Pro J2ME Polish

Open Source Wireless
Java Tools Suite

ROBERT VIRKUS

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Pro J2ME Polish: Open Source Wireless Java Tools Suite

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The source code for this book is available to readers at `http://www.apress.com` in the Downloads section.

This book is dedicated to the people who fight against software patents and for a better world.

Contents at a Glance

Contents

Foreword

So, you are a developer, you write applications for mobile devices, and you've been asked by a network operator to get your application working on their list of preferred devices, otherwise they won't deal with you. That all sounds familiar and, initially, it all sounds pretty easy—we are developing applications in Java, and as we all know, Java is platform independent and we just "write once, run anywhere."

OK, now that you've picked yourself up off the floor and stopped laughing after that statement, you've probably realized the big deal about writing mobile applications is that there are so many little differences between devices and the Java implementations on those devices that it's a mammoth task to support many devices.

How do we get around these "inconsistencies"?

How do we avoid having device-specific source code for everything we write?

These are among the *really* important questions for mobile application developers. When I started writing applications for mobile devices, we were still learning about these inconsistencies and still finding things that made us want to tear our hair out.

I would like to suggest that your first port of call should always be the API specifications. You see, that's why they are there: to show you exactly what *should* happen and how you *should* handle things—but as you know, if you sit a thousand monkeys in front of typewriters, you certainly don't end up with the works of Shakespeare. Well, the same applies here. If you give all the device manufacturers the specifications for the application management software, you certainly can't expect them to work in exactly the same way. (Now, I'm not saying it's all their fault—I mean, it's not always exactly the same hardware, and miracles don't happen.)

So, how *do* we get around these inconsistencies? Well, that's where this book and J2ME Polish come in. I recommend going straight to the "Programming in the Real World" section and having a quick read through it. Then you should have a better appreciation for the problems at hand, and you'll realize that you need some help to control the mass of workarounds that you're likely to need. Of course, that help comes in the form of J2ME Polish, and this book explains how to use it.

As I mentioned earlier, when I started writing mobile device applications, we were still figuring out the problems, and to a certain extent we still are. I used to have my own custom Ant scripts for individual builds of an application for individual devices. I just looked at one of the device benchmark sites and it already has results for over 400 devices! I certainly don't want to have 400 versions of source code for one application. I first came across J2ME Polish when I was looking for a better way to implement my build system, and since then I've found it to be an extremely useful addition to my entire development process. Tools like this are what will keep us developing applications in a reasonable amount of time for multiple devices, which keeps the network operators and publishers happy—and you want to keep them happy, because this mobile applications industry is one of the fastest-growing industries in the world.

So if you want to be successful, keep your knowledge up to date, keep your eye on the ball, and keep enjoying the ride. J2ME Polish keeps developers happy and able to make everything work.

Welcome to your world—make it a good one!

Kirk Bateman
Managing Director/Lead Developer
Synaptic Technologies Limited (UK)

About the Author

ROBERT VIRKUS is the architect and lead programmer for the open source project J2ME Polish. He is an internationally recognized J2ME expert and is a member of Mobile Solutions Group, Bremen, Germany.

After studying law and computer science in Bremen, Germany, and Sheffield, England, Robert began working in the mobile industry in 1999. He followed WAP and J2ME from their very beginnings and developed large-scale mobile betting applications.

In 2003, he founded Enough Software, the company behind J2ME Polish.

In his spare time, Robert enjoys the company of his girlfriend, Jinny, and his dog, Benny. Other spare-time favorites are going to concerts of soul, ska, and punk-rock bands, and playing around with old computers like Atari 400, Commodore 8296, and MCS Alpha 1.

About the Technical Reviewer

THOMAS KRAFT is a managing director of Synyx, a company located in Karlsruhe, Germany. Synyx specializes in developing business solutions based on open source frameworks. Thomas has many years of experience developing Java applications, with a focus on business solutions and J2ME applications. He is also an expert in the open source content management system OpenCms. Thomas has written several articles about J2ME developing, mostly GUI related. Thomas resides in the beautiful city of Karlsruhe and can be reached via e-mail at *kraft@synyx.de*.

Acknowledgments

Writing this book was hard work, but also a lot of fun. Thanks to everyone who made it possible, especially Jinny Verdonck, Thomas Kraft, Ricky Nkrumah, Kirk Bateman, and the whole Apress crew. A big thanks goes also to the community that continuously extends and improves J2ME Polish!

