAN driver, the driver is unbound from all communication protocols and removed from all network boards it was linked to.

  After a LAN driver is unloaded, users with network boards that require the unloaded driver receive the following error message:

  ```
  Network error on Server <fileserver>: Error receiving from
    network. Abort, Retry?
  ```

  If this occurs, do the following:

  - Retry once to see if an alternate route to the NetWare® server is available on another network.
  - If the retry fails, retry again after the LAN driver is reloaded and bound to the communication protocol.

  A user who receives the error message must reestablish a connection within 15 minutes. If the connection is broken for more than 15 minutes, the server watchdog terminates the station’s connection.

  If the LAN driver will be unloaded for 15 minutes or longer, have users log out before unloading the LAN driver.

- Name Space Modules

  Before unloading name space modules, dismount all volumes that are using the module. These volumes cannot be remounted until the module is loaded again.

  To permanently delete a name space from a volume before you unload the name space module, use VREPAIR.

- Disk Drivers

  Before unloading a disk driver, dismount all volumes stored on the hard disks connected to the controller or host bus adapter.

  If you don't dismount the volumes, the system warns you that the driver is in use and lists the volumes using the driver.

  If you override the warning and unload the driver without dismounting the volumes, the server dismounts the volumes and notifies those who are using the volumes.

Examples

- To unload MONITOR, enter

  UNLOAD MONITOR

- To unload the CLIB module from the address space for GroupWise®, enter

  UNLOAD ADDRESS SPACE=GRPWISE CLIB

- To unload all modules from the GroupWise address space and shut down the address space, enter

  UNLOAD ADDRESS SPACE=GRPWISE

- To shut down an address space that cannot be unloaded any other way, enter

  UNLOAD KILL ADDRESS SPACE=ADDRESS_SPACE1

UPS_AIO

Purpose

If your uninterruptible power supply (UPS) is connected to the server through a serial port, use UPS_AIO to provide the software link between your server and the UPS.

Syntax

[LOAD] [*path*]UPS_AIO [*parameter*...]

Parameter	Use to
path	Specify the path to UPS_AIO if you moved it from the default directory.
DOWNTIME=*number*	Specify the amount of time to run on battery before system shutdown. If power is restored before this time elapses, no shutdown will occur. If a low battery condition occurs before this time elapses, an immediate shutdown will occur. **Supported values:** 30 seconds minimum, no practical maximum limit. **Default:** 300 seconds
MSGDELAY=*number*	Specify the elapsed time before a broadcast message is first sent to users. **Supported values:** 0 seconds minimum, no practical maximum limit. **Default:** 5 seconds The broadcast message states the time remaining until shutdown. This message is generated automatically by UPS_AIO.
MSGINTERVAL=*number*	Specify the time interval between broadcast messages sent to users. **Supported values:** 20 seconds minimum, no practical maximum limit **Default:** 30 seconds The broadcast message states the time remaining until shutdown. This message is generated automatically by UPS_AIO.

Parameter	Use to
DRIVERTYPE=*number*	Specify the AIO device driver type. **Supported values:** 1, 2, 3 **Default:** 1 The default value of 1 represents the AIOCOMX driver, which comes with NetWare®. Other drivers might be represented by other driver type numbers. Refer to the documentation that came with the driver.
BOARD=*number*	Specify the AIO board number. **Supported values:** Determined by the driver manufacturer **Default:** 0 To determine the board number, read the driver information when the AIOCOMX driver is loaded. This information includes both the board and port numbers. If you do not use the AIOCOMX driver, refer to the driver documentation to determine the board number.
PORT=*number*	Specify the port number. **Supported values:** Determined by the driver manufacturer **Default:** 0 To determine the port number, read the driver information when the AIOCOMX driver is loaded. This information includes both the port and board numbers. If you do not use the AIOCOMX driver, refer to your driver documentation to determine the port number.

Parameter	Use to
SIGNAL_HIGH	Specify the signal_high parameter to set the normal RS232 signaling state to high. **Supported values:** SIGNAL_HIGH or no value Use this parameter only if your UPS system uses high values, instead of low values, to determine if power is off or the battery is low. Most UPS systems use low values. Refer to your UPS hardware documentation to determine whether you need to use the parameter.
?	Display a help screen that explains these parameters. When you use this parameter, the UPS_AIO module is not loaded. To load UPS_AIO, you must execute LOAD UPS_AIO again, without the ? parameter.

Using UPS_AIO

NOTE: The serial cable between the UPS and the server must be designed for use with the UPS. Contact the manufacturer of your UPS for information on the correct cable to use for your system.

- You must load an AIO device driver before loading UPS_AIO; the driver is not loaded automatically. The AIOCOMX driver is included with the NetWare operating system. If you want to use a different driver, consult the UPS hardware and driver documentation.
- The UPS_AIO module does not allow you to change parameter settings after loading the module. If you want to change the settings, reload the module with the new parameter values.
- Place the commands to load the device driver and UPS_AIO in your autoexec.ncf file to load them each time the server comes up.
- After you load UPS_AIO, a status screen displays messages about the current status and activities of the UPS. To toggle between this and other screens, press Alt Esc. These messages are also logged to SYS:SYSTEM\SYS$LOG.ERR.

