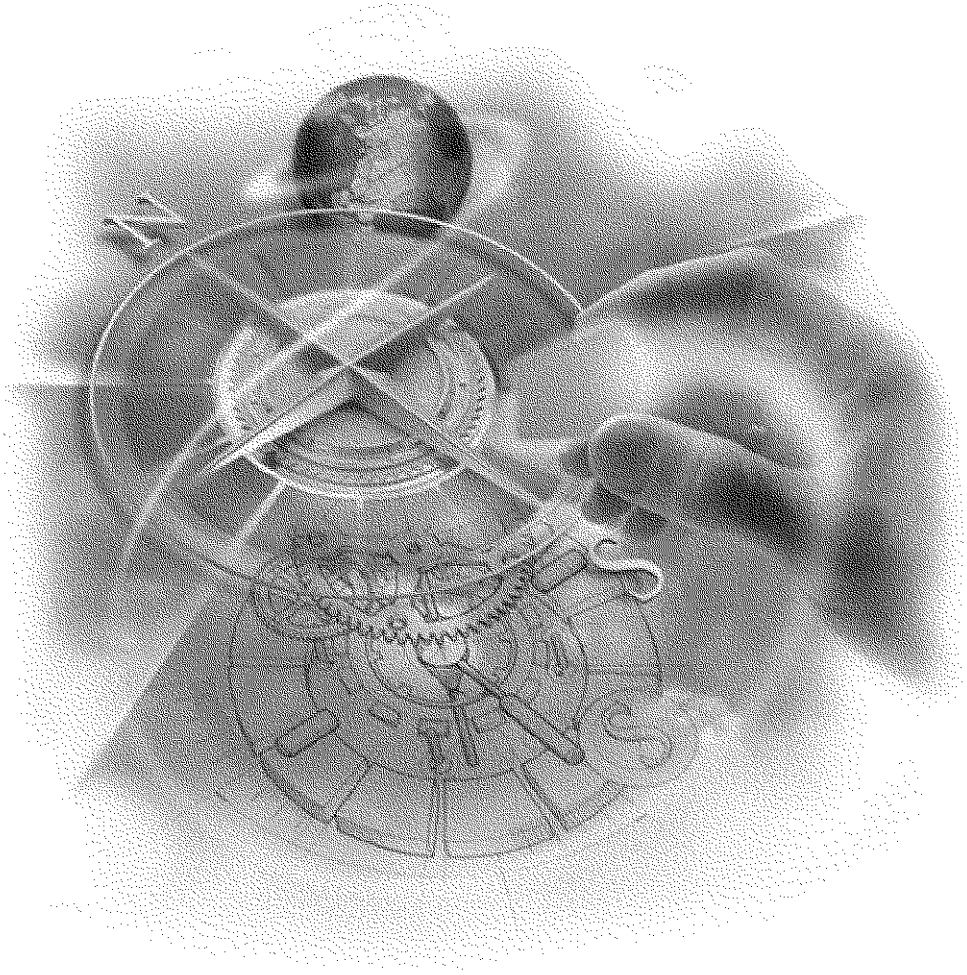
Novell Developer Kit

Novell JVM for NetWare®



Novell®

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Novell JVM 1.1.7b for NetWare
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Contents

Novell JVM 1.1.7b 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 1.1.7b 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®, including the following:

Important Java Files

Directory	File	Description
SYS:\JAVA\LIB	classes.zip	Standard Java classes
	nawt.properties	User-editable preferences for color mappings and mouse variables
	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
	java.nlm	Novell JVM for NetWare

Directory	File	Description
	java_g.nlm	Novell JVM for NetWare, debug version
	jdbc.nlm	Java Database Connectivity NLM
	jdbc_g.nlm	Java Database Connectivity NLM, debug version
	jnet.nlm	Java.net classes support
	jnet_g.nlm	Java.net classes support, debug version
	jpeg.nlm	JPEG image support
	jpeg_g.nlm	JPEG image support, debug version
	math.nlm	Math support
	math_g.nlm	Math support, debug version
	mmedia.nlm	Multimedia support
	mmedia_g.nlm	Multimedia support, debug version
	symcjit.nlm	Symantec JIT
	symcjit_.nlm	Symantec JIT, debug version
	sysres.nlm	System resources
	sysres_g.nlm	System resources, debug version
	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
	def_rsp.ncf	Script for setting up GUI to VGA 16 (Default)
	nwwm.nlm	Window manager for NetWare GUI
	startx.nfc	Starts graphical user interface
	superpro.nlm	Utility for creating configuration and startup files

Directory	File	Description
	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
	xfvga16.nlm	Driver for VGA 16-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\NWGFX\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
SYS:\SYSTEM	aio.nlm	Asynchronous I/O driver, which allows aiocomx.nlm to function as a mouse driver
	aiocomx.nlm	Protocol for serial mice.

