



**MIDP Installation Guide
For Palm Powered™ Devices**

Contents

Chapter 1. Introduction	1
About J9 runtimes	1
About J9 class libraries.....	2
About PRC packages.....	2
Additional features	4
Chapter 2. Tasks	5
Installing the runtime on your computer.....	5
Installing the runtime on a Palm Powered device.....	5
Installing the sample application on a Palm Powered device.....	6
Running the sample application on a Palm Powered device	6
Using the IBM Java VM preferences.....	6
Using the J9 Java Options preferences panel.....	7
Uninstalling the runtime from a Palm OS device	7
Error messages.....	9
Chapter 3. Application Management System (AMS)	10
Overview	10
User Interface.....	10
Chapter 4. JarToPrc.....	12
Overview	12
Using the JarToPrc Graphical Interface.....	12
Other Field Descriptions.....	13
Button Descriptions.....	14
Menu Item Descriptions	14
Using JarToPrc at the Command Line.....	15
Creating a Splash Screen	15
Appendix. Additional information	17
Further Information	17
Notices	17
Trademarks	20

Chapter 1. Introduction

About this document

This document can help you install Java Technology for Palm OS® Garnet. It tells how to install the **MIDP2.0** configuration that you need to run a J9 VM executable on your Palm Powered™ mobile device.

Note: This document assumes a certain level of knowledge about working with Palm Powered mobile devices. For example, if you need further information on how to install files on your device, please refer to the Palm OS documentation.

About J9 runtimes

What is a J9 runtime?

The J9 VM, the core of **WebSphere Everyplace Micro Environment (WEME)**, is the IBM™ implementation of the **Java Virtual Machine Specification, Version 1.3**. A Java virtual machine executes machine instructions, known as bytecodes, which are typically compiled from Java language source code. For more on the Java Virtual Machine Specification, refer to <http://java.sun.com/docs/books/vmspec>.

The J9 VM and **Java Class Libraries (JCL)** comprise the J9 runtime environment. The J9 runtime environment is **Java 2 Platform, Micro Edition (J2ME)** compliant and contains **Connected Limited Device Configuration (CLDC)** and **Mobile Information Device Profile 2.0 (MIDP2.0)** based technologies. In addition, the **WebSphere Everyplace Custom Environment (WECE)** is a combination of the J9 VM and IBM custom libraries.

The WEME product is supported on a variety of:

- Operating systems (including Microsoft Windows, Linux, Palm OS, OSE, Rex, VxWorks, PocketPC, Symbian, QNX and Nucleus)
- Hardware architectures (including Intel x86, xScale, ARM, MIPS, SH4, and PowerPC)

WebSphere Everyplace Micro Environment (WEME) is a certified Java Powered product, developed under an agreement between IBM and Sun Microsystems. Deployment of applications or devices with Workplace Client Technology requires an appropriate deployment license from IBM or one of IBM's partners.

About J9 class libraries

Which J9 class libraries are available for a Palm Powered device?

The following J9 class library is available for your Palm Powered device:

- JclMidp20 for Palm OS is an implementation of the **J2ME Mobile Information Device Profile 2.0** (JSR-118), based on the **MIDP 1.0** specification (JSR-37).

About PRC packages

What is a PRC package?

The PRC package is a collection of files packaged together to apply to Palm Powered devices.

The following PRC packages are available for your device:

Type of Package	Filename	Description	Space required to install
Runtime Package	J9JavaVMMidp20.prc	<p>J2ME Connected Limited Device Configuration 1.1 (JSR-46)</p> <p>J2ME Mobile Information Device Profile 2.0 (JSR-118)</p> <p>This runtime package includes the:</p> <ul style="list-style-type: none">• J9 VM runtime• CLDC 1.1/MIDP 2.0 Class Libraries• The installer for the VM itself and other required components. This is required to be installed in order to run Java applications. <p>Note: Limitations in Palm HotSync prevent code segment sizes greater than 64 kB from being synchronized on or off the device. Due to this limitation the runtime components are not backed up. If you must hard reset your device, the J9JavaVMMidp20.prc must be manually reinstalled.</p>	1,781KB

