

Novell JVM for NetWare®

1.40

www.novell.com

INSTALLATION AND ADMINISTRATION
GUIDE



Novell®

Legal Notices

Novell, Inc. makes no representations or warranties with respect to the contents or use of this documentation, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Further, Novell, Inc. reserves the right to revise this publication and to make changes to its content, at any time, without obligation to notify any person or entity of such revisions or changes.

Further, Novell, Inc. makes no representations or warranties with respect to any software, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Further, Novell, Inc. reserves the right to make changes to any and all parts of Novell software, at any time, without any obligation to notify any person or entity of such changes.

You may not export or re-export this product in violation of any applicable laws or regulations including, without limitation, U.S. export regulations or the laws of the country in which you reside.

Copyright © 1999-2003 Novell, Inc. All rights reserved. No part of this publication may be reproduced, photocopied, stored on a retrieval system, or transmitted without the express written consent of the publisher.

U.S. Patent Nos. 5,553,139; 5,553,143; 5,677,851; 5,758,069; 5,784,560; 5,818,936; 5,864,865; 5,903,650; 5,905,860; 5,910,803. Patents Pending.

Novell, Inc.
1800 South Novell Place
Provo, UT 84606
U.S.A.

www.novell.com

Novell JVM 1.4.0 for NetWare
[August 2002](#)

Online Documentation: To access the online documentation for this and other Novell developer products, and to get updates, see developer.novell.com/ndk. To access online documentation for Novell products, see www.novell.com/documentation.

Novell Trademarks

NDebug is a trademark of Novell, Inc.

NetWare is a registered trademark of Novell, Inc. in the United States and other countries.

NetWare Loadable Module and NLM are trademarks of Novell, Inc.

Novell is a registered trademark of Novell, Inc. in the United States and other countries.

Novell Directory Services and NDS are registered trademarks of Novell, Inc. in the United States and other countries.

Third-Party Trademarks

All third-party trademarks are the property of their respective owners.

Contents

	Novell JVM 1.4.0 for NetWare Overview	5
1	JVM Setup and Operating Requirements	7
	Important Java Files	7
	Supported Video Controllers	9
	Hardware Requirements	10
	CPU	10
	Memory	10
	Hard Disk Space	11
	Mouse	11
	Software Requirements	11
	Frequently Asked Questions (FAQs)	11
	What is Novell JVM for NetWare?	11
	What Novell platforms are supported in this release?	11
	How many Java applications can be run concurrently on the server?	11
	What are the memory requirements for running Novell JVM for NetWare on the server?	12
	Can I run any Java application or applet on the server?	12
	Can I display graphical interfaces on the server?	12
	Are there limitations to using the GUI on the server?	12
	Do I need to buy a new video controller?	12
	Is it difficult to configure a Novell server platform to use video controllers?	12
	Can Java applications take advantage of multiple threads?	13
	Does this release of Novell JVM for NetWare include a Symantec Just In Time (JIT) for NetWare Compiler?	13
	What Novell-specific services does Novell JVM for NetWare support?	13
2	Installation Guide	15
	Installation Prerequisites	15
	Installing or Upgrading Novell JVM for NetWare	15
	Using INETCFG to Change or Add TCP/IP	16
	Configuring DNS Domain Name and the Addresses of DNS Servers	16
	Installing Novell JVM for NetWare	17
	Loading Novell JVM for NetWare	18
	Troubleshooting	18
	Java Applications Fail to Load	19
	GUI Fails to Load	19
	GUI Resolution is Not Working Properly	19
	Mouse Does Not Respond	19
	Applications Using JAVA.NET Do Not Work Properly	20
	Supporting the Graphics Font	20

3	Administration Guide	21
	JAVA.CFG	21
	Loading and Unloading Novell JVM for NetWare	22
	Loading Novell JVM for NetWare without NetWare GUI	22
	Unloading Novell JVM for NetWare	22
	NetWare GUI Tasks	22
	Starting NetWare GUI	22
	Shutting Down NetWare GUI	22
	Toggling between NetWare GUI and the Console	23
	Activating the Desktop Menu	23
	Configuring the Desktop Menu	23
	Configuring XServer Using the GUI Environment Utility	25
	Configuring Your System for an Accelerated Video Driver	25
	Selecting a Background Pattern	26
	Using NetWare GUI without a Mouse	26
	Keystroke Actions for Java Text Areas and Text Fields	27
	Applet and Application Tasks	28
	Running an Applet	28
	Running an Application	28
	Enabling Symmetric Multiple Processor Support	29
	Getting a List of Running Java Processes	30
	Shutting Down a Running Java Process	30
	Viewing and Setting Environment Variables	30
	Viewing the Current Values of Environment Variables	30
	Setting the DISPLAY Environment Variable	31
	Using the Remote Display Feature	31
	Setting the CWD Environment Variable	32
	Setting the CLASSPATH Environment Variable	33
4	Developer's Guide	35
	Prerequisites	35
	Tasks	35
	Using Java Native Interface (JNI) on NetWare	35
	Tools Required	36
	Description of Files	36
	Building a JNI Example	36
	Installing a JNI Example	37
	Running a JNI Example	37
	Unloading JNI	37
	JNI Notes	38
	WATCOM 11.0 Compiler Flags for Native Method NLM Programs	39

Source Level Debugging	40
Required VM Options	40
Obtaining the Fully qualified Domain of the Local Host	42

Novell JVM 1.4.0 for NetWare Overview

The Novell[®] Java^{*} Virtual Machine (JVM) is the Novell Software Development Kit (SDK) for Java. The Graphical User Interface (GUI) lets you run graphical Java applications.

Novell JVM 1.4.0 for NetWare[®] contains the following components:

- ◆ Several NetWare Loadable Module[™] (NLM[™]) programs, which let the NetWare server run Java-based applications and applets that use the packages in the Java core API. Novell JVM for NetWare supports multi-threaded applications and applications that use a graphical interface.
- ◆ NetWare GUI including drivers for most popular video cards.