Introduction

This book introduces J2ME Polish, a collection of open source tools for creating "polished" wireless Java applications. J2ME Polish is best known for its build tools and its user interface—but more about that later. In this book, you will learn how to use J2ME Polish to your advantage. You will also learn about the challenges you will encounter in the real world of wireless Java programming and how J2ME Polish can help you to master these problems, by circumventing device bugs, integrating the best matching resources, and more.

The first part of this book helps you to install and integrate J2ME Polish in your development system. The second part of the book deals with the various tools included in J2ME Polish, including the following:

- Device database (Chapter 6)
- Build tools (Chapter 7)
- Preprocessor (Chapter 8)
- Logging framework (Chapter 9)
- Utilities (Chapter 10)
- Game engine (Chapter 11)
- User interface (Chapter 12)

You can also extend J2ME Polish in almost every aspect, which I discuss in Chapter 13. In the third and last part of the book, you will learn about differences between J2ME devices, known issues, and typical challenges of J2ME programming in the real world.

In this book, I assume that you are already familiar with J2ME development, so you should know what a MIDlet is, what the Mobile Media API is used for, and so forth. This book will not teach J2ME programming; instead, it focuses on how you can get the most out of your programming.

Please feel free to get in touch with me at *robert@enough.de*.

PART 1

Getting Ready

Creating mobile Java applications is great fun. Use this part for learning how to install J2ME Polish and other necessary or useful tools for J2ME programming. If you already have J2ME Polish up and running, I suggest that you skim through this part, so you don't miss out on the additional tips and tricks.

CHAPTER 1

Quick Setup Guide

In this chapter:

- Download J2ME Polish (*http://www.j2mepolish.org*).
- Install J2ME Polish (double-click the downloaded file or call `java -jar j2mepolish-[version].jar`).
- Check out the sample applications (call `ant` or `ant test j2mepolish` in the *samples/menu* or *samples/roadrunner* directory), if you have Ant and the Wireless Toolkit (WTK) installed.

About two years ago, I was working on yet another mobile application and experienced the agony of J2ME development: the application worked fine on the emulators, but not in the crude real world. Then it worked on one device, but not another. After a while, my coworkers and I managed to get it running on all our target devices (five different handsets), but we had to split up the application into a different branch for each device we targeted. Then we needed to incorporate any changes into each branch. What a headache! We used way too much time coding device adjustments—more time than we devoted to the actual application itself. Being good programmers, we managed it in the end, of course. Then we presented our finished project. Although the application itself was regarded as good, the design was utterly rejected. So, we had to redo the code, once again in every branch.

This scenario probably sounds familiar to you. And, as a programmer, you probably wondered, as I did, if it really had to be that way. Why should you create yet another application branch just for incorporating device-specific adjustments? Why should you do these adjustments in the first place? And last, but not least, why should you, as a programmer, be forced to design the user interface of the application yourself? These are the types of problems that J2ME Polish was designed to address.

In this chapter, you'll get a quick start with J2ME Polish. Here, I assume that you have set up Ant and the Wireless Toolkit already. Please refer to the following chapters for a detailed step-by-step guide.

Installing J2ME Polish

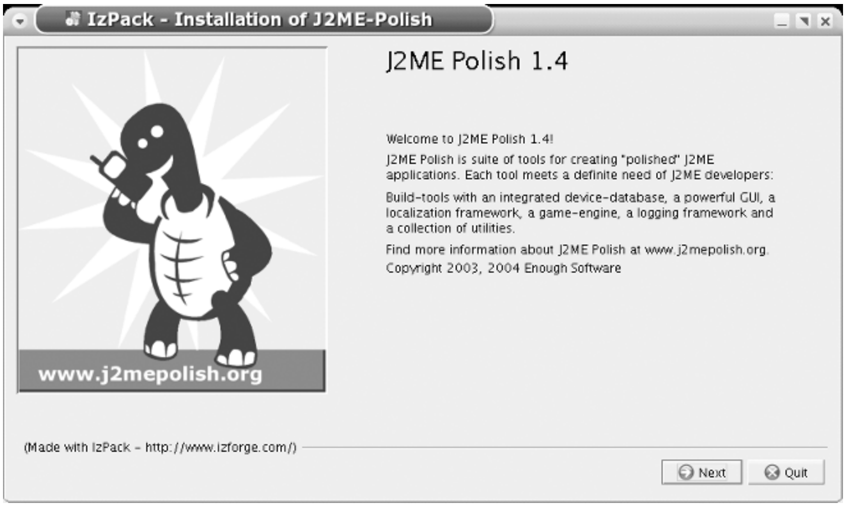
The installation of J2ME Polish is done in three distinct phases:

1. Install the Java Software Development Kit (SDK) 1.4 or higher, the Wireless Toolkit (WTK), and a Java integrated development environment (IDE) or Ant.
2. Install J2ME Polish.
3. Integrate J2ME Polish into your favorite IDE.

