

JAVA™ DEVELOPER'S JOURNAL

The World's Leading Java Resource

January 2003 Volume:8 Issue:1

JAVADEVELOPERSJOURNAL.COM



Conference: January 21-24, 2003
Expo: January 22-24, 2003
www.linuxworldexpo.com
The Javits Center
New York, NY *see details on page 55*

From the Editor

Alan Williamson pg. 5

Java & Linux

A Marriage Made in Heaven
pg. 6

TCO for Linux

...and J2EE Projects pg. 8

60 Linux Vendors

Life Is About Choices pg. 26

Career Opportunities

Bill Baloglu & Billy Palmieri
pg. 72



*How to use Linux to develop
& deploy Java applications*

*written by Calvin Austin
page 34*

Linux Fundamentals: Tools of the Trade
Programming Java in Linux - a basic tour

Feature: Managing HTTP
Create a well-designed...

Feature: The New PDA Profile
The right tool for J2ME developers

Product Review: exe4j
by ej-technologies - a solid piece of software

Interview: JDJ Asks ...Sun on Java
An exclusive chance to find out what's going on at Sun

Cubist Threads: '(Frozen)'
A snow-packed Wyoming highway adventure

Ian McFarland

28

Jim Van Peurse

42

Jim Keogh

46

Jan Boesenberg

56

58

Blair Wyman

74

SPECIAL OFFER! **WEB SERVICES EDGE 2003 EAST** **SAVE \$400**
INTERNATIONAL WEB SERVICES CONFERENCE & EXPO
8 PAGE CONFERENCE
INSERT PAGE 63

RETAILERS PLEASE DISPLAY UNTIL MARCH 31, 2003

\$5.99US \$6.99CAN

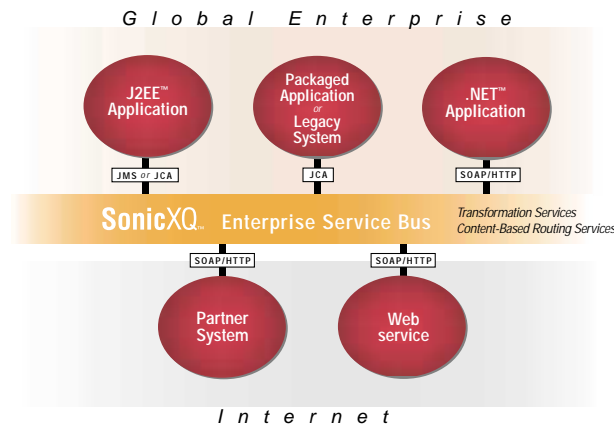


SYS-CON MEDIA

Everybody's focused on exposing applications as Web services while letting someone else figure out how to connect them. We're that someone else.

Introducing **SonicXQ**TM

Integrate with ease, extend at will.TM



Most companies are focused on exposing individual applications as Web services, but haven't yet considered how to effectively integrate or manage them. And that's no small task.

SonicXQ is the first product to deliver on the vision of the Enterprise Service Bus: a standards-based, service-oriented architecture that reliably and securely integrates enterprise applications through Web services and JCA technologies. SonicXQ includes configurable XML processing

services that allow applications and business partners to easily interact over the SonicXQ bus, eliminating the need for point-to-point integrations and the expensive centralized solutions that implement them.

And because SonicXQ is built upon the proven SonicMQ[®] messaging backbone, it provides end-to-end reliability and comprehensive security between services. Our patent-pending Dynamic Routing ArchitectureTM ensures that

Web services and distributed processes can scale to meet the demands of today's global enterprises.

Capitalize on the promise of Web services right now with SonicXQ. After all, what good is a Web service if it's an island unto itself?



sonic
SOFTWARETM
www.SonicSoftware.com/JDJ

their installer tool

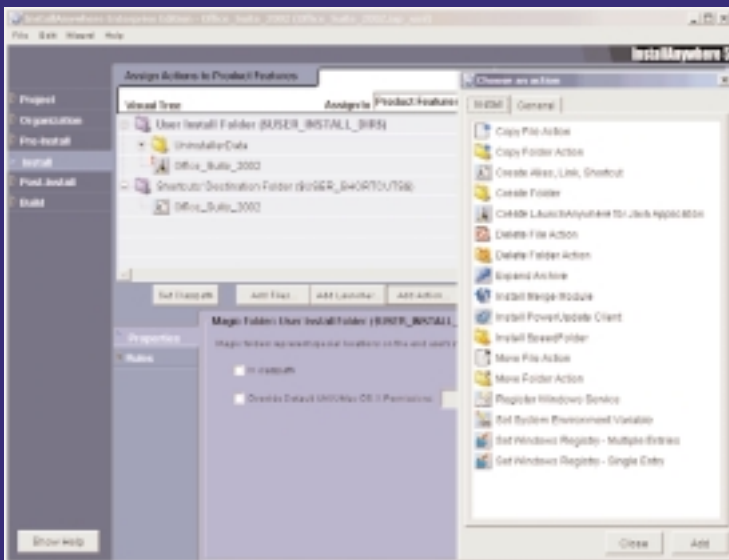


our installer tool

Installer letting you down? Can't get your software out the door because those other multi-platform guys say that you need to take a seminar before you can even use their installer tool? Creating installers doesn't have to be difficult. InstallAnywhere makes it child's play to create masterful installers on the fly with our powerful, intuitive, task-based Advanced Designer.