1

JVM Setup and Operating Requirements

This chapter contains information necessary for setting up Novell® JVM for NetWare®. This chapter includes the following topics:

- ♦ “Important Java Files” on page 7
- ♦ “Supported Video Controllers” on page 9
- ♦ “Hardware Requirements” on page 10
- ♦ “Software Requirements” on page 11
- ♦ “Frequently Asked Questions (FAQs)” on page 11

Important Java Files

Directory	File	Description
SYS:JAVA\LIB	rt.jar	Standard Java Classes
	charsets.jar	Standard Java Classes
SYS:JAVA\BIN\CLIENT	JVM.NLM	Client version of Hotspot
SYS:JAVA\BIN\SERVER	JVM.NLM	Server version of Hotspot

Directory	File	Description
SYS:JAVA\BIN	dt_skt.nom	Support file for Sun's JDB
	cmm.nlm	Color Management Module
	dcpr.nlm	Support file for Java 2D graphics engine
	fontmn.nlm	Font manager
	hprof.nlm	Java heap profiler
	jvmlib.nlm	JVM library support module
	java.nlm	Novell JVM for NetWare
	jdbc.nlm	Java database connectivity NLM
	jmsock.nlm	Java multicast socket support
	jnet.nlm	Java.net classes support
	jpeg.nlm	JPEG image support
	jvmlib.nlm	Multimedia support
	mlib.nlm	Multimedia support
	nawt.nlm	Native Java methods for GUI
	zip.nlm	Java compression library
	zip_g.nlm	Java compression library, debug version
	icelib.nlm	Window manager libraries for NetWare GUI
icewm.nlm		
SYS:JAVA\NWGFX\BIN	conlogj.nlm	Native Java methods for console log GUI application
	conlogo.nlm	OS support for console log GUI application
	nterm.nlm	OS support for server console GUI application
	ntermj.nlm	Native Java methods for server console GUI application
SYS:JAVA\NWGFX\BIN (cont'd)	nwbgn.nlm	Native support for JVM GUI background Utility

Directory	File	Description
	nwbgpnt.nlm	Native support for JVM GUI background Utility
	startx.def	Starts graphical user interface
	vesa_rsp.ncf	Script for setting up GUI to SVGA 256 colors
	xaccel.nlm	Driver for Xi Graphics, Inc. Accelerated-X server
	Xvesa.nlm	Driver for Super VGA 256-color cards
	xlib.nlm	Display mechanism for graphical user interface
	xmodmap.nlm	International Keyboard Support NLM
	xsetup.ncf	Script for starting graphical GUI setup utility
SYS:\JAVA\LIB\FONTS		Fonts for displaying characters in a GUI window
SYS:\JAVA\NWGFX\lib\X11\locale		Locale specific files such as xmodmap.* and keyboard mapping files
SYS:\JAVA\NWGFX\PIXMAPS	*.xpm	xpm format files used for background pattern
SYS:\JAVA\NWGFX\HELP		Help directories for Java help files and help sets
SYS:\ETC\	java.cfg	Environment configuration file
SYS:\JAVA\NWGFX\ACE\ETC	Xaccel.ini	Template configuration file for Xi Graphics Accelerated-X server

Supported Video Controllers

Instead of supporting specific chipsets, Novell supports the VESA BIOS extensions that allow abstraction away from the hardware. JVM provides one physical driver that works with NetWare 6, VESA (Xvesa.nlm). This driver provides graphics support for VESA 1.2 and higher compliant video controllers. Resolution for VESA video controllers is controller dependent.

NetWare 6 has XFree86 Xvesa as the default Xserver. XFree86 supports VESA 1.2 through 3.0. NetWare also includes Xi Graphic's Accelerated-X as an alternative Xserver, which supports over 540 specific video cards.

JVM currently supports the following video controllers:

- ◆ VESA 1.x, 2.x, 3.x

640 x 480 256-colors

800 x 600 256-colors (assuming mode is supported)

1024 x 768 256-colors (assuming mode is supported)

VESA 1.x and 2.x support covers a large percentage of recently manufactured controllers and provides nonaccelerated support for additional hardware modes.

- ◆ Over 540 specific video controllers in the following modes:

640 x 480 256-colors

800 x 600 256-colors (assuming mode is supported)

1024 x 768 256-colors (assuming mode is supported)

See [“Configuring XServer Using the GUI Environment Utility” on page 25](#) for instructions on accessing the video card tab in the Desktop Menu to view a complete list of supported controllers.

NOTE: During the install, NetWare GUI boots to SVGA 800 x 600 256-color mode.

To learn how to configure your monitor for an accelerated video driver, see [“Configuring Your System for an Accelerated Video Driver” on page 25](#).

Hardware Requirements

CPU

- A CPU speed of 200 MHz and above
 - ◆ Intel* Pentium* Pro
 - ◆ Intel Pentium

Memory

- 128MB minimum (Refer to NetWare 6 memory requirements)

Hard Disk Space

- 150MB minimum

Mouse

- PS/2
- USB mouse

NOTE: Some applications can function without a mouse, but it is not recommended.

Software Requirements

- NetWare 6 with support pack 2 or later loaded and running on the server.
- Novell JVM for NetWare self-extracting executable file. (See [“Novell JVM 1.4.0 for NetWare Overview”](#) on page 5.)
- Workstation running Windows* 95 or Windows NT* with the Novell Client™ 32

Frequently Asked Questions (FAQs)

This section contains some frequently asked questions. Use this section to answer questions and concerns you might have.

What is Novell JVM for NetWare?

Java Virtual Machine for NetWare is the Novell Software Development Kit for Java.

What Novell platforms are supported in this release?

This release of Novell JVM for NetWare supports NetWare 6, and requires Support Pack 2 or later.

How many Java applications can be run concurrently on the server?

You can run any number of applications as long as you do not exceed the available memory on the server. The memory requirements of the applications and the amount of main memory available on the server determines how many applications you can run.