You can download J2ME Polish from *http://www.j2mepolish.org* and start the installation by either double-clicking the downloaded *.jar* file or by calling

```
java -jar j2mepolish-[version].jar
```

from the command line. (Sanity note: Please substitute the [*version*] with the actual version number of J2ME Polish.) You should now be presented with the screen similar to Figure 1-1.



J2ME Polish 1.4

Welcome to J2ME Polish 1.4!

J2ME Polish is suite of tools for creating "polished" J2ME applications. Each tool meets a definite need of J2ME developers:

Build-tools with an integrated device-database, a powerful GUI, a localization framework, a game-engine, a logging framework and a collection of utilities.

Find more information about J2ME Polish at www.j2mepolish.org.

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IzPack - Installation of J2ME-Polish
www.j2mepolish.org
(Made with IzPack - http://www.izforge.com/)
Next
Quit

Figure 1-1. *Installing J2ME Polish*

Launching the Sample Applications

After you have installed J2ME Polish to any directory, which I refer to as *${polish.home}*, you can check out the sample applications, which can be found in the *samples* directory. Change (`cd`) to one of the directories, such as *samples/menu*, and call Ant from the command line:

```
ant test j2mepolish
```

The default WTK emulator should pop up when J2ME Polish has finished processing the application, as shown in Figure 1-2.

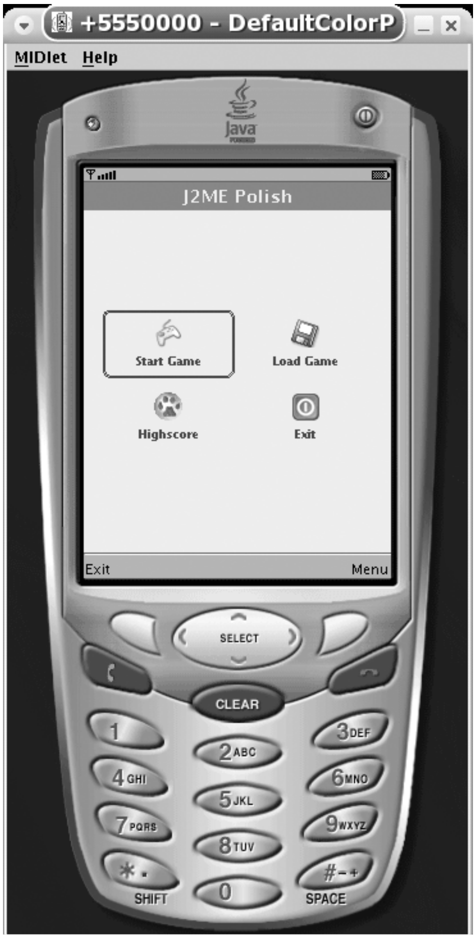

Figure 1-2. *The sample menu application in the WTK emulator*

If you see any error messages, most likely your Ant setup or your path to the WTK is not correct. See the "Troubleshooting Sample Application Errors" section in Chapter 3 for help.

You can also start J2ME Polish from within any Java IDE. You need to mount the sample project, right-click the *build.xml* file within it, and select Run Ant, Execute, or a similar menu command to launch J2ME Polish. If you want to start the emulator, make sure that you have selected the `test` target first, followed by the `j2mepolish` target.

Exploring the Sample Applications

If you wonder how the sample applications are made, you can take a peek at the *build.xml* file in either the *samples/menu* or *samples/roadrunner* directory. This standard Ant file controls the build process and uses the `<j2mepolish>` task for creating the application.

If you take a look at the code itself in the *src* directory of the Menu application, you will find a very simple application that uses a `javax.microedition.lcdui.List` for displaying a menu. Open the *resources/polish.css* file to find out how this application was designed. This file contains the design information in a human-readable format. To gain your first experience with J2ME Polish, change the `fontColor` in the `colors` section on the top from `rgb( 30, 85, 86 )` to `red`, and then restart J2ME Polish by calling `ant test j2mepolish`!

Congratulations, you are now ready to rumble!

Summary

This chapter explained the necessary steps for installing and using J2ME Polish in a very condensed manner. The following chapters describe how to install the other tools you need to run J2ME Polish, detail the J2ME Polish installation steps, recommend some additional tools that you might find helpful, and show how you can tightly integrate J2ME Polish into your favorite IDE.