Our designer handles platform-specific actions intelligently, allowing you to focus on installer design, without worrying about how your installer will function on different operating systems. And, we save you time and money by speeding you through your multi-platform deployment. We're faster than the competition – you can create a simple installer in just five minutes flat. And, we're better too – with more built-in functionality so you don't have to waste time writing tedious code to do the things that are built right into InstallAnywhere.

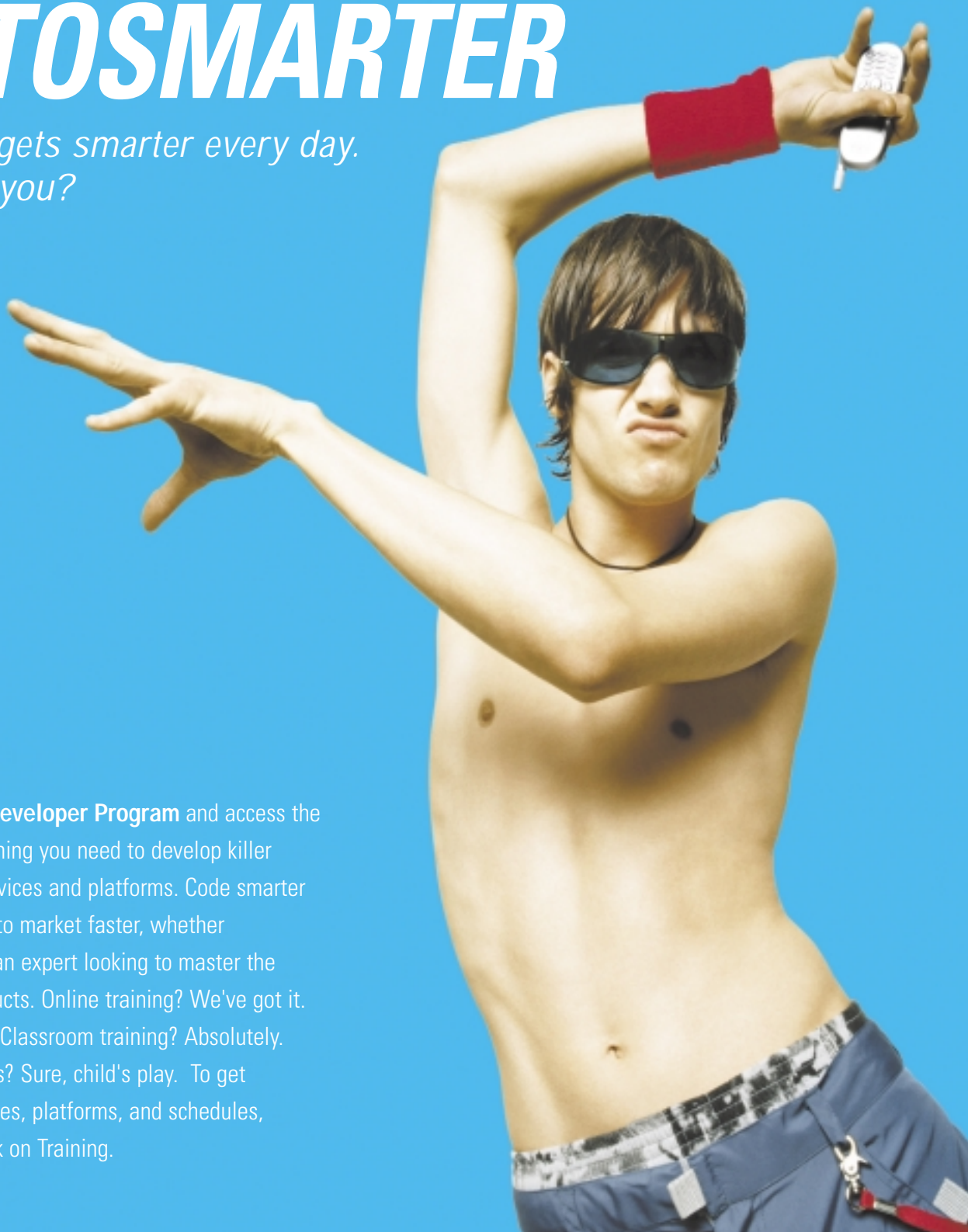
Pull the trigger. Give yourself a lift. Download a FREE fully functional trial version today at www.ZeroG.com and see for yourself why InstallAnywhere is the world's most powerful multi-platform installer.