What are the memory requirements for running Novell JVM for NetWare on the server?

You should have at least 32 MB of main memory available to run text-based Java applications—and at least 64 MB to run graphical applications.

Can I run any Java application or applet on the server?

Novell JVM for NetWare can run any application certified as 100% Pure Java, as described by JavaSoft™. However, if you have applications that use native methods, you must port these applications to NetWare before you run them.

Can I display graphical interfaces on the server?

Yes. NetWare GUI lets you display graphical interfaces that use the Abstract Window Toolkit (AWT) and Java Foundation Classes (JFC) libraries from Sun Microsystems, Inc.

Are there limitations to using the GUI on the server?

The limitations of graphical applications in NetWare GUI are the same as the limitations of other Java implementations.

Do I need to buy a new video controller?

No. NetWare GUI includes drivers for popular video controllers. See [“Supported Video Controllers” on page 9](#). A VESA 2.0 compliant video controller will give the best generic performance.

Is it difficult to configure a Novell server platform to use video controllers?

No. The Novell JVM for NetWare installation includes a utility (VESA_RSP.NCF) that automatically recognizes and configures the Novell server platform to use your video controller. Click the Settings option to see all the different configuration options.

The GUI is self configuring the first time it is run. VESA. RSP.NCF is used to reset the GUI to its self configured state.

Can Java applications take advantage of multiple threads?

Yes. Novell JVM for NetWare supports applications that use multiple Java threads.

Does this release of Novell JVM for NetWare include a Symantec Just In Time (JIT) for NetWare Compiler?

No. It uses Hotspot.

What Novell-specific services does Novell JVM for NetWare support?

The standard Java Application Programming Interfaces (APIs) support the Novell file system and networking. It does not support other NetWare-specific services such as the directory, eDirectory™ objects, or the bindery. These services are supported by other libraries in the Novell Developer Kit (NDK).

2 Installation Guide

After you install NetWare[®] software, you can upgrade and start the JVM for NetWare. This chapter includes the following topics:

- ♦ “Installation Prerequisites” on page 15
- ♦ “Installing or Upgrading Novell JVM for NetWare” on page 15
- ♦ “Troubleshooting” on page 18
- ♦ “Supporting the Graphics Font” on page 20

Installation Prerequisites

- NetWare 6 running with support pack 2 or later
- Novell JVM for NetWare self-extracting executable file (See “Novell JVM 1.4.0 for NetWare Overview” on page 5)
- Client workstation running Windows 95/98 or Windows NT/2000/XP with Novell Client 32
- USB or PS/2-style mouse attached

Installing or Upgrading Novell JVM for NetWare

If you are doing an upgrade, you do not need to complete the first tasks. Instead, begin with “Installing Novell JVM for NetWare” on page 17.

Using INETCFG to Change or Add TCP/IP

To change or add TCP/IP information after installation, you need to load the INETCFG utility on the server. INETCFG might prompt you for permission to transfer text from AUTOEXEC.NCF to other text files in the SYS:\ETC directory. Enter **Yes** if this occurs, and then use the standard setup method instead of the quick method.

To configure the gateway address from INETCFG, complete the following:

- 1 From the Internetworking Configuration menu, select Protocols > TCP/IP.
- 2 Press the Down-arrow until Lan Static Routing is highlighted.
- 3 Select Lan Static Routing and press Enter.
- 4 Select Enabled and press Enter.
- 5 Select Lan Static Routing Table and press Enter.
- 6 Press Insert.
- 7 Select Route Type and press Enter.
- 8 Select Default Route and press Enter.
- 9 On the Next Hop Router on Route line, enter the IP address for your router.
- 10 On the Metric for this Route line, enter the number of hops to the router you selected.
- 11 Press Esc until Update Database appears.
- 12 Select Yes.

Configuring DNS Domain Name and the Addresses of DNS Servers

If your version of INETCFG lets you configure the DNS domain name and the addresses of DNS servers, the options will be under Protocols > TCP/IP > DNS Resolver Configuration.

If your INETCFG does not have this configuration option, from a client workstation, create a file called SYS:\ETC\RESOLV.CFG on the NetWare server with the following contents:

```
domain <your.domain.com>
```

```
nameserver 001.01.01.01
```

Where <your.domain.com> is the fully qualified domain name of your NetWare server, and where the entries for the name server are the IP addresses for the name servers on your network. You must enter the domain and name server parameters. You can have more than one name server line to search more than one domain name server.

Installing Novell JVM for NetWare

Prerequisites

- NetWare 6 installed on the server with Support Pack 2.
- Shut down NetWare GUI if it is running (See [“Shutting Down NetWare GUI” on page 22.](#))
- Shut down Novell JVM for NetWare if it is running (See [“Unloading Novell JVM for NetWare” on page 22.](#))

Installation Procedure

- 1 Obtain the admin rights for the sys: volume of the servers by mapping a volume or logging in.
- 2 Run the Novell JVM for NetWare self-extracting executable file on the client.

This expands the archive and launches the InstallShield installation script.

- 3 At the Welcome screen, click next.
- 4 To accept the license agreement, click Yes; otherwise, click No.
Rejecting the license agreement stops the installation process.
- 5 At the Installation components screen, click Next.
- 6 At the Select Destination Servers screen, select the servers you want to install Novell JVM for NetWare on and click Next.
- 7 After reviewing the current settings profile, click Back to change the description of the servers. If you are satisfied with the profile, click Next.
InstallShield displays an installation progress bar.

The installation process copies the .zip file to the destination servers and unzips the file on each server.

The Readme document contains last-minute information about JVM for NetWare that is not in the HTML documentation.

Loading Novell JVM for NetWare

When you install Novell JVM for NetWare, the NetWare GUI is automatically configured during the install. After the installation, you can load Novell JVM for NetWare and start the NetWare GUI.

- ◆ To load Novell JVM for NetWare without NetWare the GUI, at the server console, enter

```
load java
```

This loads Novell JVM for NetWare into memory and allows the command interpreter to recognize when a Java application or applet is launched.