Supported Video Controllers

Instead of supporting specific chipsets, Novell supports the VESA BIOS extensions that allow abstraction away from the hardware. JVM provides two physical drivers, VGA (xfvga16.nlm) and VESA (xfsvga.nlm). Both drivers will work for both NetWare 4 and NetWare 5. These drivers provide graphics support for basic VGA video controllers and for VESA 1.2 and 2.0 compliant video controllers. Support is limited to 640x480 16 colors for standard VGA and 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:

- IBM* VGA Support

  640 x 480 16-colors

- 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 30 for instructions on accessing the video card tab in the Desktop Menu to view a complete list of supported controllers.

NOTE: Upon installation, NetWare GUI boots in SVGA 640 x 480 256-color mode if possible; otherwise, it boots in VGA 640 x 480 16-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 31.

Hardware Requirements

CPU

- A CPU speed of 100 MHz and above
  - Intel* Pentium* Pro
  - Intel Pentium
  - Intel 486

Memory

- NetWare 4
  - 32 MB for text-based Java applications
  - 48 MB for graphical Java applications
- NetWare 5
  - 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 4 or NetWare 5 loaded and running on the server
  - Support Pack 8 or later for NetWare 4
  - Support Pack 3 or later for NetWare 5
- Novell JVM for NetWare self-extracting executable file. (See "Novell JVM 1.1.7b for NetWare Overview" on page 9.)
- 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 4 or later.

- NetWare 4 requires Support Pack 8 or later
- NetWare 5 requires Support Pack 3 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 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

- NetWare 4 or NetWare 5 loaded and running on the server
  - Support Pack 8 or later for NetWare 4
  - Support Pack 3 or later for NetWare 5
- Novell JVM for NetWare self-extracting executable file (See "Novell JVM 1.1.7b 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 22.

Adding Long Name Space to a Volume

If you plan to have JMV access any volume, including CD volumes, you must add long name space to that volume. Otherwise, JVM cannot read the volume. After you load long name space, NetWare uses it as the default setting.

NetWare 4.2 and NetWare 5 add long name space by default—NetWare 4.11 does not.

Do the following to add long name space to the SYS: volume. If you want to use another volume, substitute that volume name.

1. On the NetWare 4 server console, enter

   ```
   load long.nam
   ```

2. Enter

   ```
   add name space long to sys
   ```

3. Restart the server.

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

Prerequisites

- ❑ Support Pack 2 for NetWare 5 installed on the server
- ❑ Shut down NetWare GUI if it is running (See "Shutting Down NetWare GUI" on page 28.)
- ❑ Shut down Novell JVM for NetWare if it is running (See "Unloading Novell JVM for NetWare" on page 28.)

Procedure

1. Obtain the Supervisor right for the SYS: volume of the server 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. At the contents screen, click Next.
5. To accept the license agreement, click Yes; otherwise, click No.

   Rejecting the license agreement stops the installation process.
6. Select the server you want to install Novell JVM for NetWare on, and then click Next.

   The InstallShield script checks for Support Pack 6a (if installing from the NDK). If it is not found, InstallShield exits.
7. After reviewing the current settings profile, 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.
8. Bring down the server and then bring it back up.

Related Topics

- Chapter 1, “JVM Setup and Operating Requirements,” on page 11
- “GUI Fails to Configure” on page 25

Loading Novell JVM for NetWare

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

- 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 25.

Uninstalling Novell JVM for NetWare

The Novell JVM for NetWare uninstall program is NWUNINSTALL.EXE. This launches InstallShield and deletes all previous installations of Novell JVM for NetWare. It does not delete files you added by hand that were not part of the InstallShield profile. The uninstall program is in SYS:\ as a hidden file; you cannot delete this file accidently.

NOTE: NWUNINSTALL.EXE replaces DELETEJAVA.EXE from all previous releases of Novell JVM for NetWare.

Prerequisites

- Client workstation running Windows 95 or Windows NT
- Map root to the volume where you installed Novell JVM for NetWare.

Procedure

In a DOS session, change your current drive to the mapped root drive and enter

```
nwuninstall jvm
```

This launches InstallShield, which deletes all previous and current installations of Novell JVM for NetWare.

If InstallShield reports that it could not delete all files, this means that additional files have been added to the Novell JVM for NetWare directory structure that were not part of the installation profile. You can delete these files manually if you want.

IMPORTANT: Do no delete NWININSTALL.EXE because it is used to delete other packages in the Novell Developer Kit (NDK) as well as Novell JVM for NetWare.

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 to127.0.0.1:0.0 or to the IP number of the server. (For more information, see "Setting the DISPLAY Environment Variable" on page 36.)

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 VGA 16 colors, at the server console enter

  def_rsp

- 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. Otherwise, it sets up VGA 16 colors.