 **InstallAnywhere**
Zero G
www.ZeroG.com/install

MOTOSMARTER

*Technology gets smarter every day.
What about you?*



Join the **Motorola Developer Program** and access the up-to-the-minute training you need to develop killer apps for Motorola devices and platforms. Code smarter and get applications to market faster, whether you're a beginner or an expert looking to master the latest Motorola products. Online training? We've got it. Onsite training? Yep. Classroom training? Absolutely. J2ME™, Java™, tools? Sure, child's play. To get specifics on class times, platforms, and schedules, visit our site and click on Training.

>> **Join today!** Visit www.motorola.com/developers/wireless

For a limited time, MDP is offering free, self-paced, online training for all members.



MOTOROLA
intelligence everywhere™

INTERNATIONAL ADVISORY BOARD

CALVIN AUSTIN (Lead Software Engineer, J2SE Linux Project, Sun Microsystems)
 JAMES DUNCAN DAVIDSON (JavaServlet API/JMP API, Sun Microsystems)
 JASON HUNTER (Senior Technologist, CollabNet)
 JON S. STEVENS (Apache Software Foundation)
 BILL ROTH (Group Product Manager, Sun Microsystems)
 BILL WILLETT (CEO, Programmer's Paradise)
 BLAIR WYMAN (Chief Software Architect IBM Rochester)

EDITORIAL

EDITOR-IN-CHIEF: ALAN WILLIAMSON
 EDITORIAL DIRECTOR: JEREMY GEELAN
 EXECUTIVE EDITOR: NANCY VALENTINE
 J2EE EDITOR: AJIT SAGAR
 J2ME EDITOR: JASON R. BRIGGS
 J2SE EDITOR: JASON BELL
 PRODUCT REVIEW EDITOR: JIM MILBERY
 FOUNDING EDITOR: SEAN RHODY

PRODUCTION

PRODUCTION CONSULTANT: JIM MORGAN
 ASSOCIATE ART DIRECTOR: LOUIS F. CUFFARI
 ASSOCIATE EDITORS: JAMIE MATUSOW
 GAIL SCHULTZ
 JEAN CASSIDY
 JENNIFER STILLEY
 ONLINE EDITOR: LIN GOETZ
 TECHNICAL EDITOR: BAHADIR KARUV, PH.D.

WRITERS IN THIS ISSUE

CALVIN AUSTIN, BILL BALOGLU, JASON BELL, JAN BOESBERG,
 JASON R. BRIGGS, SCOTT HANDY, JIM KEOGH, VLAD KOLAROV,
 MIKE MCCALLISTER, IAN MCFARLAND, BILLY PALMERI, BRIAN RUSSELL,
 AJIT SAGAR, JIM VAN PEURSEM, ALAN WILLIAMSON, BLAIR WYMAN

SUBSCRIPTIONS

FOR SUBSCRIPTIONS AND REQUESTS FOR BULK ORDERS,
 PLEASE SEND YOUR LETTERS TO SUBSCRIPTION DEPARTMENT

SUBSCRIBE@SYS-CON.COM

COVER PRICE: \$5.99/ISSUE

DOMESTIC: \$49.99/YR. (12 ISSUES)

CANADA/MEXICO: \$79.99/YR. OVERSEAS: \$99.99/YR.

(U.S. BANKS OR MONEY ORDERS)

BACK ISSUES: \$10/EA., INTERNATIONAL \$15/EA.

EDITORIAL OFFICES

SYS-CON MEDIA, 135 CHESTNUT RIDGE RD., MONTVALE, NJ 07645
 TELEPHONE: 201 802-3000 FAX: 201 782-9600

JAVA DEVELOPER'S JOURNAL (ISSN#1087-6944) is published monthly
 (12 times a year) for \$49.99 by SYS-CON Publications, Inc.,
 135 Chestnut Ridge Road, Montvale, NJ 07645.

Periodicals postage rates are paid at Montvale, NJ 07645
 and additional mailing offices. POSTMASTER: Send address changes to:
 JAVA DEVELOPER'S JOURNAL, SYS-CON Publications, Inc.,
 135 Chestnut Ridge Road, Montvale, NJ 07645.

© COPYRIGHT

Copyright © 2003 by SYS-CON Publications, Inc. All rights reserved.
 No part of this publication may be reproduced or transmitted in any
 form or by any means, electronic or mechanical, including photocopy or
 any information storage and retrieval system, without written permission.
 For promotional reprints, contact reprint coordinator Carrie Gebert,
 carrieg@sys-con.com. SYS-CON Media and SYS-CON Publications, Inc.,
 reserve the right to revise, republish and authorize its readers
 to use the articles submitted for publication.

Java and Java-based marks are trademarks or registered trademarks of
 Sun Microsystems, Inc., in the United States and other countries. SYS-CON
 Publications, Inc., is independent of Sun Microsystems, Inc. All brand and
 product names used on these pages are trade names, service marks or
 trademarks of their respective companies.