VIEW

Purpose

Use to view a file from the NetWare® server console.

NOTE: VIEW does not let you create or modify files. To create or modify a file, use "EDIT" on page 55.

Syntax

[LOAD] VIEW [*filename*]

Parameter	Use to
filename	Specify a file to view.

Using VIEW

If you do not specify a filename, VIEW prompts you for the name.

VOLUME

Purpose

Use at the server console to list mounted volumes.

Syntax

VOLUME [*name*]

Parameter	Use to
(no parameter)	List general information about all mounted volumes.
name	Specify the volume you want to display information about.

Using VOLUME

When you execute VOLUME without the *name* parameter, a message similar to the following appears:

```
Mounted Volumes   Name Spaces       Flags
  SYS               DOS               Cp Sa Mg
```

The output lists each mounted volume, its name spaces, and the flags that are set for that volume. The three possible flags are:

Cp—indicates that file compression is enabled on the volume

Sa—indicates that block suballocation is enabled on the volume

Mg—indicates that migration is enabled on the volume

When you execute **`volume`** ***name***, the screen displays more detailed information about the specific volume, such as the following:

Figure 3 Volume Information

```
Volume SYS information:

Block Usage: 4 FAT blocks, 34 Directories blocks, 0 EDS blocks
Blocks: 1569 used of 4084     Directory Entries: 1314 used of 2176
EDS: 0 used of 0 extants      Extended Attributes: 0
Data Streams: 590, 668 (Cp), 9 (Cp Limbo), 242 (Cant Cp)
Sub Alloc Blocks: 321
NameSpaces: DOS               Flags: Cp Sa
```

VREPAIR

Purpose

For traditional NetWare volumes, use at the server console to

- Correct volume problems
- Remove name space entries from Directory Entry Tables

NOTE: You can't use VREPAIR on a mounted volume.

Also, VREPAIR is not used to repair NSS volumes. For NSS volumes, you must use the REBUILD utility. See "REBUILD" on page 149.

Syntax

[LOAD] [*path*] VREPAIR [*volume_name*] [*log_filename*]

Parameter	Use to
path	Specify the path to VREPAIR.NLM if you moved it from the default directory.
volume_name	Specify the name of a volume to repair.
log_filename	Specify a text filename to log errors into.

Using VREPAIR

- For an explanation of the VREPAIR main menu, see "VREPAIR Options" on page 282.
- If a volume fails to mount when the server is brought up, VREPAIR loads automatically and tries to repair the failed volume.

  If you don't want VREPAIR to automatically repair a volume that won't mount, load MONITOR, select Server Parameters > File System, and set the Automatically Repair Bad Volume parameter to OFF. (For more information, see "MONITOR" on page 103.)
- Use the version of VREPAIR that matches the operating system.
- The majority of all problems fixed by VREPAIR are caused by hardware failures. If a volume frequently needs repair, consider replacing the hard disk or controller.

  HINT: Copy vrepair.nlm and the VREPAIR name space support modules (*v_namespace*.nlm) to the boot partition of your server. Then, if volume SYS: fails to mount, you can load and run VREPAIR from the DOS boot directory.

How VREPAIR Works

Minor problems can occur on a volume if the primary File Allocation Table (FAT) or Directory Entry Table (DET) becomes corrupted.

VREPAIR compares the primary tables with their mirrored counterparts. (The operating system keeps two copies of all tables. If hard disks are mirrored, then four copies are kept.)

VREPAIR checks the sets of mirrored tables for errors. If it finds inconsistencies, it uses the most correct table entry as the corrected entry. VREPAIR then writes the corrected entry to both the primary and mirrored tables.

VREPAIR may have to delete some corrupted files or tables. For more information, see “Viewing Deleted Files” on page 284.

VEPAIR will log bad block information into a file if you specify a log filename when you load VREPAIR. You can also specify a log filename after you load VREPAIR, when VREPAIR displays an error.

When to Use VREPAIR

VREPAIR can repair a bad volume that you have dismounted while other NetWare® server volumes are functioning. After you finish running VREPAIR, you can mount the repaired volume (in most cases).

Use VREPAIR when

- A hardware failure either prevented a volume from mounting or caused a disk read error.

  NOTE: Although VREPAIR can’t fix hardware problems, it can sometimes fix related volume damage.

- A power failure corrupted a volume.
- The server displays memory errors and can’t mount a volume after a name space (such as Macintosh*) is added to the volume.

  For this type of problem, either add more memory to the server or use VREPAIR to remove the newly added name space.

- The volume has bad blocks.

  The following kinds of errors in FATs or Directory tables signal bad blocks:

  - Read errors
  - Data mirror mismatch errors
  - Multiple allocation errors
  - Fatal DIR errors
  - Write errors

  HINT: This information is reported in the log file.

