

Novell JVM for NetWare®

1.22

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INSTALLATION AND ADMINISTRATION
GUIDE



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Novell JVM 2.2 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 2.2 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.
- ♦ Symantec* Just In Time (JIT) for NetWare compiler 3.10c, which provides improved performance of Java-based applications.

1

JVM Setup and Operating Requirements

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

- ♦ “Important Java Files” on page 11
- ♦ “Supported Video Controllers” on page 14
- ♦ “Hardware Requirements” on page 15
- ♦ “Software Requirements” on page 15
- ♦ “Frequently Asked Questions (FAQs)” on page 16

Important Java Files

Directory	File	Description
SYS:\JAVA\LIB	rt.jar	Standard Java Classes
	l18n.jar	Standard Java Classes
	taskbar.example	Task bar example
SYS:\JAVA\BIN	agent_g.nlm	Support file for Sun’s JDB
	cafe_g.nlm	Support file for Symantec’s Visual Cafe debugger
	cmm.nlm	Color Management Module

Directory	File	Description
	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
	jmc sock.nlm	Java multicast socket support
	jnet.nlm	Java.net classes support
	jpeg.nlm	JPEG image support
	jvmlib.nlm	Multimedia support
	math.nlm	Math support
	math_g.nlm	Math support, debug version
	mmedia.nlm	Multimedia support
	medialib.nlm	Multimedia support
	nawt.nlm	Native Java methods
	symcjit.nlm	Symantec JIT
	zip.nlm	Java compression library
	zip_g.nlm	Java compression library, debug version
SYS:\JAVA\NWGFX	aiops2.nlm	Mouse driver for PS/2* mouse
	cards	Specifies properties for supported video cards
	conlogj.nlm	Native support for GUI application log
	conlogo.nlm	Native support for GUI console application console log
	def_rsp.ncf	Script for setting up GUI to VGA 16 (Default)
	icelib.nlm	Window manager libraries for NetWare GUI

Directory	File	Description
SYS:\JAVA\NWGFX (<i>cont'd.</i>)	nwwm.nlm	Window manager for NetWare GUI
	nterm.nlm	Native support for application server console GUI
	ntermj.nlm	Native Support for console log GUI application
	nwbj.nlm	Native support for JVM GUI background Utility
	nwbjgpt.nlm	Native support for JVM GUI background Utility
	startx.nfc	Starts graphical user interface
	superpro.nlm	Utility for creating configuration and startup files
	nawt.nlm	Native Java methods
	nawt_g.nlm	Native Java methods, debug version
	vesa_rsp.ncf	Script for setting up GUI to SVGA 256 colors
	xaccel.nlm	Driver for Xi Graphics, Inc. Accelerated-X server
	xf86conf	Configuration file for graphical user interface
	xfsvga.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\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\	Xaccel.ini	Configuration file for Xi Graphics Accelerated-X server
	java.cfg	Environment configuration file

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 5.1, VESA (xfsvga.nlm). This driver provides graphics support for basic VGA video controllers and for VESA 1.2 and 2.0 compliant video controllers. Support is limited to 256 colors for VESA compliant video controllers. Resolution for VESA video controllers is controller dependent.

NetWare 5.1 has XFree86 SVGA 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 XSetup Utility” on page 28 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 in SVGA 640 x 480 256-color mode.

To learn how to configure your monitor for an accelerated video driver, see “Configuring Your Monitor for an Accelerated Video Driver” on page 28.

Hardware Requirements

CPU

- ☐ A CPU speed of 100 MHz and above
 - ◆ Intel* Pentium* Pro
 - ◆ Intel Pentium

Memory

- ☐ NetWare 5.1 and 64 MB minimum (Refer to NetWare 5 memory requirements)

Hard Disk Space

- ☐ 100MB minimum

Mouse

- ☐ PS/2
- ☐ Serial

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

Software Requirements

- ☐ NetWare 5.1 or later loaded and running on the server and the latest Support Pack installed.

If your version of JVM 2.2 for NetWare supports 64-bit file I/O, your server requires NetWare 5.1 with support pack 5 or higher NetWare 6 with support pack 2 or higher.

If your version of JVM 2.2 for NetWare does not support 64-bit file I/O, your server requires NetWare 5.1 with support pack 5 or higher. NetWare 6 does not require a support pack.