Localization Files for the Runtime Package	J9JavaVMMidp20_de.prc, J9JavaVMMidp20_es.prc, J9JavaVMMidp20_fr.prc, J9JavaVMMidp20_it.prc, J9JavaVMMidp20_ja.prc, J9JavaVMMidp20_zh_CN.prc	You can install these PRCs to localize the Runtime Package in German, Spanish, French, Italian, Japanese, and Chinese.	
Developer Package	j9pref.prc	The developer preferences panel must be installed in order to debug Java applications. Note: The developer preferences panel is intended for use by software developers only. It is not intended for end users. Also, it is not localized; it is available only in English.	7KB
Sample Application	GolfScoreTracker.prc	The sample application to demonstrate the runtime.	92KB
Extra Package: JSR-75	PIMPrefs.prc, fileconnect.prc, pimop.prc	Install these files if you want your JVM to support JSR-75, which provides access to PIM databases and allows MIDlets to write data to the VFS card.	
Localization Files for the JSR-75 Package	PIMPrefs_de.prc, PIMPrefs_es.prc, PIMPrefs_fr.prc, PIMPrefs_it.prc, PIMPrefs_ja.prc, PIMPrefs_zh_CN.prc	You can install these PRCs to localize the JSR-75 Package in German, Spanish, French, Italian, Japanese, and Chinese.	
Extra Package: JSR-172	WS-Security.prc, WebServices.prc	Install these files if you want your JVM to support JSR-172, which supports Web Services.	
Error Strings	JavaVMCheck_deDE.prc, JavaVMCheck_enUS.prc, JavaVMCheck_esES.prc, JavaVMCheck_frFR.prc, JavaVMCheck_itIT.prc, JavaVMCheck_jpJP.prc, JavaVMCheck_zhCN.prc	These files contain error strings in German, English, Spanish, French, Italian, Japanese, and Chinese, saying "This Java VM is not compatible with your device. Please contact your manufacturer." This error message appears if a user tries to run a MIDlet that was created for a different manufacturer's Java VM.	

Additional features

- Java Technology for Palm OS Garnet supports a variety of display resolutions:
 - 160x160
 - 240x320 (QVGA)
 - 320x320
 - 320x480 (HVGA)
- Java Technology for Palm OS Garnet supports the Palm OS **dynamic input area**. Users can close the dynamic input area when they do not need to enter characters. For detailed information on the dynamic input area, see your Palm OS documentation.

Chapter 2. Tasks

Installing the runtime on your computer

To install Java Technology for Palm OS Garnet on your development computer, simply unzip the files into a directory of your choice.

Installing the runtime on a Palm Powered device

Follow these steps to install a runtime environment on your device:

Note: These instructions are for Windows XP/2000 only.

1. In the **Start Menu**, select **Programs | Palm Desktop | Palm Quick Install** to launch the install program.
2. Select **File | Add Files** and browse to the directory where you installed Java Technology for Palm OS Garnet. Then browse to `\JVM\ARM4T`.
3. Select **J9JavaVMMidp20.prc** and **j9pref.prc** and click **Open** to add the files to the **Quick Install** window.

Note: The **j9pref.prc**, which is the developer preferences panel, is intended for use by software developers only. It is not intended for end users. Also, it is not localized; it is available only in English.

4. Verify that your device is placed in the cradle correctly.
5. HotSync the device. If you are prompted for a user, select the correct user.

Result: You are ready to install a Java application.

Note: Only applications that have been specifically packaged for this version of WebSphere Everyplace Micro Environment will work correctly. This means only applications that have been converted from JAR files to PRC files will run. The IBM Java VM lets you download native JAR files, but to access MIDlets on your device or through a web browser, you must use AMS or the JarToPRC tool to convert the JAR files to PRC files. To access MIDlets on an SD card, the JAR must have been converted to a PRC using the JarToPRC tool (not AMS). For instructions see “Chapter 3. Application Management System (AMS)” and “Chapter 4. JarToPrc.”

After you install the runtime environment, the Java Application Management System (AMS), **IBM Java VM**, appears in your **Launcher** and an additional option, **IBM Java VM**, appears in the **Preferences** area.