ALAN WILLIAMSON EDITOR-IN-CHIEF

JavaScript! = Java!!!

If you ever questioned the usefulness or power of blogs, let me remove any remaining doubt you may have with this story. I have my own blog, <http://alan.blog-city.com>, and I use it primarily as a public scratchboard, noting thoughts and various observations regarding our industry through the eyes of a Java developer. What I find great about the blog is that it enables others to chip in with their thoughts and ideas. You'll discover that all of us at **JDJ** have blogs you can follow.

Now, I thought we had long passed the stage of always defending Java from the old legacy arguments we were throwing around some five years ago. I was under the impression we had moved on from there and were engaged in more meaningful debates. I was proved wrong this month. The first item that came up on my radar was a press release from a company announcing their joy that they had removed Java from their B2B Web site and how the efficiency and speed of their site was suddenly catapulted forward. This demanded closer inspection. Thank goodness I did; they were talking about JavaScript, not Java!!! Letting out a yelp, I quickly blogged my comments, e-mailed the originator of the press release, and within 30 minutes we had a retraction and an apology for the confusion. My fear was the countless "drones" who would have picked up on this, not read it properly, and used it as fodder for assuming that Java was down and out.

Okay... "calm down, Alan"... I thought to myself, innocent enough mistake, easily made in the excitement of constructing a press release! Rational and technical people wouldn't make this mistake, would they? Well, I was about to be proved wrong again, but this time from a source I didn't expect. While at my sister's I was browsing through the well-known title *Computer Shopper*, (UK edition). This title is seen everywhere, and manages to creep onto the majority of IT

managers' desks due to its large supplier advertising. The editorial in this title has gotten meatier over the years, but you wouldn't particularly buy the magazine because of it.

There was a piece written by Mike James (a well-established *Computer Shopper* writer) regarding Java development. Sadly, the information he was basing all his facts on was at least five years out of date. Such classic hollers as "because it's interpreted it has a tendency to be slow"! Excuse me? It didn't get any better, with major errors regarding the pricing of Java, performance, and his general feel for the language. Remember the piece was not written as an editorial; it was meant to be an informative piece, full of startling facts, not personal opinions. The problem isn't so much that Mike James hasn't a clue what he is talking about when it comes to Java, but the fact that many people in middle management will read this and believe it – thus continues the cycle of stuff and legend.

The question is: What can we do? Many leading Java dignitaries have suggested that we need to form a marketing coalition that will present a clear and united front. I didn't think much of it, believing the language to be strong enough to stand on its merit, but maybe we need to address this. Here at **JDJ** we'll be doing our bit. We're establishing a working group of Java movers and shakers, under the guidance of our newly appointed chairman Joseph Ottinger. Their task: to tackle head-on the issues facing Java in the forthcoming year.

Joseph is a strong personality and should keep things in order; I'm looking forward to working with him on this. We'll report how things are going next month.

Until then, enjoy our Linux focus issue and please check our Calvin's really enlightening article on Linux/Java threads. ☘

AUTHOR BIO

When not answering your e-mails and working on the next issue of JDJ, Alan heads up a small team dubbed the "Thunderbirds of the Java industry," providing on- and offsite rescue for Java projects in trouble. For more information visit www.javaSOS.com. You can also read his blog: <http://alan.blog-city.com>.

alan@sys-con.com



WRITTEN BY
SCOTT HANDY

Java and Linux — A Marriage Made in IT Heaven

Who would have guessed that this duo – Java and Linux – would revitalize the development community and help customers make the move to an open, standards-based approach to computing?

The momentum surrounding Java and Linux is undeniable. In just a few short years, both have grown from grassroots movements to leading topics in CTO offices around the world. The result is that both Java and Linux have support from multiple vendors and support multiple platforms – giving businesses the flexibility required in today's ever-changing marketplace.

As the momentum builds, it's clear that developers go where the action is. Over the last three years Linux has been the fastest-growing server operating system and IDC projects that it will continue to be the fastest growing throughout their projection period.

When Linux first entered the picture, it was mainly used for Web servers and file and print serving. No additional Linux-based applications were required beyond Apache and SAMBA. Over time, businesses recognized the benefits of the operating system and as Linux matured, they expanded the use of the OS to run critical applications, such as e-commerce, accounting, ERP, and CRM.

It was at this phase of Linux adoption that the developer community really started to link Java and Linux together. As businesses demanded more Linux-based applications, developers turned to Java – because of its multiplatform support – to create the apps.

Another critical element that's driving the success of Java and Linux is Eclipse. Eclipse is an open-source development platform that makes it much easier to create tools and applications that work on a number of different operating systems, including Linux. With Eclipse implemented as a Java-based framework, the tools that were built on this technology would not be locked into a particular operating system, which was just what developers wanted.