- ◆ To load Novell JVM for NetWare and start the NetWare GUI, at the server console, enter

```
startx
```

This first loads Novell JVM for NetWare—if it is not already loaded. It then starts the NetWare GUI. When the Novell button appears on the taskbar in the bottom left corner, the process is complete.

You can now launch Java applications and applets.

If you experience difficulties loading Novell JVM for NetWare, see [“Troubleshooting” on page 18](#).

Troubleshooting

This section provides you with suggestions for resolving problems you might have when you load Novell JVM for NetWare.

Java Applications Fail to Load

If Java applications have trouble running in the NetWare GUI, ensure that the `DISPLAY` variable is set to `127.0.0.1:0.0` or to the IP number of the server. (For more information, see [“Setting the DISPLAY Environment Variable” on page 31.](#))

GUI Fails to Load

If the NetWare GUI fails to load after you install Novell JVM for NetWare, run the following `.NCF` file at the server console:

```
vesa_rsp
```

This configures the NetWare GUI for SVGA 256 colors and sets the resolution to 800 X 600. The GUI resolution can then be changed from the NetWare GUI desktop menu. For more information, see [“Configuring XServer Using the GUI Environment Utility” on page 25.](#)

GUI Resolution is Not Working Properly

If your GUI resolution is not working, configure the NetWare GUI for SVGA by entering the following at the server console:

```
vesa_rsp
```

This sets the minimum resolution. The GUI resolution can then be changed from the NetWare GUI desktop menu. For more information, see [“Configuring XServer Using the GUI Environment Utility” on page 25.](#)

Mouse Does Not Respond

If the mouse that is properly attached to your server does not function in the NetWare GUI, it might not be configured correctly. To automatically reconfigure the mouse, do the following:

- 1 Close the NetWare GUI.
- 2 At the server console enter the following command:

```
vesa_rsp
```

- 3 Start the NetWare GUI.

For instructions on starting the GUI, see “[Loading Novell JVM for NetWare](#)” on page 18.

This automatically reconfigures the mouse. It also resets the NetWare GUI to its base configuration (SVGA 256 colors and a resolution of 800 X 600.) The GUI resolution can then be changed from the NetWare GUI desktop menu. For more information, see “[Configuring XServer Using the GUI Environment Utility](#)” on page 25.

Applications Using JAVA.NET Do Not Work Properly

If Java applications that use the JAVA.NET package have trouble resolving host names or IP addresses, ensure that the TCP/IP configuration includes the file /ETC/RESOLV.CFG, and that WINSOCK is loaded on the server.

The /ETC/RESOLV.CFG file tells the server its fully qualified domain name (FQDN), and it allows the server to locate name servers that can resolve names into IP addresses.

Another problem might be that the IP address and DNS name of the client machine need to be added to the /ETC/HOSTS file. The proper entry format is

```
<IP address> <DNS name>
```

Supporting the Graphics Font

The FONT.PROPERTIES file controls the Java font-to-native-font mapping in JAVA\LIB\FONT.PROPERTIES. The FONT.PROPERTIES file is platform-specific and indicates the fonts that a particular platform uses for its Java virtual fonts. The FONT.PROPERTIES file for JDK1.4.0 on NetWare is nearly identical to the Solaris implementation. For a description, see the font properties on the [Sun Web site \(http://java.sun.com/j2se/1.4/docs/guide/intl/fontprop.html\)](http://java.sun.com/j2se/1.4/docs/guide/intl/fontprop.html)

3

Administration Guide

This chapter explains the administrative tasks that you can do with Novell® JVM 1.4.0 for NetWare®.

JAVA.CFG

The Java configuration file (JAVA.CFG) is the first file your system reads when you load Java. This file is not necessary to load or run java applications but it will set some default environment values if the file is present. When you install JVM, the install procedure creates the following default environment settings in the java.cfg file:

```
JAVA_HOME=SYS:\JAVA  
MGMT_HOME=SYS:\PUBLIC\MGMT  
JAVA_FONTS=SYS:\JAVA\LIB\FONTS
```

If you want to update the SYS:\SYSTEM\AUTOEXEC.NCF file, add the following lines right after the mount all command in the file:

```
SEARCH ADD SYS:\JAVA\BIN  
SEARCH ADD SYS:\JAVA\BIN\CLASSIC  
SEARCH ADD SYS:\JAVA\NWGFx\bin  
STARTX
```

HINT: The STARTX line is optional. It causes the Java GUI to begin running at server startup. You might want to delete any other instances of these lines in the AUTOEXEC.NCF.

Loading and Unloading Novell JVM for NetWare

Loading Novell JVM for NetWare without NetWare GUI

To load Novell JVM for NetWare (JAVA.NLM) without running NetWare GUI, at the server console, enter

```
load java
```

For more information, see [“Starting NetWare GUI” on page 22](#).

Unloading Novell JVM for NetWare

You can unload Novell JVM for NetWare (java.nlm) from memory by entering the following command at the server console:

```
unload java
```

NetWare GUI Tasks

Starting NetWare GUI

To start the NetWare GUI, at the server console enter

```
startx
```

This loads Novell JVM for NetWare, if not already loaded, then loads NetWare GUI into memory.

Shutting Down NetWare GUI

The following are three ways to shut down NetWare GUI. The first two close the NetWare GUI without shutting down the JVM.

- ◆ Activate the desktop menu (see [“Activating the Desktop Menu” on page 23](#)), then click Close GUI > Yes.
- ◆ Press Ctrl+Alt+Backspace.
- ◆ To shut down the JVM as well as NetWare GUI, toggle to the server console (see [“Toggling between NetWare GUI and the Console” on page 23](#)), then enter

```
java -exit
```

Toggling between NetWare GUI and the Console

- ◆ To toggle to the next screen, press Alt+Esc.
- ◆ To toggle to the NetWare screen selection list, press Ctrl+Esc.

Activating the Desktop Menu

To activate the desktop menu in NetWare GUI, click the Novell button in the lower lefthand corner of the screen.