- ☐ Novell JVM for NetWare self-extracting executable file. (See “Novell JVM 2.2 for NetWare Overview” on page 9.)
- ☐ Workstation running Windows* 95 or Windows NT* with the Novell Client [™] 32

Determining the File I/O

If you have the 64-bit file I/O in Novell JVM for NetWare 1.3.1, it will already be installed on your system. To determine if you have the 64-bit file I/O, enter the following command at the server console:

```
modules java
```

Version numbers 1.31a or later include the 64-bit file I/O support.

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 does this release support?

This release of Novell JVM for NetWare supports NetWare 5.1 and NetWare 6.

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?

The memory requirements for Novell JVM 2.2 for NetWare depends on the number of applications you have. However, 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 14. 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.

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?

Yes. This JIT compiler is a port from the Symantec JIT v.3.10.106.

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, NDS™ 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 install and start the JVM for NetWare. This chapter includes the following topics:

- ♦ “Installation Prerequisites” on page 19
- ♦ “Installing or Upgrading Novell JVM for NetWare” on page 19
- ♦ “Troubleshooting” on page 23
- ♦ “Supporting the Graphics Font” on page 24

Installation Prerequisites

- ☐ NetWare 5.1 running with the latest support pack on the server
- ☐ Novell JVM for NetWare self-extracting executable file (See “Novell JVM 2.2 for NetWare Overview” on page 9)
- ☐ Client workstation running Windows 95 or Windows NT with Novell Client 32
- ☐ Serial 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 21.

Setting Up TCP/IP Support for Java

The following must be configured to set up TCP/IP support for Java:

- ♦ IP address of the NetWare server
- ♦ Net mask

- ♦ Gateway address
- ♦ DNS domain
- ♦ Address of one or more DNS servers

NOTE: Some or all of these items might be set up during the NetWare installation. You learn which items are set up after the installation is complete.

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 Configuration menu, click Protocols > TCP/IP.
- 2** Press the Down-arrow until Lan Static Routing appears.
- 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 a 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.

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

- 1** Shut down the NetWare GUI if it is running. For instructions on shutting down the NetWare GUI, see “Shutting Down NetWare GUI” on page 26.
- 2** Shut down Novell JVM for NetWare if it is running. For instructions on shutting down NetWare, see “Unloading Novell JVM for NetWare” on page 26.
- 3** Obtain the Supervisor right for the SYS: volume of the server by mapping a volume or logging in.
- 4** Run the Novell JVM for NetWare self-extracting executable file on the client.

This expands the archive and launches the InstallShield installation script.

- 5** At the welcome screen, click Next.
- 6** At the contents screen, click Next.
- 7** To accept the license agreement, click Yes; otherwise, click No.
Rejecting the license agreement stops the installation process.
- 8** Select the server you want to install Novell JVM for NetWare on, and then click Next.

The InstallShield script checks for the required support pack. If it is not found, InstallShield exits.

- 9** Click Back to change the description of the server. If you are satisfied with the profile, click Next.

The installation continues. InstallShield removes any older versions of Novell JVM for NetWare. It also deletes all previous NDK components from the server. You need to install these again from the current NDK.

InstallShield displays an installation progress bar. When the installation Readme file included with the Novell JVM for NetWare archive. This contains last-minute information about JVM for NetWare that is not in the HTML documentation.

- 10** If you are satisfied with the profile, click Next. Otherwise, Install Shield displays an installation progress bar. The installation Readme file is included with the Novell JVM for NetWare install. The Readme file provides current information that is not in this manual.
- 11** Bring down and then bring up the server.

Related Topics

- ♦ Chapter 1, “JVM Setup and Operating Requirements,” on page 11
- ♦ “GUI Fails to Configure” on page 23

Loading Novell JVM for NetWare

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

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

```
startx
```

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

If you can move the mouse around on your workspace, your GUI applications can respond to mouse commands.

You can now launch Java applications and applets.

If you experience difficulties loading Novell JVM for NetWare, see “Java Applications Fail to Load” on page 23.

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 AWT, 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 33.)

GUI Fails to Configure

NetWare GUI configuration is usually performed during installation. If NetWare GUI is still not configured after installation, run one of the following two .NCF files.

To configure NetWare GUI for SVGA 256, colors at the server console enter

```
vesa_rsp
```

This sets up XFree86 SVGA if your card supports it.

You can also customize your graphics environment by using the XSetup utility, which is used to configure standard SVGA, and accelerated-X Servers on Netware. (For more information, see “Configuring XServer Using the XSetup Utility” on page 28.)