While it's true that IBM contributed the technology to open source and eclipse.org, it has been broadly adopted by developers

and the tools vendors – including IBM's key competitors. The numbers speak for themselves. In its first year of availability, 175 software vendors have participated in the project and have committed to delivering Eclipse-based tools; there have been more than 2.5 million downloads of the free Eclipse code by developers from around the world. Pretty big numbers and a hot Java-based technology by most anyone's metrics.

While it's impossible to accurately chart the number of Linux-based applications that exist, the number of developers who are just working with IBM software has skyrocketed over the last five months. In that short time, more than 34,000 developers have created over 4,200 Linux-based applications using IBM software. Creating this number of apps in five months – on any technology – is simply amazing.

After taking a close look at these new applications, it quickly registered that all of these new apps were developed using the Eclipse-based WebSphere Studio tools for Linux, a Java tool. Over 56% of these developers said the new applications were created for a Java-based app server that supports Web services.

Of course, this should not be surprising. Whether you talk to Microsoft or the J2EE-based pack, which includes Sun, IBM, Oracle, BEA, and others, everyone agrees – Web services is the direction for new application development. Developers want to create apps that support a standards-based infrastructure that will work with a variety of operating systems. They want an alternative to Windows and .NET. Increasingly, developers are using an Eclipse-based set of tools that supports J2EE and Web services, enabling the deployment of new applications on any operating system, including Linux.

The momentum surrounding Java and Linux represents a huge shift in the IT industry. More and more businesses are making the move to an open, standards-based approach that works across platforms instead of getting locked into a proprietary Windows-centric platform like .NET.

As Forrest Gump would say, Java and Linux “go together like peas and carrots.”

shandy@us.ibm.com

AUTHOR BIO

Scott Handy is director, Linux Software Solutions for the IBM Software Group, and is responsible for Linux activity across IBM's broad portfolio of e-business infrastructure software. Scott has a BS in electrical engineering and computer science from the University of California, Berkeley.

SYS-CON MEDIA

PRESIDENT AND CEO
FUAT A. KIRCAALI fuat@sys-con.com
COO/CFO
MARK HARABEDIAN mark@sys-con.com
VICE PRESIDENT, BUSINESS DEVELOPMENT
GRISHA DAVIDA grisha@sys-con.com

ADVERTISING

SENIOR VICE PRESIDENT, SALES AND MARKETING
CARMEN GONZALEZ carmen@sys-con.com
VICE PRESIDENT, SALES AND MARKETING
MILES SILVERMAN miles@sys-con.com
ADVERTISING SALES DIRECTOR
ROBYN FORMA robyn@sys-con.com
ADVERTISING ACCOUNT MANAGER
MEGAN RING megan@sys-con.com
ASSOCIATE SALES MANAGERS
CARRIE GEBERT carrieg@sys-con.com
KRISTIN KUHNLE kristen@sys-con.com
ALISA CATALANO alisa@sys-con.com

EDITORIAL

EXECUTIVE EDITOR
NANCY VALENTINE nancy@sys-con.com
ASSOCIATE EDITORS
JAMIE MATUSOW jamie@sys-con.com
GAIL SCHULTZ gail@sys-con.com
JEAN CASSIDY jean@sys-con.com
JENNIFER STILLLEY jennifer@sys-con.com
ONLINE EDITOR
LIN GOETZ lin@sys-con.com

PRODUCTION

PRODUCTION CONSULTANT
JIM MORGAN jim@sys-con.com
LEAD DESIGNER
LOUIS F. CUFFARI louis@sys-con.com
ART DIRECTOR
ALEX BOTERO alex@sys-con.com
ASSOCIATE ART DIRECTOR
RICHARD SILVERBERG richards@sys-con.com
ASSISTANT ART DIRECTOR
TAMI BEATY tami@sys-con.com

WEB SERVICES

VICE PRESIDENT, INFORMATION SYSTEMS
ROBERT DIAMOND robert@sys-con.com
WEB DESIGNERS
STEPHEN KILMURRAY stephen@sys-con.com
CHRISTOPHER CROCE chris@sys-con.com

ACCOUNTING

ACCOUNTS RECEIVABLE
KERRI VON ACHEN kerri@sys-con.com
FINANCIAL ANALYST
JOAN LAROSE joan@sys-con.com
ACCOUNTS PAYABLE
BETTY WHITE betty@sys-con.com

SYS-CON EVENTS

PRESIDENT, SYS-CON EVENTS
GRISHA DAVIDA grisha@sys-con.com
CONFERENCE MANAGER
MICHAEL LYNCH mike@sys-con.com
REGIONAL SALES MANAGERS
MICHAEL PESICK michael@sys-con.com
RICHARD ANDERSON richard@sys-con.com

CUSTOMER RELATIONS

CUSTOMER SERVICE REPRESENTATIVE
MARGIE DOWNS margie@sys-con.com
JDJ STORE MANAGER
RACHEL MCGOURAN rachel@sys-con.com



Developing Web Services before WebLogic Workshop.



Developing Web Services after WebLogic Workshop.