VREPAIR Options

The VREPAIR main screen displays the following menu:

```
Options:
1 - Repair a volume
2 - Set VRepair options
3 - Exit
```

Main Menu Selection	Use to
Repair a volume	Begin or continue with volume repair. You can also use this option to stop a volume repair in process or change the method of displaying errors during the repair.
Set VRepair options	Set VREPAIR configuration options.
Exit	Exit VREPAIR.

In the Set VRepair Options menu, there are two settings for each option, a default option and an alternate option. When VREPAIR autoloads and tries to repair a volume that will not mount, the default settings are used.

You can configure the VREPAIR alternate options by selecting the associated option number to toggle between the alternate and default options.

For example, Option 2 settings are Write All Directory and FAT Entries Out to Disk and Write Only Changed Directory and FAT Entries Out to Disk.

The default for Option 2 is Write Only Changed Directory and FAT Entries Out to Disk. If you select Option 2, your current VREPAIR configuration reflects the change from the default to the new setting: Write All Directory and FAT Entries Out to Disk.

The VREPAIR configuration options are described in Table 22 on page 283.

Table 22 VREPAIR Configuration Options

Default Option	Alternate Option	Explanation
1. Quit if a VREPAIR Name Space Support NLM™ Is Not Loaded	Remove Name Space Support From The Volume	These options control whether name space support for non-DOS files is retained in the volume tables. If you add a name space to a volume and the system doesn't have enough memory, select Remove Name Space Support From the Volume. Then select a name space to delete. If you remove a name space, the accompanying extended file information is destroyed. For example, if you remove Macintosh name support, the Macintosh long names, the finder icons, and the resource forks are destroyed. (The DOS name and its data file are kept and are accessible from DOS workstations.) **Important:** To repair a volume with non-DOS name space entries, VREPAIR must find the corresponding name space support modules. (For example, to repair a volume with the Macintosh name space, you need to load V_MAC.NLM; to repair a volume with the OS/2*, Windows* 95, or Windows NT* name space, load V_LONG.NLM.) For more information, see Repairing a Traditional Volume.
2. Write Only Changed Directory And FAT Entries Out To Disk	Write All Directory And FAT Entries Out To Disk	These options control the changes that are made to the FATs and Directory tables. If you repair a mirrored or duplexed volume, select the alternate option to force an update of all tables on both hard disks.

Default Option	Alternate Option	Explanation
3. Write Changes Immediately To Disk	Keep Changes In Memory For Later Update	NetWare defaults to writing changes immediately to disk. In most cases, this default option speeds the repair. Disks requiring very few changes will repair faster if the alternate option is used.
4. Retain Deleted Files	Purge All Deleted Files	These options control whether deleted files are purged or retained. If a file is deleted, but not purged, it can be salvaged. Purge deleted files if you are concerned about the amount of disk space being used to retain deleted files or if you don't want users to salvage files (for example, for security reasons).
5. Return to Main Menu		After you select the VREPAIR configuration options, press menu item 5 to return to the VREPAIR main menu.

Displaying Errors during Repair

There are run-time options you can modify during the VREPAIR process to change the way errors are displayed. To view the options, select the main menu option, Repair a Volume.

- Select Option 1 if you do not want VREPAIR to pause after each error.
- Select Option 2 if you want VREPAIR to log errors in a text file.
- Select Option 3 to stop the repair of the volume.
- Select Option 4 to continue with a volume repair after you have temporarily suspended the repair.

Viewing Deleted Files

The repair operation can create new files containing data that VREPAIR deleted. You can access these files if you select the default configuration option, Retain Deleted Files. The files are numbered and named VR*NNNNNN*.FIL where *N* is any number.

These numbered files are created in any of the following circumstances:

- VREPAIR found a filename that has an invalid DOS name. The filename might contain invalid characters or might be too long.
- VREPAIR found that the filename is not unique. (Another file exists with the same name.)
- VREPAIR found a FAT chain without a file showing ownership of it.

  NOTE: A file is divided into a series of data blocks that are linked together in a FAT chain.
- No files in the Directory Entry Table (DET) claimed ownership of the data, so a new filename was generated to point to this data.

VREPAIR might create as many as several thousand of these files. These numbered files are created in the directory where they were found during the volume repair operation.

Recovering Files

You might be able to recover some or all of the files deleted by VREPAIR. Contact Technical Support for more information.

Additional Information

Topic	See
Repairing a volume	Repairing a Traditional Volume or Rebuilding NSS Storage Pools and Volumes

WAN Traffic Manager

WAN Traffic Manager allows you to manage how and when traffic is sent across WAN links, thus reducing network costs. It consists of three elements:

- WTM.NLM, which resides on each server in the eDirectory™ tree. Before eDirectory sends server-to-server traffic, wtm.nlm reads a WAN traffic policy and determines whether that traffic will be sent.
- WAN traffic policies, which are rules that control the generation of eDirectory traffic. WAN Traffic Policies are text stored as an eDirectory property value on the NetWare® Server object, the LAN Area object, or both.