GUI Resolution Is Not Working Properly

If your GUI resolution is not working, configure 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 XSetup Utility” on page 28.)

JAVA.NET Does Not Work

If Java applications that use the JAVA.NET package have trouble resolving names, 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 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 JDK1.3.1 on NetWare is nearly identical to the Solaris implementation. For a description, see the font properties page on the Sun Web site (<http://java.sun.com/products/jdk/1.2/docs/guide/internat/fontprop.html>).

The FONT.PROPERTIES and Solaris implementation platforms are similar because they both use X11. NetWare's version of X11 supports only TrueType fonts, not Type 1 fonts. It is possible to install other fonts to replace the bitmap fonts. To change a font, use the alias filename JAVA/LIB/FONTS/FONT.DIR and then use this alias in the FONT.PROPERTIES file.

3

Administration Guide

This chapter explains the administrative tasks that you can do with Novell® JVM 2.2 for NetWare®.

JAVA.CFG

The Java configuration file (JAVA.CFG) is the first file your system reads when you load Java. This file is set up with the minimum items necessary to load Java. When you install JVM, the install procedure creates the following lines:

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

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\NWGFX  
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 26.

Unloading Novell JVM for NetWare

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

```
unload java  
java -exit
```

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, and 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.

1. Activate the desktop menu (see “Activating the Desktop Menu” on page 27), and then click Close GUI > Yes.
2. Press Ctrl+Alt+Backspace.
3. 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 27), and 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 left hand corner of the screen.

Configuring the Desktop Menu

Installing Programs

Do the following to install a program into the desktop menu:

- 1** Copy all the necessary program files to the server.
- 2** Copy your program's menu files to the desktop menu directory SYS:/JAVA/LIB/TASKBAR.

If this directory does not exist, you need to create it. For an example of the file format for a menu file, see SYS:/JAVA/LIB/TASKBAR.EXAMPLE.

- 3** If your menu file uses a resource bundle for internationalization of the menu strings, copy the resource bundle to the desktop menu directory SYS:/JAVA/LIB/TASKBAR.

After you install your program, the next time you click the Novell button in the NetWare GUI, your menu items will appear. You can then start your program by selecting the appropriate menu item.

Modifying the Menu

You construct the desktop menu by merging any installed menu files and the custom menu file with the default desktop menu. You can modify the desktop menu by editing the custom menu file or any of the installed menu files.

To add items to the desktop menu, create a customized.MENU file and copy it to the SYS:/JAVA/LIB/TASKBAR directory. For an example menu file, see SYS:/JAVA/LIB/TASKBAR.EXAMPLE.

Removing Installed Menu Items from the Desktop Menu

You can remove either an entire menu file and all the contents, or you can remove only a single menu item.

To remove a whole menu file, either delete the file or rename it by changing the extension to something other than .MENU.

To remove a single menu item from the desktop menu, locate the item and delete it from the menu file. (For more information, see “Modifying the Menu” on page 27.)

Configuring XServer Using the XSetup Utility

You use the XSetup utility to configure Standard VGA, 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 XSetup utility.

- 1 Activate the desktop menu.

See “Activating the Desktop Menu” on page 27.

- 2 Click Settings > GUI Environment.

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

Configuring Your Monitor 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 800 x 600 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 If the test pattern displays properly, click OK > Yes > Yes.

Selecting a Background Pattern

- 1 Activate the desktop menu.

See “Activating the Desktop Menu” on page 27.

2 Click Tools > Backgrounds.

All files in the SYS:\JAVA\NWGFX\PIXMAPS directory display. The supported graphics formats are XPM, JPEG, GIF, and TIF. 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, COM1, or COM2 port, the GUI will start in mouseless mode. When the MOUSE DEVICE query screen appears, select the NO MOUSE option.

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.
F7	Switches to the next program.
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+A
Deselect all	Arrow keys	arrow keys
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	
Copy selection	Ctrl+C	Ctrl+C
Cut selection	Ctrl+X	Ctrl+X
Paste	Ctrl+V	Ctrl+V
Delete next character	Delete	Delete

Action	Text Area	Text Field
Delete previous character	Backspace	Backspace
Insert tab	Tab	
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 27.)