If getting dinner via a spear strikes you as less than efficient, you'll appreciate BEA WebLogic Workshop™. This unique development framework eliminates tedious and time-consuming steps, while you build Web services, create new applications and tackle the toughest integration challenges. Plus, you'll have all the support of our dev2dev developer community. To see how BEA WebLogic Workshop can radically simplify your Web services development, download it today at dev2dev.bea.com/useworkshop.



The fastest route to enterprise Web services.



AJIT SAGAR J2EE EDITOR

TCO for Linux and J2EE Projects

A colleague of mine is an easy target for anything that's free. I'm not talking about free from the perspective of "unshackled" or "independent." Rather, I'm talking about the type of free that won't make his wallet thinner. To him anything that looks, tastes, or smells "free" is the most beautiful thing in the world, at least at that moment. As we all know, there's no such thing as free in real life. There is the concept of what's cheap, but cheap is relative.

We all experienced the technology bubble. A couple of years ago, if you wanted to introduce a new product in the market, one of the best strategies was to buy a lot of stuff from third-party vendors, glue it all together, and sell it as a new offering. Buy an OS from here, an app server from there, a content management system from hither, and a commerce server from beyond – and voilà! you had a product. If your internal development team couldn't hack it together, you could always hire high-priced consultants from the same vendor who charged the big bucks for the product, and still deliver to the customer on time. Time was the main factor, not money. The end client was willing to pay for all the OEM-ed products that lay hidden inside your product.

Obviously, all that has changed now. Hence this propensity toward cheaper alternatives and this migration toward open-source software as the only reasonable alternative. Since there is ample synergy between J2EE and Linux environments, the cost of developing an application in J2EE that is deployed in Linux becomes a very attractive proposition. But when embarking on such a project, it's important to consider all the facets involved in developing, marketing, and deploying the application. Eventually, what is the total cost of ownership (TCO) of the deployed solution?

Let's start with the operating system, in

this case, Linux. You can, of course, obtain Linux for free. But do you download the free version or do you purchase the shrink-wrapped version from Red Hat, Debian, or one of the other vendors? Chances are, if you're working on a commercial project, you do the latter; essentially you pay for the support and the installation utilities. If you want to do J2EE development and deployment, you will need an enterprise version. For example, I just looked up the price of Red Hat Linux Advanced Server. From one online source, the cost is \$2,638.25 for standard support and much more for premium. This moves Linux up from free to cheap, as compared to a similar vendor.

Wait a minute, you still need an application server in order to build your J2EE application. For example, in August 2002, WebLogic announced an enhanced commitment to the Linux community through a new deal with Red Hat, Inc. While this is all good, as you buy more third-party products that will run on Linux to produce and deploy your application, the costs keep mounting up.

Don't get me wrong. Linux is a leading contender for the enterprise J2EE space. But the reason is no longer because it's free. After all, J2EE is free if you use the reference implementation. But do you make that choice for your application? TCO studies done by various sources indicate that Linux may be one of the cheapest and most feasible options for producing J2EE applications. It definitely has industry support. However, what really counts is that it is one of the best options for deploying quality products because of its scalability and reliability and the amount of community support. One of the challenges still facing the Linux camp is to change the perception that management in large companies has regarding the validity of "free" or "cheap" software. Development has to emphasize the fact that these qualifiers do not mean "unsupported." ☛

ajit@sys-con.com

AUTHOR BIO

Ajit Sagar is the J2EE editor of JDJ and the founding editor of XML-Journal. He is the director of engineering at Controlling Factor, a leading B2B software solutions firm based in Dallas, and is well versed in Java, Web, and XML technologies.

TCO for Linux and J2EE Projects

A colleague of mine is an easy target for anything that's free. I'm not talking about free from the perspective of "unshackled" or "independent." Rather, I'm talking about the type of free that won't make his wallet thinner. Since there is ample synergy between J2EE and Linux environments, the cost of developing an application in J2EE that's deployed in Linux becomes a very attractive proposition.

by Ajit Sagar

8

Tools of the Trade

While the jury is still out on whether Linux will ever conquer Aunt Sadie's desktop, it has always been a coder's paradise. That goes for Java coders, too. If you're a Java old timer, but a Linux newbie, follow me on this basic tour of how to write Java on Linux.

by Mike McCallister

10

Managing HttpSession Objects

Java servlet technology provides developers with functionality, scalability, and portability that can't be found in other server-side languages. One feature of the Java servlet specification that's commonly used, and sometimes misused, is the HttpSession interface. This simple interface allows you to maintain a session or state for Web site visitors.

by Brian A. Russell

18

The Next Generation of XML Tools

Realize your wildest dreams
Download a free trial now!



The industry standard XML Development Environment for designing, editing and debugging enterprise-class applications involving XML, XML Schema, XSL/XSLT, SOAP, WSDL and Web service technologies. The ultimate productivity enhancer for J2EE, .NET and database developers.