Configuring the Desktop Menu

GUI Menu

The GUI menu consists of items that are either menus or commands. Menus contain the following:

- ◆ **Default name**
- ◆ **International name (optional)**

If you enter an international name, this name appears in the GUI menu; otherwise, the default name appears.

Internationalized names are stored in files with the properties extension. A Properties file is a text file that contains key=value entries. For example, PROGRAMS=programs or UTILITIES=utilities. You must place these files in the SYS:\java\lib\taskbar directory.

Properties File

The properties file lets you specify characters that you are not able to enter from the server's keyboard. You do this by specifying the Unicode values on the right side of the equal sign (=). For example, you can specify the value RUN with any of the following values:

- ◆ RUNITEM=Run
- ◆ RUNITEM=\u0052\u0075\u006e
- ◆ RUNITEM=R\u0075\n

When you specify the Properties file, you specify the default properties file such as NWMenu.properties. Names are retrieved from that file according to the language and locale of the server. For example, if the NWMenu.properties file is used, the server is set to use German, and there is a NWMenu_de.properties file, the NWMenu_de.properties file is searched first for the entry. If the entry is not found in this file, the NWMenu.properties file is searched. If the entry is not found in either file, the default name is used.

If you want to use a properties file for your names, you can use a default name such as `MyNames.properties`. If you are providing the product for an internationalized audience, you might want to ship properties files for each of the locales supported by the server.

IMPORTANT: Do not add your own name entries in the `NWMenu.properties` file. This file is overwriting when you install a newer version of the JVM.

Commands

Commands contain the following:

- ◆ **Default name**
- ◆ **International name**
- ◆ **The command to execute**

IMPORTANT: We recommend that you specify an `.NCF` file that contains actual commands to execute.

You configure the GUI menu by using the Menu Editor. To access this tool, on the GUI taskbar click `Settings > Menu Editor`.

Creating a Menu Item

- 1 Right-click on the location where you want to install the menu item.
- 2 Click `New Command` or `New Menu`.
- 3 Enter the information in the edit field.
- 4 Click `File > Save` on the menu bar.

Modifying a Menu Item

- 1 Click the menu item you want to change.
- 2 Modify the command information in the Edit panel.
- 3 Click `File > Save` on the menu bar.

Deleting a Menu Item

- 1 Right-click the menu item.
- 2 Click `Remove`.
- 3 Click `File > Save` on the menu bar.

Moving Menu Items

- 1 Right-click the menu item.
- 2 Click Move Up or Move down.
- 3 Click File > Save on the menu bar.

If a menu is open, the selected menu item moves into that menu; otherwise, the menu item moves past the menu.

Configuring XServer Using the GUI Environment Utility

You use the GUI environment utility to configure Super VGA, and Accelerated-X Servers on NetWare. This utility lets you select the video board, keyboard, mouse, and monitor from a set of predefined hardware devices supported by the GUI environment utility.

- 1 Activate the desktop menu.
See [“Activating the Desktop Menu” on page 23](#).
- 2 Click Settings > GUI Environment.

See the GUI environment online help for further documentation on using this utility.

Configuring Your System for an Accelerated Video Driver

To achieve the best video quality when you configure your accelerated video driver, configure the monitor and select a refresh rate as high as possible.

- 1 From the desktop menu toolbar, select GUI Environment.
- 2 Select your video board from the Video Board List.
This activates the monitor tab. The default settings are Super VGA with 640 x 480 resolution and monitor tab deactivated.
- 3 Select your monitor from the list of monitors.
This enables all possible refresh rates for the selected monitor.
- 4 Select the highest available refresh rate, and then set the video board to the desired resolution.
- 5 Select Test and then click OK.
- 6 After the test pattern display, click OK > Yes > Yes.

Selecting a Background Pattern

1 Activate the desktop menu.

See “[Activating the Desktop Menu](#)” on page 23.

2 Click Tools > Backgrounds.

All files in the SYS:\JAVA\NWGFX\PIXMAPS directory display. The supported graphics formats are XPM, JPEG, and BMP. If you have background patterns (in the supported formats) that you want to use, place them in the SYS:\JAVA\NWGFX\PIXMAPS directory.

3 Select the desired background pattern and test it by clicking test.

4 If you want this background, click OK.

Using NetWare GUI without a Mouse

If you start NetWare GUI without a mouse driver attached to a PS/2, or USB, the GUI will start in mouseless mode. When the Mouse Device query screen appears, select No Mouse.

When the NetWare GUI system is executing in mouseless mode, use the keypad keys for mouse movement and button clicks.

IMPORTANT: NUMLOCK must be activated to enable keypad mouse movements.

KeypadKey	Function
Arrows	Move the mouse pointer.
Shift+arrows	Accelerate pointer movement.
5	Behaves like the default pointer button.
0	Locks the default pointer button down (for easy dragging).
. (decimal)	Unlocks the default pointer button (releases a drag).
+ (plus)	Double-clicks the default pointer button.
ALT+F7	Switches to the next program.
ALT+F8	Switches to the previous program.

Keystroke Actions for Java Text Areas and Text Fields

The following table shows the keystroke actions for Java text areas and text fields as implemented for the Novell JVM for NetWare.