CHAPTER 2

Installing the Prerequisites

In this chapter:

- Install the Java SDK (*http://java.sun.com/j2se*).
- Install the WTK (*http://java.sun.com/products/j2mewtoolkit*, or the Mac OS X version from *http://mpowers.net/midp-osx*).
- Obtain an IDE (such as Eclipse, *http://www.eclipse.org*), if you don't already have one.
- Install Ant (*http://ant.apache.org*).
- Obtain device emulators (from vendors, such as *http://forum.nokia.com*, *http://motocoder.com*, and *http://developer.samsungmobile.com*).

J2ME Polish relies on several open-source and free tools. You need to have the Java 2 Software Development Kit (SDK), the Wireless Toolkit (WTK), and Ant—either stand-alone or as part of your integrated development environment (IDE). You should also install device emulators from several vendors for testing your applications. Even though these are not strictly needed for developing great applications, they make your programming life a good deal easier. This chapter covers the installation of these tools.

The Java 2 SDK

J2ME Polish is a solution for creating wireless Java applications. So, it's only natural that you need Java itself as well. Java comes in three editions for catering to different needs:

- The Java 2 Standard Edition (J2SE) runs on your desktop computer and is needed by J2ME Polish for generating the actual mobile applications.
- The Java 2 Micro Edition (J2ME) runs on mobile phones, but also on television set-top boxes, personal digital assistants (PDAs), and embedded devices.
- The Java 2 Enterprise Edition (J2EE) runs on servers and is used for powering web applications or delivering mobile applications over the air.

If you do not have J2SE installed, please download the latest 1.4.*x* version now from *http://java.sun.com/j2se* and install it. You can also use Java 5.0 (1.5.*x*), but many mobile emulators require J2SE 1.4, so I recommend that you to stick to the 1.4 branch for now.

Tip See *Beginning J2ME: From Novice to Professional, Third Edition*, by Jonathan Knudsen (Apress, 2005) for a great introduction to J2ME development.

The Wireless Toolkit

The Wireless Toolkit (WTK) provides not only a generic emulator of a Java-enabled mobile phone, but also a preverification tool, which you need to make a J2ME application ready for deployment.

The installation is straightforward once you have downloaded it from *http://java.sun.com/products/j2mewtoolkit*. Just install it into the default directory, and you're ready to go.

WTK Versions

Several versions of the WTK are available, notably the old 1.0.4 version for Mobile Information Device Profile (MIDP) 1.0 phones and the latest version from the 2.*x* branch. Usually, you should go with the latest version, but you can also use the 1.0.4 version if you prefer it. The main difference is that you need to compile the code to Java 1.1 when you use the older WTK, whereas Java 1.2 is used by default when WTK 2.*x* is available. In theory, this shouldn't make a difference, but sometimes you might encounter really mind-boggling bugs that seem to be linked to overloading problems. In such cases, the `javac` target can make a difference, so just keep in mind that you can change it when you use WTK 2.*x*, but not when you use WTK 1.0.4.

WTK for Mac OS X

The standard WTK is not available for Mac OS X, but you can use a port that is provided by mpowers LLC at *http://mpowers.net/midp-osx*. To do so, you need to have X11 installed as well, which you can obtain at *http://www.apple.com/macosx/x11*.

The WTK itself is delivered as a disc image, which is mounted automatically when you double-click it. Just install it by dragging the mounted disc image onto the desktop first, and then into the *Applications* folder. If you don't have administrator's rights, you can move the disc image into the *Applications* folder within your home folder (create that folder if necessary).

IDE

In case you don't use an IDE yet, I recommend the Eclipse IDE, which is available for free from *http://www.eclipse.org*. Eclipse provides a modular and powerful environment based on plug-ins. J2ME Polish also brings along some Eclipse plug-ins that help you to write preprocessing code, manage emulators, and so on. Chapter 3 discusses the possible integration in more detail. Refer to *http://eclipse-tutorial.dev.java.net/* to learn more about developing Java programs with Eclipse.

Other popular IDEs include NetBeans (*http://www.netbeans.org/*) and JBuilder (*http://www.borland.com/jbuilder/*).

Ant

Ant forms the well-established standard for building any Java applications. You can use Ant from the command line or from within any serious IDE, such as Eclipse, NetBeans, JBuilder, or IDEA.