Installing the sample application on a Palm Powered device

The Golf Score Tracker sample application is included in the runtime package to verify that the runtime installation is properly installed. To install Golf Score Tracker:

Note: These instructions are for Windows XP/2000 only.

1. In the **Start Menu**, select **Programs | Palm Desktop | Palm Quick Install** to launch the install program.
2. Select **File | Add Files** and browse to the directory where you installed Java Technology for Palm OS Garnet. Then browse to the `\Samples` directory.
3. Select **GolfScoreTracker.prc** and click **Open** to add the file to the **Quick Install** window.
4. Verify that your device is placed in the cradle correctly.
5. HotSync the device. If you are prompted for a user, select the correct user.

Running the sample application on a Palm Powered device

After you have installed the Golf Score Tracker application (**GolfScoreTracker.prc**) to your device, tap the **Golf MIDlet** application to run it. You may need to switch to the **Unfiled** category in the Launcher to locate it among your other installed applications.

Using the IBM Java VM preferences

The J9 runtime has certain characteristics which can be configured at runtime. Configuration is done using the **IBM Java VM preferences** panel. This panel is accessed by selecting **Prefs** in the **System** category in the Launcher on your device.

The **IBM Java VM preferences** panel provides the ability to modify the following application settings:

- **Double Buffering** - A double-buffered canvas draws more smoothly while sacrificing some drawing speed.
- **High resolution** - High resolution coordinates allow the MIDlet to draw in actual screen coordinates rather than emulating the legacy 160x160 screen coordinates. This option will only be available in devices that have a high-resolution display. For QVGA, the MIDlet always uses high resolution.
- **HTTP Proxy** - URL and/or port of HTTP proxy

- Memory Maximum - Sets the maximum memory the VM will allocate. Equivalent to the `-Xmx<x>` command line option.
- Maximum Java Thread Stack Size - Sets the maximum Java thread stack size. Equivalent to the `-Xss<x>` command line option.

Preferences are stored at the global level and the application level. The default behavior is for each MIDlet to use the global preferences.

To modify an application's settings to override the global preferences:

1. Select application from the drop-down list at the top of the screen.
2. Uncheck **Use global preferences** if this selection is checked
3. Make the desired setting changes.

Using the J9 Java Options preferences panel

The J9 Java Options preferences panel will be available if `j9pref.prc` has been installed on the device.

Note: The J9 Java Options preferences panel is intended for use by software developers only. It is not intended for end users. Also, it is not localized; it is available only in English.

To use the **J9 Java Options preferences** panel:

1. Select an application from the Java App drop-down list.
2. Select the VM options from the drop-down list. See the J9 command options section for more detailed command information.
3. In the **App Options** field, enter any parameters that should be passed to your application.
4. Click **Launch** to start your application.
 - Clicking **Revert** reloads the previously saved preferences for the selected application.
 - Clicking **Default** reloads the default preferences for the selected application.

Uninstalling the runtime from a Palm OS device

Note: Prior to removing the runtime, make sure any MIDlets downloaded over the air ("OTA") with IBM Java VM have been deleted from the device. If MIDlets are still present in the IBM Java VM, they cannot be removed after the runtime has been deleted.

Follow these steps to remove packages installed on your device:

1. In the Palm Launcher, select **App | Delete**.

2. Delete the following items from the list:
 - IBM Java VM
 - J9 Exchanger
 - J9 Java Launcher
 - J9 Java Options
 - J9 MIDP Bundle

3. Tap **Done** to return to the Launcher.

Error messages

The first time you run a MIDlet, the following error messages may appear.

Error Message	Meaning
This Java VM is not compatible with your device. Please contact your manufacturer.	<p>This means the JVM on the device is not licensed to run this particular MIDlet. The MIDlet was written for another manufacturer's JVM.</p> <p>The strings for this error message are contained in PRC files named JavaVMCheck_<llCC>.prc, where <llCC> stands for the localization code. You can find the strings for this error message in the directory on your development computer where you installed Java Technology for Palm OS Garnet, in the /JVM/ARM4T directory.</p>
Please ensure that IBM's WebSphere Everyplace Micro Environment Java VM is installed.	This error message appears if IBM's WEME JVM is not present on the device. It also automatically appears after the error message "This Java VM is not compatible with your device" is displayed.