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

```
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 27.)

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 5.1 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 32.

- 2 At the server console, enter

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

For example:

```
java -kill11121950320
```

where 21950320 is 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 26.

- 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.

Setting the DISPLAY Environment Variable

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

To set the display environment variable, enter the following at the server console:

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

- 1 At the server console, enter

```
load java
```

- 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 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 34.

- 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 GUI screen does not open 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 26.

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:

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 26.

- 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 35.)

Setting the JAVA_COMPILER Environment Variable to Enable the JIT

- 1 Start the Novell JVM for NetWare.

See “Loading Novell JVM for NetWare without NetWare GUI” on page 26.

- 2 Enter the following at the server console:

```
envset JAVA_COMPILER=SYMCJIT
```

The Symantec JIT compiler is now enabled. To disable the Symantec JIT compiler, enter the following at the server console:

```
envset JAVA_COMPILER=
```

This disables the JIT for all subsequently launched Java applications.

Setting the JAVA_HOME Environment Variable

The JAVA_HOME environment variable specifies the location of the JVM.

- 1 Start Novell JVM for NetWare.

See “Loading Novell JVM for NetWare without NetWare GUI” on page 26.

- 2 Enter the following at the server console:

```
envset JAVA_HOME=<current JVM location>;
```

The default location of the Novell JVM for NetWare is SYS:\JAVA\LIB.

Setting the XLOCALEDIR Environment Variable

The XLOCALEDIR environment variable specifies the location of files necessary to support other languages, including keyboard and font files.

- 1 Start Novell JVM for NetWare.

See “Loading Novell JVM for NetWare without NetWare GUI” on page 26.

- 2 Enter the following at the server console:

```
envset XLOCALEDIR=<files location>;
```

The default location of the locale files is
SYS:\JAVA\NWGFX\LOCALE.

4

Developer's Guide

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

Tasks

- ♦ “Using Java Native Interface (JNI) on NetWare” on page 39
- ♦ “WATCOM 11.0 Compiler Flags for Native Method NLM Programs” on page 43

Using Java Native Interface (JNI) on NetWare

The JAVA\BIN directory includes a file named JNI.TAR. When you extract this file, it demonstrates simple native method examples for Java 1.1. This section is an example of how to write native methods for the Java 1.3.1 Virtual Machine on NetWare. It is not a comprehensive tutorial on writing native methods.

Tools Required

- ☐ Java 1.3.1 for NetWare
- ☐ JDK 1.1 for Win32
- ☐ NetWare SDK Release 15 or later
- ☐ 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	JNI section of this file
NWIMPL.C	Native method C implementation
NWMAIN.C	CLIB NLM wrapper - main()

Installing JNI

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 at the Windows command prompt:
copy nwnative.nlm G:\java\bin
- 3 Copy the classes to G:\JAVA\CLASSES by entering the following at the command prompt:
copy *.class g:\java\classes

Building JNI

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
```

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

```
nmake clean
```

Running JNI

To ensure that the CLASSPATH variable isn't corrupted by extra spaces, misplaced or missing semicolons, or incorrect data, enter the following at the server console:

```
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. 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()
- ◆ sysFree - same parameters as free()
- ◆ 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 5.1 or NetWare 6. In some instances, you might prefer memory returned from malloc, such as buffers used for callbacks or ECBs.

3. 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, you'll link in a bad prelude and things will not work correctly. If you're using C++, see Item 4 below. To prevent these warnings, add the following Makefile option:

```
Option NoDefaultLibs
```

4. 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.

5. 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=l /ri /ei /5s /or /ot /w3 /s /zq /ez
```

Debug flags are

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

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

Revision History

The following table outlines all the changes that have been made to the Novell® JVM for NetWare® documentation (in reverse chronological order) since November 1999.

NDK Release	Description of Changes
November 2000	Added a new section in the Administration Guide, "Configuring Your Monitor for an Accelerated Video Driver" on page 28.
March 2000	Added clarification information on unsupported Invocation APIs in "Using Java Native Interface (JNI) on NetWare" on page 39. Added back into the documentation all references to NetWare 4 support that had been previously removed.
January 2000	Removed all references in the documentation to NetWare 4 support because of previously insufficient testing on that platform. Updated information on "JVM Setup and Operating Requirements" on page 11, "JVM Setup and Operating Requirements" on page 11, "JVM Setup and Operating Requirements" on page 11, and "Troubleshooting" on page 23. Added new documentation on "Configuring the Desktop Menu" on page 27, "Configuring XServer Using the XSetup Utility" on page 28, "Setting the JAVA_HOME Environment Variable" on page 37, "Setting the XLOCALEDIR Environment Variable" on page 37.