Action	Text Area	Text Field
Navigate out forward	Ctrl+Tab	Tab
Navigate out backward	Ctrl+Shift+Tab	Shift+Tab
Move up/down one line	Up-arrow, Down-arrow	
Move to prev/next char	Left-arrow, Right-arrow	Left, Right
Move to prev/next word	Ctrl+Left-arrow, Ctrl+Right-arrow	Ctrl+Left, Ctrl+Right
Move to start/end of line	Home, End	Home/End
Move to start/end of text area	Ctrl+Home, Ctrl+End	
Move up/down a page	PgUp, PgDn	
Select all	Ctrl+A	Ctrl+/
Deselect all	Arrow keys	Ctrl + \
Extend selection up/down	Shift+Up arrow, Shift+Down arrow	
Extend selection left/right	Shift+Left-arrow, Shift+Right-arrow	Shift+Left, Shift+Right
Extend selection to start/end of line	Shift+Home, Shift+End	Shift+Home, Shift+End
Extend selection to prev/next word	Ctrl+Shift+Left-arrow, Ctrl+Shift+Right-arrow	Ctrl+Shift+Left, Ctrl+Shift+Right
Extend selection to start/end of text area	Ctrl+Shift+Home, Ctrl+Shift+End	
Extend up a page	Shift+PgUp	
Extend down a page	Shift+PgDn	

Action	Text Area	Text Field
Copy selection	Ctrl+C	Ctrl+C
Cut selection	Ctrl+X	Ctrl+X
Paste	Ctrl+V	Ctrl+V
Delete next character	Delete	Delete
Delete previous character	Backspace	Backspace
Insert tab	Tab	
Toggle Insert/Replace mode	Insert	Insert
Insert line break	Enter	
Submit entry		Enter

Applet and Application Tasks

Running an Applet

- ◆ To run the applet in the existing screen, enter

```
applet <html filename>
```

- ◆ Or, to run the applet in a new screen, enter

```
applet -j-ns <html filename>
```

Novell JVM for NetWare assigns a screen to the applet and executes the applet. The NetWare GUI is then loaded and the applet is displayed.

While the applet is running, you can toggle between the NetWare GUI and the server console. (For more information, see [“Toggling between NetWare GUI and the Console” on page 23.](#))

For example, suppose an applet called MYAPP is found in SYS:\MYAPPS\. To run this applet, you would enter

```
applet SYS:\MYAPPS\MYAPP.HTML
```

Running an Application

- ◆ To run an application in the existing screen, enter

28 Novell JVM 1.4.0 for NetWare

```
java <application name>
```


- ◆ To run the application in a new screen, enter

```
java -ns <application name>
```

Novell JVM for NetWare assigns a screen to the application and then executes the application. If the application requires a graphical interface, Novell JVM for NetWare loads NetWare GUI and displays the application. If the application requires console keyboard input, the `-ns` option must be used.

While the application is running, you can toggle between NetWare GUI and the server console. (See [“**Toggling between NetWare GUI and the Console**” on page 23.](#))

To run multiple applications concurrently, toggle to the console and follow one of the above procedures for running a Java application. When the application is finished executing, Novell JVM for NetWare removes the application's window from the screen.

All GUI applications appear in the same GUI screen. The server supports only one attached monitor at a time.

Enabling Symmetric Multiple Processor Support

NetWare 6 allows symmetric multiple processor support—this is the default setting. To force the JVM instance to run on a specific processor, use the `-mp` flag. Disabling multiple processor support is equivalent to using the `-mp0` flag.

- ◆ The multiple processor command line option assigns a JVM to run on a processor other than zero. To use this setting, enter the following at the server console:

```
java -mp <application name>
```

A processor is chosen for you.

- ◆ If you want to assign a JVM to a processor, the processor number should follow `-mp`. For example, to assign a JVM specifically to processor 3, enter the following at the server console:

```
java -mp3 <application name>
```

If your specific application heavily uses services on processor 0, such as file IO, processor 0 might be faster.

To assign a JVM to processor 0, enter the following at the server console:

```
java -mp0 <application name>
```

Getting a List of Running Java Processes

To display a list of currently running processes and their process IDs, enter the following at the server console:

```
java -show
```

Shutting Down a Running Java Process

- 1 Get a list of the running Java processes

See “[Getting a List of Running Java Processes](#)” on page 30.

- 2 At the server console, enter

```
java -kill<process ID>
```

For example:

```
java -kill610
```

Replace 610 with the ID of the process to be killed.

- 3 To shut down all running processes, enter the following at the server console:

```
java -killall
```

Viewing and Setting Environment Variables

Viewing the Current Values of Environment Variables

- 1 Start the Novell JVM for NetWare.

See “[Loading Novell JVM for NetWare without NetWare GUI](#)” on page 22.

- 2 At the server console, enter

```
envset
```

When you unload Novell JVM (JAVA.NLM) for NetWare, the process deletes the Environment variables that use ENVSET. You can add Environment variables in the SYS:\ETC\JAVA.CFG file, which is read when Java loads.

NOTE: The file SYS:\ETC\JAVA.CFG is not required for JVM 1.4.0. However, it might be convenient to create it and populate it with common environment variables.

Setting the DISPLAY Environment Variable

IMPORTANT: You must understand the UNIX* XWindows environment to set up the DISPLAY environment variable.

- 1 Start Novell JVM for NetWare.

See “[Loading Novell JVM for NetWare without NetWare GUI](#)” on page 22.

- 2 At the server console, enter

```
envset DISPLAY=<IP address>:<display>
```

The default value for DISPLAY is 127.0.0.1:0, which is the address of the loopback interface and the default value for the display and screen you want to use.

Using the Remote Display Feature

The Remote Variable Display feature lets you export the display of any X client programs on to any machine on the network running an X server. Because NetWare GUI is X based, all Java GUI applications and applets are considered X clients and are able to use the remote display feature.

Allowing Remote Access to a Server

You must configure your destination server to allow remote access. The following are two methods to authorize access of a remote Xclient to a local Xserver:

- ◆ Enter **-ac** at the Xserver command line.

This turns off access control and lets any other client access the server. Be cautious with this method. It lets anyone who can connect to your Xserver do tasks in your account name and run programs on your display.

- ◆ Run **xhost** on the local system.

You use this command to add hosts to the list of client workstations you allow to access your server. You also use this command to delete workstations from this list. For more information on determining the best method of allowing remote access, see your Xserver user manual.