- WANMAN ConsoleOne™ snap-in which is the interface to WAN Traffic Manager. It allows you to create or modify policies, create LAN Area objects, and apply policies to LAN Areas or to servers.

  When WAN Traffic Manager is installed, the schema will include a LAN Area object and three new detail pages on the Server object:

  - LAN Area Membership
  - WAN Policies
  - Cost

A comprehensive Help system is built into the utility. For addition information and procedures, refer to the Help system.

WMDMMGR

Purpose

WMDMMGR is a windows-based modem script editing tool used to create and modify modem descriptions and PPP login scripts used with Novell® Internet Access Server 4.1.

X25CON

Purpose

Use X25CON to access interface configuration and statistical information for all X.25 interfaces reported by the specified host.

X25DISP

Purpose

X25TRACE works with X25DISP to provide a way to analyze the output of X25TRACE. X25DISP is a DOS executable utility that decodes the X25TRACE output file and generates an ASCII format file.

X25DISP.EXE is located in sys:system\utils.

XLOG

Purpose

Use the XLOG utility to help diagnose ISDN-related connection problems with Eicon* Technology ISDN adapters.

A LAN Driver Statistics

This appendix contains information on both common and custom LAN driver statistics.

Monitoring Network Traffic

By comparing information about LAN drivers installed on your server, you can tell which cabling system is handling the most traffic.

If errors occur frequently on a high-traffic system, you may want to switch some of the stations on the busy system to a new or less busy cabling system.

To view LAN driver statistics:

1. At the server console prompt, enter

   [LOAD] MONITOR

2. Select Available Options > LAN/WAN Drivers.
3. Select a LAN driver from the Available LAN Driver menu.

The statistics for the selected LAN driver are displayed. Press Tab > PageUp or PageDown to scroll through the information in the window.

For more information, see “LOAD” on page 86.

Common LAN Driver Statistics

The generic statistics common to most of the drivers are maintained by two modules in the NetWare® operating system that are autoloaded by LAN drivers. The modules are:

- The Media Support Module™ (MSM.NLM)
- The Topology Specific Module™ (TSM.NLM)

  There are three TSM™ modules. The one that is autoloaded will depend on your server's LAN driver. The three are ETHERTSM (Ethernet), TOKENTSM (token-ring), and FDDITSM.

These common LAN driver statistics can be viewed with MONITOR. Select Available Options > LAN/WAN drivers, and then select a driver. The system displays a window containing both the generic and custom statistics for the selected driver.

Brief descriptions of the statistics maintained by the MSM module and each of the TSM modules are found in the following tables:

- Table 23, "LAN Driver Statistics," on page 291
- Table 24, "Generic Statistics for Ethernet Drivers That Use Ethertsm.nlm," on page 294
- Table 25, "Generic Statistics for Token Ring Drivers That Use Tokentsm.nlm," on page 296
- Table 26, "Generic Statistics for FDDI Drivers That Use Fdditsm.nlm," on page 297

Custom LAN Driver Statistics

Custom statistics describe LAN activity for specific LAN device drivers.

The custom LAN driver statistics can be viewed with MONITOR. Select Available Options > LAN/WAN drivers, and then select a driver, then press Tab. The system displays a window containing both the generic and custom statistics for the selected driver.

Brief descriptions of statistics for selected drivers are found in the following tables:

- Table 27, "Custom Statistics for NE2000, NE2, NE2_32, CNE2_32, and Other Ethernet Drivers," on page 298

- Table 28, “Custom Statistics for Token Ring Drivers,” on page 303
- Table 29, “Custom Statistics for IBM Baseband PCN2L Drivers,” on page 305

NOTE: Custom statistics vary, depending on the LAN driver installed. For statistical information about third-party drivers not listed in the custom statistics section, check the documentation that comes with the driver.

Table 23 LAN Driver Statistics

Statistic	Description
Driver Name	The driver name and parameters that correspond to the hardware settings on the network board.
Version	The current version of the driver.
Logical Board Number	The number which uniquely identifies each time a driver is registered with the system.
Board Instance Number	The number assigned to each physical adapter for which the driver has been loaded..
Node Address	The station or node address of the network board in the NetWare server.
Protocols	The communication protocols bound to the driver with BIND.
Network	The network number assigned to the cabling system the LAN driver is operating on. Appears only if the IPX™ protocol has been bound to the board.
Total Packets Transmitted	The number of packets sent from the NetWare server through this LAN driver since the driver was loaded. (By comparing this figure with the figures for other LAN drivers, you can see which driver is handling the most traffic.) This value is maintained by the TSM module.
Total Packets Received	The number of packets received by the NetWare server sincethe driver was loaded. This includes file service requests, packets routed to another network, and packets sent to other IPX sockets in the NetWare server. This value is maintained by the TSM module.