A standards-based, browser enabled document editor, allowing business users to seamlessly capture thoughts and ideas directly in XML format; save to any content management system, database, or XML repository, for later retrieval or transformation, unlocking corporate knowledge.



The ultimate XML tool for web developers, providing powerful conversion utilities for painless migration of traditional HTML websites to advanced XML-based sites, in full compliance with new web standards: XML, XSLT & XML Schema, the technological foundation of future web development.

ALTOVA

www.altova.com

Tools of the Trade



WRITTEN BY
MIKE MCCALLISTER

Sure, there's a JVM for Linux and applets will run in any Linux browser, but can you actually code from a Linux box?

When the GNU/Linux boom hit in the late '90s, all the hype was directed at the server. How Linux would save enterprises great gobs of cash in storage. How stable it was for next-to-no cost. How Apache stoked the furnace for the underfunded dot-coms slated to rule the universe.

In the face of all that hype, some may have thought that Linux was really just an OS for sys admins. What those people forgot is that Linus Torvalds invented the OS just so he could code at home.

While the jury is still out on whether Linux will ever conquer Aunt Sadie's desktop, it has always been a coder's paradise. That goes for Java coders, too. If you're a Java old timer, but a Linux newbie, follow me on this basic tour of how to write Java on Linux.

Five Easy Steps to Programming on Linux

1. Install your favorite distribution.
2. See what tools are already installed.
3. Choose a JDK: Sun, IBM, Blackdown.
4. Choose your environment.
5. Start coding!

Getting Started

If you've been fearing Linux because of its legendary difficulty to install, stop worrying now. The "difficult Linux install" is increasingly a legend. These days installing any of the major Linux distributions (Red Hat, Mandrake, SuSE) is no harder than installing Windows. Basic hardware support is excellent and the installers all autodetect everything and install the proper drivers. (If you need more information on how to get a Linux distribution, see the sidebar "Getting Linux.")

The best part is once you have a distribution installed, you're basically ready to start coding Java. Distributions generally come chock full of development tools. Odds are at least one JDK is installed by default, along with the KDE and/or GNOME desktop environments, and a half-dozen text editors. My SuSE

8.0 Professional installation included the IBM JDK and has the two others available on CD or DVD.

Two advantages here: you can be confident that the JDK and the other applications included with the distribution have been tested and will work well on your system. The software is so easy to keep updated. Each distribution has a one-stop-shopping method of updating any app included in the distro. They have different names, but all you have to do is get online, run the update app, and watch it take care of the operation – no muss, no fuss, and (usually) no reboot required.

Pick Your JDK

As with many things Linux, programmers who want to write Java have an abundance of choices to make. After picking a distribution, next is which JDK to use.

You can get recent Linux ports of the J2SE and J2EE JDKs directly from the Sun Java site (<http://java.sun.com/downloads>). IBM also has a Linux JDK available for versions 1.3.1 and 1.4.0. IBM's version includes an enhanced just-in-time compiler, a mixed-mode interpreter, and a JVM. Free registration is required at both sites (if you haven't done that already).

The first official port of the Java software development kit was created by the Blackdown Organization (www.blackdown.org). You can download any version of the Blackdown JDK from their site. Blackdown is also the home for nearly all things related to Java on Linux.

The good news for Linux newbies is that both Sun and IBM give you the option to download their SDKs as an RPM file. The Red Hat Package Management system is a standard method of installing applications under Linux, and is supported by most of the popular Linux distributions (with the major exception of Debian). Running an RPM file will check your system to make sure all dependen-

Programming Java in Linux

cies are present and install files into the appropriate directories.

Pick an IDE

The Linux Java developer has access to virtually everything the Windows or Solaris Java developer has. All Linux JDKs and JREs contain all the standard tools and technologies for their version. All the major Linux databases (MySQL, PostgreSQL, Oracle, etc.) have JDBC drivers for database connectivity. IBM offers a JavaComm implementation, and implementations of other noncore technologies are available for Linux. So with a command line and text editor, you can write Java from scratch. But how easy is that?

Fortunately, there are Linux tools to lighten the load. There are quite a few tools listed on the Blackdown Products page. I'll highlight a few of the most advanced: the Sun ONE Studio, Borland's JBuilder IDE, CodeGuide, the Emacs Java extensions (JDE), and JEdit.

Download any or all of these to see which fits your style best. The three commercial IDEs have 30-day trials; JEdit is free software; and JDE comes with the Emacs editor. Generally speaking, you probably want to use JDE only if you're already using Emacs.

Sun ONE Studio (Forte)

Sun's own offering is based on Forte's NetBeans and comes in three flavors: a free Community Edition, an Enterprise Edition for Java, and a Mobile Edition.