Displaying a Java Applet or Application on a Local Xserver

- 1 Start Xserver at the local system.
- 2 Allow the remote NetWare system to access the local Xserver.
See [“Allowing Remote Access to a Server” on page 31.](#)
- 3 At the local system, start RCONJ and log in to the NetWare server.
- 4 If Java is not loaded on the NetWare server, do the following in the RCONJ window:
 - 4a Load Java.
 - 4b Enter the following command:

```
envset display=[ip address of local Xserver]:0
```
 - 4c Start the Java applet or application.
- 5 If Java is loaded on the NetWare server, enter the following in the RCONJ window and then start the Java applet or application.

```
envset display=[ip address of server]:0
```
- 6 If you want the application to always open to the GUI screen, enter the following at the command line of the client workstation:

```
envset display=[IP address of server]:0.0
```

All Java GUI applications will now display on the remote client workstation on the GUI screen. If you do not want the application to always open to the GUI screen, remove the “.0” from the end of the IP address.

NOTE: The NetWare Console screen does not automatically switch to the GUI screen when a GUI application is opened on the remote exports or foreign IP addresses.

Setting the CWD Environment Variable

You can use the Current Working Directory (CWD) variable to run an application in a specific directory even if it is not part of a package. The CWD variable is set to the root when Java is loaded; however, you can set it to any desired directory.

- 1 Start the Novell JVM for NetWare.
See [“Loading Novell JVM for NetWare without NetWare GUI” on page 22.](#)

- 2 To set the CWD for all applications, enter the following at the server console:

```
envset CWD=<pathname>
```

For example:

```
envset CWD=SYS:\MYJAVA\MYAPP
```

The preferred method is to set the CWD for the current application by using the `-env` option. For example:

```
Java -envCWD=SYS:\MYFILES MYAPP
```

Setting the CLASSPATH Environment Variable

A default CLASSPATH variable is set when Java loads. If the CLASSPATH variable is set incorrectly, your Java applications might not run. You can improve the performance by reducing the size of the CLASSPATH variable.

- 1 Start Novell JVM for NetWare.

See [“Loading Novell JVM for NetWare without NetWare GUI” on page 22](#).

- 2 Enter the following at the server console:

```
envset CLASSPATH=<current CLASSPATH value>;<path to  
append>
```

For example, entering `envset` at the server console could produce the following for the CLASSPATH variable:

```
CLASSPATH=SYS:\JAVA\LIB;SYS:  
\JAVA\CLASSES
```

To append the path `SYS:\MYCLASSES` to this CLASSPATH, enter

```
envset CLASSPATH=SYS:\JAVA\LIB;  
SYS:\JAVA\CLASSES;SYS:\MYCLASSES
```

Or substitute `<current CLASSPATH value>` with `$CLASSPATH`, as in the following:

```
envset CLASSPATH=$CLASSPATH;SYS:\MYCLASSES
```

The `$` symbol in `$CLASSPATH` allows the substitution of the current value of the CLASSPATH environment variable.

The CLASSPATH variable provides a default path. The directory to this path, SYS:\JAVA\CLASSES, is created by the install program. To use this default path, or any path inside the CLASSPATH variable, place your classes in the directory pointed to by the path.

NOTE: The default CLASSPATH variable includes ".", which means to look in the current working directory for the application. It also includes the CWD specified with the -env option. If the CWD variable is not set correctly, the application might not run (see ["Setting the CWD Environment Variable" on page 32.](#))

4

Developer's Guide

This section contains information you might need to know for developing Java applications with Novell® JVM for NetWare®.

Prerequisites

- ❑ Novell JVM for NetWare started
See [“Loading Novell JVM for NetWare without NetWare GUI” on page 22.](#)
- ❑ TCP/IP support for Java set up
See [“Using INETCFG to Change or Add TCP/IP” on page 16.](#)

Tasks

- ◆ [“Using Java Native Interface \(JNI\) on NetWare” on page 35](#)
- ◆ [“WATCOM 11.0 Compiler Flags for Native Method NLM Programs” on page 39](#)

Using Java Native Interface (JNI) on NetWare

The JAVA\BIN directory includes a file named JNI.ZIP. When you extract this file, it demonstrates simple native method examples for Java 1.x. This section is an example of how to write native methods for the Java 1.4.0 Virtual Machine on NetWare. It is not a comprehensive tutorial on writing native methods.

Tools Required

- Java 1.4.0 for NetWare
- JDK 1.4.0 for Win32
- NetWare SDK May 2001
- Watcom 11.0 (10.6 is not supported.)
- Microsoft NMAKE (Watcom supplies one, but use it at your own risk.)
- MKS Utilities (grep, cp, rm, sed) in your PATH

Description of Files

File	Description
MAKEFILE	Make file for NetWare
NWNATIVE.JAVA	Native method java class
NWTEST.JAVA	Test class
README.TXT	
NWIMPL.C	Native method C implementation
NWMAIN.C	CLIB NLM wrapper - main()

Building a JNI Example

After you unpack the package, complete the following:

- 1 Configure the following parameters in Makefile:
 - WIN32JAVABASE - Specify where the Win32 JDK is installed.
 - NWJAVABASE - Specify where the NetWare JDK is installed (typically the mounted SYS: drive).
 - NLMSDKBASE - Specify where the NetWare NDK is installed.
 - WATCOMBASE - Specify where Watcom 11.0 is installed.
- 2 Enter the following at a Windows command prompt:

nmake

The following are the file descriptions:

- ♦ **MAKEFILE**. Make file for NetWare
- ♦ **NWNATIVE.JAVA**. Native method java class
- ♦ **NWTEST.JAVA**. Test class
- ♦ **README.TXT**
- ♦ **NWIMPLE.C** Native method C implementation
- ♦ **NWMAIN.C** CLIB NLM wrapper - main ()

3 To clean the build, enter the following at a Windows command prompt:

```
nmake clean
```

Installing a JNI Example

After you build the example and map your server volume SYS: to drive G:, complete the following steps install JNI:

1 Check to see if G:\JAVA\CLASSES exists as a directory. If not, enter

```
mkdir G:\java\classes
```

2 Copy the NLM to G:\JAVA\BIN by entering the following command:

```
copy nwnative.nlm G:\java\bin
```

3 Copy the classes to G:\JAVA\CLASSES, and then at the command prompt in Windows enter

```
copy *.class g:\java\classes
```