Statistic	Description
Transmit failed, packet too big	A counter that is incremented when the NetWare server tries to transmit a packet that is too large for the hardware to handle. This value is maintained by the TSM module.
Transmit failed, packet too small	A counter that is incremented when the NetWare server tries to transmit a packet that is too small. This value is maintained by the TSM module.
Receive discarded, no available buffers	A counter that is incremented when a device sends a packet to your NetWare server, but no packet receive buffer is available. The server allocates more packet receive buffers after each incident until it reaches its maximum limit (configured with a SET parameter). If you are using an EISA or microchannel bus-master board (such as the NE3200™ board), you will probably need to increase both the minimum and maximum number of packet receive buffers. See Minimum Packet Receive Buffers and Maximum Packet Receive Buffers in SET "Communications Parameters" on page 192. No ECB Available Count messages can also indicate that the driver is not configured correctly or that the TSM module and the Hardware Specific Module™ (HSM™) are incompatible. This value is maintained by the TSM module.
Receive failed, packet too big	A counter that is incremented when the NetWare server receives a packet that is too big for the provided receive buffers. This value is maintained by the TSM module.
Receive failed, packet too small	A counter that is incremented when the NetWare server receives a packet that is too small. Currently only the RX-Net™ TSM module maintains this counter.
Receive failed, adapter overflow	A counter that is incremented each time the adapter's private receive buffer pool was exhausted. This causes subsequent incoming packets to be discarded.This value is maintained by the HSM module.

Statistic	Description
Transmit failed, Miscellaneous Error	A counter that is incremented when errors with send packets occur. This value is maintained by the HSM module.
Receive failed, Miscellaneous Error	A counter that is incremented when errors with receive packets occur. This value is maintained by the HSM module.
Transmit failed, retried	A counter that is incremented when the NetWare server tries to send a packet but fails because of a hardware error. The server tries to send the packet until either it succeeds or the retry setting is reached. This value is maintained by the HSM module.
Receive failed, checksum error	A counter that is incremented when the checksum byte at the end of the packet does not match the sum of the bytes contained in the packet. This indicates a data error. This value is maintained by the HSM module.
Receive failed, packet length	A counter that is incremented when the packet length received by the hardware and the length specified by the packet do not match. Currently only the Ethernet TSM module maintains this counter.
Bytes transmitted modulo 4 GB	The number of bytes, including low-level headers, successfully transmitted. This value is maintained by the TSM module.
Bytes transmitted rollover <times 4 GB>	Upper 32 bits of the Total Send OK Byte Count Low. The Total Send OK Byte Count High statistic is incremented to 1 when the Total Send OK Byte Count Low counter reaches 4 GB. This value is maintained by the TSM module.
Bytes received modulo 4 GB	The number of bytes, including low-level headers, successfully received. This value is maintained by the TSM module.

Statistic	Description
Bytes received rollover <times 4 GB>	Upper 32 bits of the Total Receive OK Byte Count Low. The Total Receive OK Byte Count High statistic is incremented to 1 when the Total Receive OK Byte Count Low value reaches 4 GB. This field is maintained by the TSM module.
Transmitted to a group address	The number of packets transmitted with a group or multicast destination address. This field is maintained by the TSM module.
Received from a group address	The number of packets received with a group or multicast destination address. This field is maintained by the TSM module.
Adapter resets	The number of times the adapter was reset because of internal failures or other calls to the Driver Reset routine. This field is maintained by the HSM module.
Adapter state change time stamp	The time stamp indicating when the adapter last changed operational state (such as load, shutdown, or reset). This value is maintained by the MSM module.
Packets queued for transmission	The number of transmit packets (transmit ECBs) that are queued for the adapter. This is an indication of throughput overload on transmits. This field is maintained by the TSM module.

Table 24 Generic Statistics for Ethernet Drivers That Use Ethertsm.nlm

Statistic	Description
Transmit succeeded, single collision	The number of frames involved in a single collision that are subsequently transmitted successfully. When the Ethernet controller detects a collision, it backs off and then retries the transmission.
Transmit succeeded, multiple collisions	The number of frames involved in more than one collision that are transmitted successfully. This happens if the Ethernet controller had to back off more than once due to collisions.

Statistic	Description
Transmit succeeded, deferred	The number of frames whose transmission was delayed because of a busy medium. This happens if another station is transmitting on the wire when the adapter receives the command to transmit a packet.
Transmit failed, late collision	The number of transmits that had a collision after 512 bits of the packet were transmitted. This can be caused by faulty adapters, faulty network equipment, cables that are too long, or faulty terminators.
Transmit failed, excessive collisions	The number of transmits that were aborted because of too many collisions. This usually indicates that a board in the network is bad or jabbering. (Jabbering means the board has been on the channel longer than the time needed to transmit the maximum size packet.) This condition could also occur in very heavy traffic conditions.
Transmit failed, carrier sense missing	The number of transmits aborted because of loss of carrier sense while transmitting without any collisions. This is usually caused by a faulty adapter in the network, faulty cabling, an unterminated cable, or a faulty repeater.
Transmit failed, excessive deferral	The number of transmits aborted because of excessive deferrals. This is usually caused by a faulty adapter or repeater in the system that is jabbering on the wire. It can also occur under very heavy traffic conditions.
Receive failed, bad frame alignment	The number of received frames that were misaligned. This occurs when the number of octets in the frame is not correct or the frame does not pass the FCS check. These bad packets are usually caused by a faulty adapter or repeater in the system. They can also be caused by a collision.