Chapter 3. Application Management System (AMS)

Overview

This runtime provides an **Application Management System** (AMS) with over-the-air (OTA) provisioning support as specified in the MIDP 2.0 JSR specification.

The Application Management System has several purposes:

- Present the user with a list of installed MIDlet suites. The user can then select one to update, delete or run.
- Handle the conversion and installation of the JAR file into the Palm PRC format.
- Using the Exchange Manager, AMS will register as the handler for the following mime-types and file extensions:
 - `text/vnd.sun.j2me.app-descriptor`
 - `application/java-archive`
 - `.jad`
 - `.jar`

To launch AMS, tap the **IBM Java VM** application in the Launcher.

User Interface

There are four main screens in AMS:

1. MIDlet List screen

The base screen of the AMS user interface is the MIDlet List screen. When AMS is launched for the first time, the list is empty and the ticker displays the text `Please select 'Install' to install an application.`

As applications are installed, the MIDlet Suite list is populated. To launch an installed MIDlet, select it from the list and tap **Launch** or select the choice from the menu.

2. Installation screen (titled **AMS Install**)

After selecting the **Install** command, the user can enter a complete URL to a JAD or a JAR file. After entering a URL, the user selects **Ok** to begin the download and installation process.

Note: You may need to give permission to install the MIDlet suite if it does not come from a trusted location.

3. **MIDlet Details** screen

After a MIDlet suite is installed, you can select it in the MIDlet list and choose **Manage** command from the menu. This will display the **MIDlet Details** screen, which presents all the required meta-information about the MIDlet suite.

4. MIDlet Suite Permissions screen (titled **Permission Interaction**)

Permissions can be modified by selecting a MIDlet suite in the list and choosing the **Permissions** menu option. A list of available permissions will be displayed. Once a permission is selected, the user can view and edit the permissions granted to the MIDlet suite.

Chapter 4. JarToPrc

Overview

The **JarToPrc** application enables you to convert Java applications written to the **Mobile Information Device Profile** (MIDP) specification into Palm OS application files (PRCs). The resulting Palm OS application can then be installed, run, and deleted like any other Palm OS application.

Note: JarToPrc is currently available for the Windows platform only.

JarToPrc has both a graphical interface and a command line interface. The graphical interface of **JarToPrc** is straightforward and easy to use interactively. The command line interface is ideal for integration with a non-interactive build script or with an integrated development environment (IDE). The two interfaces have the same functional capabilities.

There are two versions of the **JarToPrc** executable:

- **jartoprc.exe** - This executable supports the command line interface
- **jartoprc_w.exe** - This executable supports the graphical interface

JarToPrc is located in the directory where you installed Java Technology for Palm OS Garnet, in `\Tools\bin`.

Using the JarToPrc Graphical Interface

JarToPrc requires either a Java application descriptor (JAD) or a MIDlet suite archive (JAR). The utility will respect the inputs you provide, thereby giving you the opportunity to override defaults. If you specify a value, that value will be used even if contrary indications are found elsewhere.

There are two ways to satisfy these requirements:

1. Specify the JAD file or URL by:
 - Entering a URL or complete directory path to the desired file.
 - Clicking **Browse** to the right of the **JAD** field to navigate to and select your JAD file.
 - Dragging and dropping a JAD file on the **JarToPrc** window.

Note: The JAD file must contain a valid **MIDlet-Jar-URL** attribute. Both absolute and relative URLs are supported. Since **JarToPrc** will access the URL to retrieve the JAR file, the URL must be valid and live.

Some examples of valid MIDlet-Jar-URL attributes include:

- MIDlet-Jar-URL: `http://localhost:8080/midlets/Solitaire.jar`

- MIDlet-Jar-URL: Solitaire.jar
- MIDlet-Jar-URL: jars/Solitaire.jar

Once a JAD file is read, its contents are displayed in the remaining fields and in the JAD field's hover help.