If you want to use Ant from the command line, you should download the binary distribution from *http://ant.apache.org* and extract it. You then need to adjust your `PATH` environment variable, so that the `ant` command from the *bin* directory can be found.

If you have installed Ant into *C:\tools\ant,* enter the following command on your Windows command line (or your shell script):

```
SET PATH=%PATH%;C:\tools\ant\bin
```

You can change the `PATH` variable permanently in the System Settings of Windows (Start ➤ Settings ➤ Control Center ➤ System ➤ Advanced ➤ Environment Variables).

Also set the `JAVA_HOME` environment variable, which needs to point to the installation directory of the Java 2 SDK:

```
SET JAVA_HOME=C:\j2sdk1.4.2_06
```

Under Unix/Linux/Mac OS X, use the `export` command instead of the `SET` command:

```
export PATH=$PATH:/home/user/tools/ant/bin
export JAVA_HOME=/opt/java
```

You can set any environment variable automatically by editing the *.bashrc* script, found in your home folder.

Now you should be able to test your Ant setup by querying the installed version:

```
> ant -version
Apache Ant version 1.6.2 compiled on September 11 2004
```

■**Note** Please refer to the "Ant Crash Course" section in Chapter 7 for a guide to getting started with Ant. It's not that difficult!

Vendor-Specific Emulators

Emulators let you check out the look and feel of an application, and sometimes even help you find bugs. Some emulators are little more than the standard WTK with another skin, but some do reproduce the actual behavior of the device quite well.

■**Caution** Beware of the "But it works in the emulator" trap! Never rely on an emulator. Test as early and as often as possible on the real device.

You can usually download emulators directly from the vendors' web sites, such as listed in Table 2-1. Some vendors provide additional services, such as discussion forums and the like. Most sites require you to register before you can download any resources. Sometimes, carriers and operating system developers provide emulators too. Most emulators are available for Windows only; some are available for Linux as well. For Mac OS X, you can use the mpowerplayer SDK (*http://mpowerplayer.com*).

Table 2-1. *Emulator Vendors*

Vendor	URL	Remarks
Nokia	*http://forum.nokia.com*	Look for Java tools and SDKs for getting several emulators. Most common are the Series 60 and the Series 40 developer kits.
Motorola	*http://motocoder.com*	The Motorola SDK contains several emulators for most J2ME-enabled devices. Go to Tools ➤ SDK to download the SDK.
Samsung	*http://developer.samsungmobile.com*	The Samsung site supports only Microsoft Internet Explorer 6.0 and above. KDE's Konqueror also works, but Mozilla-based browsers cannot be used. Check out the Resources section for downloading the SDKs.
Sony Ericsson	*http://developer.sonyericsson.com*	You can download the SDK from Docs & Tools ➤ Java.
Siemens	*http://communication-market.siemens.de/portal/main.aspx?pid=1*	Download the toolkit by choosing Resources ➤ Tools.
Symbian	*http://www.symbian.com/developer*	Download the emulators from the SDKs section.

Summary

In this chapter, we looked at the various basic tools that you need in order to use J2ME Polish. In the next chapter, you will learn how to install and set up J2ME Polish itself, so that you can start developing professional mobile applications!

CHAPTER 3

Installing J2ME Polish

In this chapter:

- Get the J2ME Polish installer (*http://www.j2mepolish.org*).
- Invoke the installer (by calling `java -jar j2mepolish-[`*`version`*`].jar`).
- Use the provided sample applications.

Thanks to the graphical installer, the setup of J2ME Polish is relatively painless. This chapter describes the installation of J2ME Polish, as well as some third-party tools that you can use with J2ME Polish.

J2ME Polish Installation Guide

You can download the J2ME Polish installer from *http://www.j2mepolish.org*. Just select Download from the main page.

Tip While you're at *http://www.j2mepolish.org*, you can also subscribe to the mailing lists by selecting Discussion, then Mailing Lists. The polish-users list provides help and general discussions about J2ME Polish. The polish-announce list keeps you updated about new releases.

You can invoke the installer either by double-clicking the downloaded file or by calling `java -jar j2mepolish-[`*`version`*`].jar` from the command line. You need to substitute the `[`*`version`*`]` part with the real version number, such as `j2mepolish-1.4.1.jar`. Now the installer should start.

The installer is a simple wizard that needs your input for some steps. It presents three critical screens: license selection, WTK directory selection, and component selection.

License Selection

The license selection screen, shown in Figure 3-1, asks you to decide which license you want to use. The license will be included in the *build.xml* files, which control the actual build process. So, you can change the license at any time by modifying these files.