Table 25 Generic Statistics for Token Ring Drivers That Use Tokentsm.nlm

Statistics	Description
AC Errors	This counter is incremented when a ring station receives a Standby Monitor Present MAC frame with the A/C bits in the Frame Status field equal to zero without first receiving an Active Monitor Present MAC frame.
Transmit failed, abort delimiter sent	This counter is incremented when a ring station transmits an abort delimiter. An abort delimiter is transmitted when a ring station receives a frame in which the token bit of the access control field is set to show Token and not Frame. A ring station can also transmit an abort delimiter if an internal hardware error has occurred.
Burst errors	This counter is incremented when a ring station detects the absence of five half-bit times (a burst-five error). Other stations will detect a burst-four error followed by idles.
Frame copied errors	This counter is incremented when a ring station recognizes (receives or repeats) a frame addressed to its specific address and detects that the FC field A bits are set to 1, indicating a possible line hit or a duplicate address.
Frequency errors	This counter is incremented when the frequency of the incoming signal differs from the expected frequency by more than that specified in Section 7 of IEEE Standard 802.5-1989.
Recoverable internal error	This counts the times a ring station has a recoverable internal error, which means a ring station is probably marginal.
Last ring status	This code changes each time the ring status changes. Status codes are reported by the physical hardware. See the IBM* Token-Ring Network Architecture Reference for the status code, function, and meaning.
Line errors	This counter is incremented when a frame or token is repeated by the ring station. A frame is repeated when a Frame check Sequence error occurs or a code violation exists between the starting and ending delimiters of the frame.

Statistics	Description
Transmit failed, lost frame	This counter is incremented when a ring station transmits a frame that does not return to the station. The active monitor sends a new token.
Error tokens transmitted	This counter is incremented when a station acting as the active monitor recognizes an error condition that needs a token transmitted. This occurs when the TVX time expires.
Upstream node address	The twelve digits of the upstream node address of the next node up stream on the ring.
Last ring ID	This contains the value of the local ring ID.
Last beacon type	This contains the value of the last beacon type.

Table 26 Generic Statistics for FDDI Drivers That Use Fdditsm.nlm

Statistic	Description
Configuration State	The attachment configuration for the station or concentrator: 0=isolated; 1=local_a; 2=local_b; 3=local_ab; 4=local_s; 5=wrap_a; 6=wrap_b; 7=wrap_ab; 8=wrap_s; 9=c_wrap_a; 10=c_wrap_b; 11=c_wrap_s; 12=thru
Upstream Node Address	The upstream neighbor's MAC address (0 if unknown).
Downstream Node Address	The downstream neighbor's MAC address (0 if unknown).
Receive failed, frame error	The number of frames that were detected in error by this MAC that had not been detected in error by another MAC.
Receive failed, lost frame	The number of instances that this MAC detected a format error during frame reception such that the frame was stripped.
Ring Management State	Indicates the current state of the Ring Management state machine: 0=Isolated; 1=Non_Op; 2=Ring_Op; 3=Detect; 4=Non_Op_Dup; 5=Ring_Op_Dup; 6=Directed; 7=Trace
Consecutive LCT failures	The count of the consecutive times the link confidence test (LCT) has failed during connection management.

Statistic	Description
LEM, link rejected	The link error monitor (LEM) count of the times that a link was rejected
LEM, total errors	The aggregate link error monitor (LEM) error count.
Connection state	The state of this port's Physical Connection Management (PCM) state machine: 0=Off; 1=Break; 2=Trace; 3=Connect; 4=Next; 5=Signal; 6=Join; 7=Verify; 8=Active; 9=Maint

Table 27 Custom Statistics for NE2000, NE2, NE2_32, CNE2_32, and Other Ethernet Drivers

Statistic	Description
UnderrunErrorCount	This counter is incremented when the RAM buffer on the network board is full; the board cannot accept any more packets until the RAM buffer is cleared.
TransmitTimeoutCount	This counter is incremented when a network board interrupts the file server with the message that the send bit is lost. This is a hardware problem caused by faulty cabling, a bad network board, or a missing terminator.
RxPagingErrorCount	This is a count of the errors that occur when internal buffers on the board are corrupted.
ReceiveFIFOOverrunErrorCount	This counter is incremented when an incoming packet causes an overflow because FIFO was not serviced.
ReceiverMissedPacketCount	This counter is incremented when a packet is sent to a network board that cannot accept the packet because all its receive buffers are full.
GotNothingCount	This counter is incremented when the file server receives an interrupt from a network board that is not transmitting or receiving anything. This is not serious.
UnsupportedFramePacketCount	This counter is incremented when a packet is received by the LAN driver with a frame type that hasn't been loaded for the given board.