2. Specify a JAR file by:

- Entering a URL or complete directory path to the desired file.
- Clicking **Browse** (to the right of the JAR field) to navigate to and select your JAR file.

Note: The JAR file must contain a valid manifest file. If a JAR file contains a JAD file, the JAD is ignored.

Once a JAR file is read, its manifest is displayed in the remaining fields and in the JAR field's hover help.

Other Field Descriptions

- **Application Name** - Valid JAD and JAR manifest files must contain a **MIDlet-Name** attribute. If this attribute is found in the JAD or manifest file, its value is used as the Palm OS application name. If you wish to override this name, you may enter your preferred name in this field.
- **Version Number** - Valid JAD and JAR manifest files must contain a **MIDlet-Version** attribute. If this attribute is found in the JAD or manifest file, its value is used as the version number of your Palm OS application. If you wish to override this value, you may enter the new value in this field. A valid MIDlet version number is 0-99.0-99[.0-99]. A few examples are 1.0, 1.2.1, and 99.99.99.
- **Large Icon File** and **Small Icon File** - You may specify a custom set of icons for your application by entering in these fields the names of files containing the icons in BMP, GIF, JPG, or PNG formats. The **Large Icon** is used in the Launcher's **Icon** view, while the **Small Icon** is used in the Launcher's **List** view. The image is displayed in the field's hover help.

Icons can also be specified in the JAD and/or JAR manifest.

– MIDlet-Icon attribute will display in the Large Icon field.

– Palm-MIDlet-List-Icon attribute will display in the Small Icon field.

Note: The icons must be in PNG format and located inside the JAR file. If either icon is left unspecified, the default application icon is used.

- **Splash Screen** - You may specify a custom splash screen for your application by entering the name of the bitmap resource. See "Creating a Splash Screen" for more details.
- **Creator ID** - Palm OS requires that every program have an associated four-character Creator ID. You may specify any four-character string in this field, but you should use one you have registered with PalmSource. If you do not specify

an ID, **JarToPrc** will generate one for you. A list of the Creator IDs that **JarToPrc** has generated—along with their associated application names—is kept in a file named **data.j2p**. You can open this file in a text editor to view the list. Please note that if you create a program and have the ID generated and later create a program that uses this same Creator ID, this file will not be updated to reflect the new application name.

Note: If **JarToPrc** is for any reason unable to automatically generate the Creator ID, it uses "----" as the ID. This will not disrupt the creation of the PRC but it does indicate a problem with the **data.j2p** file.

Button Descriptions

- **Generate PRC** - After populating the required and desired fields, press **Generate PRC** to generate the PRC file. When complete, the status bar displays the location of the new PRC. You can browse to this location by selecting the **File** menu and then **Browse to PRC...** or by pressing **Ctrl+B**.
The PRC file is created in the same location as the original local JAD or JAR file. If the JAD or JAR file is remote, the PRC file is created in the directory referenced in your Windows user's TMP variable (typically, C:\TEMP).
 - **Warnings** - Minor errors encountered during the PRC generation process are displayed if this button is pressed. It will not be active if no warnings are present.
 - **Exit** - When you are finished packaging Java applications, press **Exit** to close **JarToPrc**.
-

Menu Item Descriptions

Note: Keyboard shortcuts may be different based on your computer's regional settings.

- **File Menu** Item Descriptions
 - Browse to PRC Location (Keyboard shortcut: **Ctrl+B**) - Opens a directory to the location of the generated PRC file. This selection is only active when a valid PRC has been created.
 - Reset form (Keyboard shortcut: **Ctrl+R**) - Clears the fields and status bar but does not reset the Options menu preferences.
 - Exit (Keyboard shortcut: none) - Closes the application.
- **Options Menu** Item Descriptions
 - Enable High Resolution Mode (Keyboard shortcut: **Ctrl+E**) - If this option is enabled, the generated PRC will be compatible on higher density displays (greater than 160 x 160 pixels). This option is enabled by using the `vmOption:-DLcduiHighResolution=true`.