You can also customize your graphics environment by using the XSetup utility, which is used to configure standard VGA, SVGA, and accelerated-X Servers on Netware. (For more information, see "Configuring XServer Using the XSetup Utility" on page 30.)

GUI Resolution Is Not Working Properly

If your GUI resolution is not working, configure NetWare GUI for VGA 16 colors by entering the following at the server console:

def_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 30.)

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 NETDB.NLM 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 JDK1.1.*x* on NetWare is nearly identical to the Solaris implementation. For a description, see (http://java.sun.com/products/jdk/1.1/docs/guide/intl/fontprop.html).

These platforms are similar because they both use X11. NetWare's version of X11 supports bitmap fonts and Type 1 fonts—it does not support TrueType fonts. All of the JDK fonts are bitmap fonts which do not always scale well. For better appearance, it is possible to install Type 1 fonts to replace the bitmap fonts. These Type 1 fonts are available at (http://www.gimp.org/urw-fonts.tar.gz) and information on how to use them can be found at (http://www.gimp.org/fonts.html).

3 Administration Guide

This chapter explains the administrative tasks that you can do with Novell® JVM 1.1.7b for NetWare®.

Prerequisites

- NetWare 4 or NetWare 5 must be loaded and running on the server
  - If using NetWare 4, Support Pack 8 or later must be installed.
  - If using NetWare 5, Support Pack 3 or later must be installed.
- Novell JVM for NetWare must be installed

  See Chapter 2, “Installation Guide,” on page 19.

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. We recommend that you do not modify this file at all. The following is the default JAVA.CFG file:

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

OSA_HOME=SYS:\JAVA

JAVA_HOME=SYS:\JAVA

MGMT_HOME=SYS:\PUBLIC\MGMT

JAVA_FONTS=SYS:\JAVA\LIB\FONTS

JAVA_COMPILER=SYMCJIT
```

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 28.

Unloading Novell JVM for NetWare

You can unload Novell JVM for NetWare (java.nlm) from memory by entering the following two 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 29), 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 29), 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 lefthand 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.

Once you have installed 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 29.)

Setting Taskbar Properties

Currently, the default taskbar property is the stay-on-top property. If you do not want the taskbar to stay on top, you can change this property by creating a NAWT.PROPERTIES configuration file. To turn off the stay-on-top property, add the following line to the configuration file:

```
taskbar.stayontop=false
```

For an example of a properties configuration file, see the SYS:\JAVA\LIB\NAWT.PROPERTIES.SAMPLE file.

Configuring XServer Using the XSetup Utility

You use the XSetup utility to configure Standard VGA, Super VGA, and Accelerated-X Servers on NetWare. This utililty 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 29.

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 enables the monitor tab. The default settings are Super VGA with 640 x 480 resolution and monitor tab disabled.
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 29.
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

Action	Text Area	Text Field
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
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 29.)

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 29.)

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 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 of your choice, then 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 35.

2. At the server console, enter

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

   For example:

   ```
   java -kill1121950320
   ```

   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 28.

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.

1 Start Novell JVM for NetWare

See “Loading Novell JVM for NetWare without NetWare GUI” on page 28.

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 lets you view your server's GUI display from a remote client workstation. When you access your server from a remote location, the server communicates with the client through Xserver. You must have Xserver running to use this feature. The information from your server redirects to the client machine. The GUI display cannot reside in both locations.

Allowing Remote Access to a Server

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

1. Enter **`ac`** at the Xserver command line.

   This turns off access control and allows any other client to access the server.

2. Enter **`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.

Displaying a Server from a Remote Client Workstation

1. Load Java (if it is not loaded).
2. Enter the following at the command line of the client workstation:

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

3. Start the Java applet or application you want.

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 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 28.

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 28.

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\CLASSES.ZIP;SYS:
   \JAVA\CLASSES

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

   ```
   evnset CLASSPATH=SYS:\JAVA\LIB\CLASSES.ZIP;
     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 38.)

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 28.

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. You can turn the JIT off for just one application by using the -nojit option as follows:

   ```
   java -nojit <className>
   ```

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 28.

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 28.

2. Enter the following at the server console:

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

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

Setting the DEBUGGER Environment Variable

The DEBUGGER environment variable specifies the debugger to use. This variable must be set in the JAVA.CFG file prior to starting the Novell JVM for NetWare. It cannot be set from the server console as with the other environment variables.

To set the DEBUGGER environment variable, you must edit the JAVA.CFG file and add the option DEBUGGER=<debugger>, where <debugger> is SUN if using Sun’s JDB or any debugger that uses JDB (Visual Age, JDB, etc.), or SYMC if using the Symantec Visual Cafe 3.0.