Statistic	Description
UnsupportedMulticastCount	This counter is incremented for each multicast packet received by the board that is not registered with the driver.
BackToBackSendCount	This counter is incremented each time the driver can buffer a send packet onto the network board while the board is sending a previous buffer. Use this counter to track congestion on the network board. See also EnqueuedSendsCount.
EnqueuedSendCount	This counter is incremented when the driver is unable to transmit a packet and must put the packet in a queue until the transmitter is available. Use the counter to track congestion on the network board. See also BackToBackSendCount.
HeartBeatError	(NE2100™, NE1500T™, or CNEAMD™) This counter is incremented when there is a signal quality error. This function is also known as the heartbeat or Signal Quality Error (SQE) test. This counter indicates a hardware problem.
MemoryTimeout	(NE2100, NE1500T, or CNEAMD) This counter is incremented when there is contention on the bus. If this counter is incremented, there may be multiple boards in the server or another bus-mastering device in the server, such as a LAN or disk channel device.
TxBabblingError	(NE2100, NE1500T, or CNEAMD)This counter is incremented when there is excessive length in the transmit buffer. It will increment after 1,519 data bytes have been transmitted from the buffer. It indicates that the transmitter has been on the channel longer than the time required to send the maximum length packet. If this counter is incremented, it indicates a hardware problem with the network board in the server.

Statistic	Description
TxUnderflowError	(NE2100, NE1500T, or CNEAMD) This counter is incremented when something else on the bus takes control of the bus while the LAN driver is putting the data on the wire. If this occurs, the packet must be retransmitted.
TXBufferError	(NE2100, NE1500T, or CNEAMD) This counter is incremented when there is a problem with the transmit buffer. This counter is usually incremented when TxUnderflowError is incremented; it indicates a hardware problem in the server.
RxECBsOver16MegCount TxECBsOver16MegCount	(NE2100, NE1500T, or CNEAMD) One of these counters is incremented when either a transmit or receive occurs and the driver has double buffered the ECB in the reserved buffers below 16 MB in memory. These boards require double buffering because they have a physical limitation that prevents them from accessing memory above 16 MB. Therefore, if the operating system issues an Event Control Block (ECB) with a memory address above 16 MB, the board uses some of the reserved buffers below 16 MB to queue the request. These are not errors. This value tracks how many ECBs are redirected to the buffers below 16 MB. In many cases, this counter can be as high as the total packets sent and received. This double buffering decreases performance. If you have more than 16 MB of RAM and a board that is bus-mastering or using DMA that is not a 32-bit adapter, performance might be degraded.
PacketUsed2ECBs	(NE2100, NE1500T, or CNEAMD) This counter is incremented if the Server Maximum Physical Receive Packet Size is set to 1514 bytes (default for NetWare 3.11 servers), and you need to receive a near-full-size packet. For NetWare 3.12 and 4.*x*, the default Maximum Physical Receive Packet Size is 4202. In this instance, two ECBs are used instead of one, since the CRC on the end of the packet requires an extra four bytes. Using two ECBs instead of one may decrease performance slightly.

Statistic	Description
TransmitRetryCount	(NE3200™) This counter is incremented when the driver is unable to transmit a packet after a specified number of times. This may indicate a hardware problem.
TxClearToSendsErrors	(NE3200) This counter tracks an 82586 error. There are some conditions when the Clear to Send signal from the 82586 chip is incorrect. This counter indicates the number of times the corrective code on the adapter was executed to work around this condition in the 82586.
TxDMAUnderrunErrors	(NE3200) This counter tracks an 82586 error. Contention among the BMIC, 80186, and 82586 can occur on the adapter, causing the 82586 to assume it did not receive all of the packet for transmission. The transmit operation must then be retried. This counter indicates the number of times the corrective code on the adapter was executed to work around this condition.
RxDMAOverrunErrors	(NE3200) This counter tracks an 82586 error. If two packets are received back-to-back at close to 9.6 microseconds (the minimum Ethernet interframe spacing), then the chip may report an overrun. If so, the frames are lost by the chip and the source must retransmit. This counter indicates the number of times this error has occurred.
RxPacketSlideErrors	(NE3200) This counter tracks the number of instances of an 82586 anomaly. In some conditions, the 82586 might be off by two bytes in the receive packet descriptors. In this case, the sending station must retransmit the packet. This counter indicates the number of times this condition has occurred.