– Send Debug Information to Memory Card (Keyboard shortcut: **Ctrl+D**) - If this option is enabled, any debug information reported by your generated PRC will be stored on your device's SD or MMC card. This option also includes standard out and standard error.

Note: This option is enabled by using the `vmOption: -XstdoutOnVFS`.

– Generate Automatically (Keyboard shortcut: **Ctrl+G**) - After a valid JAD file or JAR file is selected, **JarToPrc** will generate the PRC. This is especially useful when dragging and dropping multiple JAD (or JAR) files.

– Install Automatically (Keyboard shortcut: **Ctrl+I**) - This option automatically sends the generated PRC to the Palm OS application installer (**Instapp.exe**). The installer will run, showing you that your new PRC has been queued for installation. If you HotSync more than one handheld to your workstation, be sure to select the intended device in the **User** field of the installer's dialog. Press **OK** to close the dialog and then HotSync your Palm Powered device.

- **Help Menu Item Descriptions**

- Using this Toolkit (Keyboard shortcut: **Ctrl+H**) - Displays basic instructions on how to use **JarToPrc**.

- About this Toolkit (Keyboard shortcut: none) - Displays version and copyright information.

Using JarToPrc at the Command Line

To see the list of options for this mode, open a command shell and change to the `\Tools\bin` subdirectory in the directory where you installed Java Technology for Palm OS Garnet. Then run **jartoprc.exe** with the **-help** argument. The options line up one-for-one with the options available in the graphical interface. See "Using the JarToPrc Graphical Interface" for details on individual options.

Creating a Splash Screen

Palm OS resource files can be added to your application by using a resource compiler. The instructions below will assume the use of **PilRC**, a popular Palm OS resource compiler. You can download the latest version of PilRC from <http://pilrc.sourceforge.net/>.

1. Find or create a bitmap file that you wish to use (e.g. **splashscreen.bmp**).
2. Create the input file named **splashscreen.rcp** to describe the splash screen resource.
3. Add the following line to **splashscreen.rcp**:

```
BITMAPCOLOR ID 2002 "splashscreen.bmp"
```

Note: The ID must be "2002" in order for the splash screen to be displayed by the J9 runtime.

4. In a command window, run this command: `pillrc splashscreen.rcp`
You should now have a file named **Tbmp07d2.bin** that can be used as your application's splash screen.

Appendix. Additional information

Further Information

If you need more information or have questions about our product:

In the United States and Canada, call 1-800-IBM-CALL (1-800-426-2255)

In all other countries, you can submit your questions on the web at:

<http://www.ibm.com/software/pervasive/support/questions.shtml>

You might find helpful information at the following websites or newsgroup:

- <http://www.ibm.com/software/wireless/wme/>
- <http://www.ibm.com/software/wireless/wce/>
- <http://www.ibm.com/embedded>
- newsgroup: ibm.software.websphere.studio.device-developer

Notices

This information was developed for products and services offered in the U.S.A. IBM[®] might not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM might have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:
INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the information. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this information at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
Department LZKS
11400 Burnet Road
Austin, TX 78758
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of

performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

All IBM prices shown are IBM's suggested retail prices, are current and are subject to change without notice. Dealer prices may vary.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. You may copy, modify, and distribute these sample programs in any form without payment to IBM for the purposes of developing, using, marketing, or distributing application programs conforming to IBM's application programming interfaces.

You may copy, modify, and distribute these sample programs in any form without payment to IBM for the purposes of developing, using, marketing, or distributing application programs conforming to IBM's application programming interfaces.

Each copy or any portion of these sample programs or any derivative work, must include a copyright notice as follows:

(C) (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs. (C) Copyright IBM Corp. 2004 All rights reserved.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Trademarks

The following terms are trademarks or registered trademarks of International Business Machines Corporation in the United States, or other countries, or both: IBM, WebSphere

PalmSource, the PalmSource logo, HotSync, the HotSync logo, Palm, the Palm logo, the Palm trade dress, Palm Computing, Palm OS, and Palm Powered are trademarks of PalmSource, Inc. or its affiliates.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Microsoft, Windows, Windows NT, Windows Mobile and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

Other company, product or service names may be trademarks or service marks of others.