4 Developer's Guide

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

Prerequisites

- ❑ NetWare 4 or NetWare 5 loaded and running on the server
  - If running NetWare 4, Support Pack 8 or later must be installed.
  - If running NetWare 5, Support Pack 3 or later must be installed.
- ❑ Novell JVM for NetWare started

  See "Loading Novell JVM for NetWare without NetWare GUI" on page 28.
- ❑ TCP/IP support for Java set up

  See "Setting Up TCP/IP Support for Java" on page 20.

Tasks

Debugging NetWare Java JNI Applications with RDebug

RDebug now supports debugging Java applications running on NetWare JVM for NetWare. To use RDebug on a Windows 95 or NT machine, you do not need a special connection between the machines. You use the standard IP network communication protocol between RDebug and NetWare JVM for NetWare on both machines.

1. Bring up RDebug on a Windows 95 or NT machine.
2. Click Debug > Debug a Java Application.
3. Enter the requested Host IP Address and Password.
4. Load the debugging version of Novell JVM for NetWare (java_g) and then enter the following at the server console:

   ```
   load java_g
   ```

   The JAVA.NLM version of Novell JVM for NetWare does not support debugging. The java_g version does not ship with NetWare 5, but it is available on the Novell Developer Kit (NDK).
5. If necessary, set the CLASSPATH environment variable to include your application path.

   See “Setting the CLASSPATH Environment Variable” on page 38.
6. Enter the following at the server console:

   ```
   jdb
   ```

   A password displays.
7. Enter the Host IP address of the NetWare server and the password in the RDebug dialog box and click OK.
8. (Optional) At the RDebug debug window, click Setting > Options item, and then set up the search path of the source for the class you intend to debug.
9. At the debug window, click File > Load a Class.

   Using the Load a Class dialog will work even if the class is already loaded.
10. Enter the name of the class you want to debug and click OK.

    The source for the class displays in the debug window.

11 Set breakpoints in the class by double-clicking on the line number or by using the Breakpoints dialog.

12 To create a thread, Click GO.

You can also click Debug > Run Class with New Thread to do this.

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 1.1.7b Virtual Machine on NetWare. It is not a comprehensive tutorial on writing native methods.

NOTE: JVM 1.1.7b does not currently support the Invocation APIs. These might be supported in a later release. The specific calls not supported are JNI_GetDefaultJavaVMInitArgs, JNI_GetCreatedJavaVMs, JNI_CreateJavaVM, DestroyJavaVM, AttachCurrentThread, and DetachCurrentThread.

Tools Required

- Java 1.1.7b 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()

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
   ```

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, and then at the command prompt in Windows enter

   ```
   copy nwative.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 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. 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.

Debugging NetWare Java Applications with Visual Cafe

You use Visual Cafe 3.0 to debug Java applications running on NetWare JVM for NetWare. To use this tool, run Visual Cafe 3.0 on a Windows 95 or NT machine and remotely debug the Java applications running on NetWare. You do not need a special connection between the two machines. You need only the standard IP network connection on both machines.

1. Bring up Visual Cafe 3.0 on a Windows 95 or NT machine as usual.
2. Create a project for your Java application and build it.
3. Move the resulting classes to the NetWare server.
4. In the Visual Cafe, click Project > Options.
5. Fill in the Main Class and Program Arguments fields.
6. Select Debugger, enable remote debugging, and fill in the Host Address field.
7. Load the debugging version of Novell JVM for NetWare (java_g), and at the server console enter

   ```
   load java_g
   ```

   JAVA.NLM does not support debugging. The java_g version is not shipped with NetWare 5, but it is available in the Novell Developer Kit (NDK).
8. If necessary, set the CLASSPATH environment variable to include your application path.

   See “Setting the CLASSPATH Environment Variable” on page 38.
9. At the server console, enter

   ```
   jdb
   ```

   A password displays.
10. In Visual Cafe, set the password field to the displayed password and close the dialog.

You can now use the Visual Cafe Run In Debugger command.

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.

Using RMI on NetWare

The JAVA/BIN directory includes a file called RMI.TAR. This file contains an example program for how to write RMI (Remote Method Invocation) enabled programs for Java 1.1.7b Virtual Machine on Netware. This file provides only an example of how to write RMI enabled programs; it is not a comprehensive tutorial on writing RMI applications.

To use these examples, you must set up TCP/IP support for Java. See "Setting Up TCP/IP Support for Java" on page 20.

A 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 31.
March 2000	Added clarification information on unsupported Invocation APIs in "Using Java Native Interface (JNI) on NetWare" on page 43. 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 25. Added new documentation on "Configuring the Desktop Menu" on page 29, "Configuring XServer Using the XSetup Utility" on page 30, "Setting the JAVA_HOME Environment Variable" on page 40, "Setting the XLOCALEDIR Environment Variable" on page 40, and "Setting the DEBUGGER Environment Variable" on page 40.