Statistic	Description
RxDummyRCBUsedErrors	(NE3200) This counter tracks an 82586 error. In some cases, the 82586 may attempt to receive data into a nonexistent receive buffer at the end of its receive buffer list. To catch this condition and avoid internal data corruption, a dummy receive buffer is added to the end of the list. This variable counts the number of times the 82586 attempted to write into the dummy buffer.
InternalAdapterReset	(NE3200) This counts the number of resets (by the 80186) that occurred on the adapter due to failures on the adapter. This counter is incremented when the software corrects itself for minor problems or if the adapter is in an unknown state. It is common for this counter to be incremented. Under normal conditions, more of these errors should occur during idle time than when the driver is busy. This counter would only indicate a hardware problem if it registered thousands of these errors when the network is busy.
MondoFragmentLengthErrors	(NE3200) This counter tracks the number of instances in which an NLM™ on the server has passed the NE3200 driver an ECB whose logical memory address could not be translated to a physical memory address. You should check other NLM programs on the system and upgrade them. If you are still experiencing problems, identify which NLM is causing the problem and contact the third-party manufacturer of the NLM.
PollingTimeout	(NE3200) This counter tracks the number of times the adapter's request was put on the queue but was not serviced within 800 nanoseconds (default). After this occurs, the adapter fires an interrupt.
ResetBecauseHardwareDiedErrors	(NE3200) If the adapter is in an unknown state or stops transmitting on the host side, the driver increments this counter and resets or restarts the adapter.
NumberOfInterruptsFired	(NE3200) This counter is incremented each time the adapter had to fire an interrupt to service a request because the polled request wasn't serviced.

Table 28 Custom Statistics for Token Ring Drivers

Statistic	Description
Bad Correlator Count	(CNTR2000™, NTR2000™) This counter is incremented when a network board responds with a request for data from the file server that the file server does not have. The ECB or some other code may be corrupted. Eventually, this error will abend the server. If this counter is non-zero, you should try to find the software that is corrupting the data.
Unknown ARB requests	(CNTR2000, NTR2000) This counts bad Adapter Request Blocks (ARBs). Normally the network board (adapter) uses one of four known commands to communicate with the driver. If a network board sends a command that is not one of the four, the driver does not recognize the request. This error is not a catastrophic error. Sometimes old adapters send bad ARB requests because of software problems on the board. NetWare responds to the network board so that the board will not hang.
MicroChannel Error Count	(TOKENDMA) This counter tracks the number of times the adapter had a problem transmitting on the bus. The adapter interrupt occurred from the firmware on the board.
ECBs Over 16 MB	(TOKENDMA) This counter tracks the number of packets received that had to use an ECB over 16 MB. This number should increment only when more than 16 MB of RAM is used in the server.
DMA Bus Errors Count	(TOKENDMA) This counter is incremented when a DMA transfer completes with a bus error. If this counter is incremented, it could indicate a hardware problem.

Statistic	Description
DMA Parity Errors Count	(TOKENDMA) This counter is incremented when a DMA transfer completes with a parity error. If this is incremented, it could indicate a hardware problem.
Command Reject Count	(TOKENDMA) This counter is incremented when the driver sends a command to the board and the command is either invalid or the board is still busy processing the previous command. This number should be zero or a low number.
Tx Timeout Count	(TOKENDMA) This counter is incremented and the adapter is reset if two seconds elapse before the driver learns from the firmware that the transmit was or wasn't successful. This counter shows the driver is successfully recovering from the lost hardware transmit. It isn't a problem if this number is incremented.
Transmit Late Count	(TOKENDMA) This counter is incremented when the firmware reports that the board transmitted more than it actually did. After this event occurs, the data that wasn't transmitted will be sent in the next packet. This problem is more likely to occur on busier networks.
Transmit Defragment Count	(TOKENDMA) This counter tracks how many ECBs are redirected to the buffer below 16 MB. The IBM Token-Ring DMA LAN boards are not able to access memory above 16 MB. Therefore, if the operating system issues an Event Control Block (ECB) with a memory address above 16 MB, the board uses some of the reserved buffers below 16 MB to double buffer the ECB. These are not errors. In many cases, this counter can be as high as the total packets sent and received. However, this double buffering decreases performance. If the system has more than 16 MB of RAM and a board that is bus-mastering or using DMA that is not a 32-bit adapter, performance may decrease.

Table 29 Custom Statistics for IBM Baseband PCN2L Drivers

Statistic	Description
HotCarrierInterruptCount	(PCN2L) This counter is incremented when the board detects a carrier longer than expected without a transmit. This indicates that some board on the network has failed or is beginning to fail.
No82588InterruptCount	(PCN2L) This counter is incremented each time the server receives an interrupt from the board, but not from the 82588 chip. This should happen very seldom, if ever.
WeirdInterruptCount	(PCN2L) This counter is incremented when the server has received an interrupt from the board, but the board claims not to have sent one. This should happen very seldom, if ever.
BadTransmitComplete-InterruptCount	(PCN2L) This counter is incremented for each complete transmission with no transmit active.
HardTransmitErrorCount	(PCN2L) This counter is incremented when a transmit fails and the driver retries the transmit.
GotNothingCount	(PCN2L) This counter is incremented when the driver receives an interrupt from the board indicating that it has completed a receive but there is no data in the board's receive buffer. This is not serious.
ReceiveUnderrunErrorCount	(PCN2L) This counter is incremented when the driver finds less data in the board's buffer than the board reported.
ReceivedShortPacketCount	(PCN2L) This counter is incremented when a packet of fewerthan 17 bytes is received.
BadReceiveConditionCodeCount	(PCN2L) This counter is incremented when the buffer is flushed because the board hasn't received the incoming packets properly.

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