Running a JNI Example

If your CLASSPATH variable is correct, you can run JNI. Enter the following at the command prompt:

```
java NWTest
```

Unloading JNI

To unload, at the server console enter

```
java -exit
```

JNI Notes

This section contains notes and examples that might be helpful with the JNI process:

1. What you can do in your main() function depends on how you build your NetWare Loadable Module™ (NLM™) program. If you include the following option in your Makefile, your NLM program can use a synchronized startup:

```
Option SYNCHRONIZE
```

With the synchronize option, you can initialize any global information your NLM program might contain in the main() function as long as you call the following function after initialization has completed:

```
void SynchronizeStart();
```

For example:

```
main()  
{  
  /* Do global initialization */  
  SynchronizeStart(); /*MUST BE CALLED */  
  ExitThread, 0); /* MUST BE CALLED*/  
}
```

If you choose not to use a synchronized startup for your NLM program, you must limit your main() function to the following:

```
main ()  
{  
  ExitThread (TSR_THREAD,);  
}
```

2. If you use the Metroworks IDE, the Synchronized linker option can be turned on by clicking the following box:

```
ALT-F7 > NLM Linker > Flags > Synchronize
```

3. Do not use the standard malloc() or realloc() or free() calls directly. Java provides the following macros in sys_api.h instead:

- ◆ sysMalloc - same parameters as malloc()

- ◆ sysRealloc - same parameters as realloc()
- ◆ sysCalloc - same parameters as calloc()

Using these macros gives you free resource tracking. This also lets the memory used by your NLM program use Virtual Memory in NetWare 6. In some instances, you might prefer memory returned from malloc, such as buffers used for callbacks or ECBs.

4. When you link your NLM, you might get the following errors:

- ◆ Warning! W1008: cannot open math387s.lib: No such file or directory
- ◆ Warning! W1008: cannot open noemu387.lib: No such file or directory
- ◆ Warning! W1008: cannot open emu387.lib: No such file or directory
- ◆ Warning! W1008: cannot open clib3s.lib: No such file or directory

If you find the correct libraries to correct for these warnings, you'll link in a bad prelude.obs and things will not work properly. If you're using C++, see Item 4 below. To prevent these warnings, add the following Makefile option:

```
Option NoDefaultLibs
```

5. If you are using C++, add the following lines to the link file:

```
LIBPath $(WATCOM)\lib386;$(WATCOM)\lib386\netware;
LIBFile $(WATCOM)\lib386\plbx3s.lib
```

Remove the \$(PRELUDE) entry from the file directive.

6. If you used the word *stub* in the name of any of your native method classes, change sedscript to ensure that it doesn't corrupt your .EXP file.

WATCOM 11.0 Compiler Flags for Native Method NLM Programs

Optimized flags are

```
/zp=1 /ri /ei /5s /or /ot /w3 /s /zq /ez
```

Debug flags are

```
/zp=1 /ri /ei /d2 /od /3s /w1 /s /zq /ez
```

IMPORTANT: /ri and /ei are critical for building native method NLM programs.

Source Level Debugging

You can debug applications running on NetWare using any JDPA compliant debugger or debugging IDE. The following are available debuggers:

- ♦ NetBeans (www.netbeans.org)
- ♦ Forte (forte.sun.com)
- ♦ Novell's Silverstream IDE

Remote and local debugging of Java Applications are available through the socket transport.

IMPORTANT: The socket transport name of NetWare is `dt_skt`. On other platforms, it is `dt_socket`.

Required VM Options

To debug applications, you need the following debug invocation options:

- ♦ **-Xdebug**. Enables debugging.
- ♦ **-Xrunjdpw: <sub_options>** Loads the JPDA reference implementation of JDWP. This library resides in the target VM and uses JVMDI and JNI to interact with it. It uses a transport and the JDWP protocol to communicate with a separate debugger application. The following section describes the specific `sub_options`:

Name	Required	Default Value	Description
Help	No	N/A	Prints a brief help message and exits the VM.
Transport	Yes	none. Must be <code>dt_skt</code>	Name of the transport to use in connecting to debugger application

Name	Required	Default Value	Description
Server	No	N	<p>If Y, listen for a debugger application to attach; otherwise attach to the debugger application at the specified address</p> <p>If Y and no address is specified, choose a transport address to listen to a debugger application at and print the address to the standard output stream.</p>
Address	Yes, if <i>server = n</i> ; otherwise, no		<p>Transport address for the connection. If <i>server=n</i>, attempt to attach to debugger application at this address. If <i>server=y</i>, listen for a connection at this address.</p>

-Xrunjdpw Examples

```
-Xrunjdpw:transport=dt_skt,server=y,address=8000
```

Listen for a socket connection on port 8000. Suspend this VM before main class loads (*suspend=y* by default). After the debugger application connects, it can resume the VM.

```
-Xrunjd2p:transport=dt_skt,address=8000
```

Start the application without suspending. Then listen for a socket connection on port 8000. When the debugger application connects, it can suspend the VM.

Complete Examples

```
java -Xdebug
-runjdpw:transport=dt_skt,server=y,address=8000
-Xbootclasspath/a:SYS:/myapp/foo.jar HelloWorld
```

Listen for a socket connection on port 8000. Suspend this VM before the main class loads. After the debugger application connects, it can send a JDWP command to resume the VM of the HelloWorld application.

Obtaining the Fully qualified Domain of the Local Host

With the NetWare JVM, the call `java.net.InetAddress.getLocalHost().getHostName()` will return the name of the NetWare server. To obtain the fully qualified domain (DNS) name, (FQDN) of the local host, use the following:

```
InetAddress localhost = InetAddress.getByName ( InetAddress.  
getLocalHost() .getHostAddress() );
```

The object, *localhost*, now contains the correct FQDN and can be obtained via the call, *localhost.getHostName*.