- **Community Edition:** This surprisingly robust free option lets you build applets, JavaServer Pages, and servlets; supports the Ant build system; and includes the Java-based PointBase Server database and a Tomcat Web server. You get JDBC connectivity to any other database format. It also generates Javadoc, HTML, and XML documents.
- **Enterprise Edition for Java:** While the Community Edition has generic support for J2EE, the Enterprise Edition



analyze the problem

understand the customer needs

define the requirements

control the changes

deliver the right solution

start club for overachievers

be liberated

A job? A job is something normal people have. You, however, have 20 jobs. You have customers to satisfy. Requirements to meet. Changes to control. And more. But if you're lucky, you also have Rational.[®] With solutions to help you visually describe and manage requirements. Solutions that automate traceability across your project's lifecycle, so you can control and communicate the impact of changes. And solutions that are flexible, easy to learn in a day and easy to expand over time. Find out how Rational can liberate you and help you satisfy your customers. Go to www.rational.com/offer/roadmap4 today to get your free roadmap to business modeling and requirements management.

Rational[®]
the software development company

(at \$1,995) adds an RMI compiler, CORBA and application support, and the ability to create Enterprise JavaBeans. Enterprise also lets you create SOAP-based Web services. Additional stuff is available on Solaris, but Linux users should find this more than adequate.

- **Mobile Edition:** This slightly stripped-down version takes out what you would expect (servlet and CORBA support, database connectivity) and adds the J2ME module.

Borland JBuilder

JBuilder gives you all the tools you'd expect in a modern IDE. Wizards to create projects, applets, apps, classes – even beans! – Swing and AWT GUI builders, debuggers, etc. As with Java, there are three flavors of JBuilder:

- **Personal Edition:** Not just for embedded apps, JBuilder Personal Edition is a free download for creating all non-commercial Java apps, classes, and applets. This is a no-frills version (as you would expect), but is more than adequate for the beginning Java developer. You can write, debug, and optimize your projects. You also have access to the essential Java documentation within the Help system. The Personal Edition is currently at version 7, and builds to the 1.3.1 JDK by default. If you have another JDK on your system, you can replace the default JDK reference, but not add it.
- **Standard Edition:** The Standard Edition adds the ability to write JavaBeans and use other J2SE tools. It uses Ant as a build system for your projects. Write to multiple JDKs, generate JavaDoc documentation, and get support for translation and CVS version control. Version 8 adds accessibility features for Section 508 compliance and red lines problem code. Download a 30-day trial from the Borland site.
- **Enterprise Edition:** Borland throws in the kitchen sink in the enterprise version (the feature matrix document runs 17 pages!). Write EJBs (v1 and 2), EJB modules, and test clients, and make Enterprise Archives (EAR) and JMS projects. Use the Ant build system. The Enterprise Edition has extensive XML support, Rational ClearCase and Visual SourceSafe features, servlets for all major server types, a SQL tool suite, an embedded database, and JDataStore. You name it, it's here. Version 8 adds Web services support and a Struts application framework. The Enterprise Performance Bundle adds the Optimizeit Suite. Download a 30-day trial from the Borland site.

CodeGuide

CodeGuide from the German developer Omnicore is a low-cost (\$299 for a single-developer license) cross-platform Java IDE for Standard and Enterprise Edition apps. It claims to analyze your source code on the fly, comes with Ant and Tomcat, and does instant compilation.

Java Development Environment for Emacs (JDEE)

The fabled GNU Emacs text editor (and its GUI clone Xemacs) has a storied reputation of being able to do just about anything within its confines. James Gosling even wrote his own version before the GNU project began. So, of course, Emacs does Java.

The JDE major mode is written and managed by Paul Kinnucan. It's included with all recent versions of Emacs, but Xemacs users may have to download this package from the JDEE homepage (<http://jdee.sunsite.dk>). The site is worth checking out in any case.

You must have a JDK installed for JDE to work, and a set of Lisp programs (the Enhanced Implementation of Emacs Interpreted Objects [EIEIO] object-oriented Lisp package, the semantic parser generator, and the speedbar file browser) accessible from the site.

Opening a file with a .java extension in Emacs automatically puts you in JDE mode. You get a Java menu and syntax color coding; you can edit, compile, debug, and run files of all types; and you can use Ant or make it a build system. There's even a BeanShell command interpreter included with JDE.

JEdit

Much has been said in the pages of *JDJ* about the wonders of JEdit. This very cool Java-based text editor is, of course, multiplatform and also open source. JEdit is included with several distributions (though the one included with SuSE 8.0 is an earlier version), and can be downloaded either as an executable JAR or as a Linux-specific RPM.

JEdit is very much like Emacs without the complex keyboard commands. It comes with syntax highlighting, a BeanShell interpreter, and a few Java-specific macros. Where the real power comes in is with the plug-ins contributed by the JEdit community. You can install new plug-ins or update your current ones right from the Plug-ins menu in the editor. The User Guide and help system explain both the macro language and the plug-in architecture so you can make your own.

INSTALLING YOUR JDK

On the off chance your distribution doesn't have the JDK you want, you may have to do the heavy lifting of installing it yourself. Here's how.

Installing an RPM

In MS Windows, installing any new application is usually just a matter of double-clicking setup.exe. The install file does the rest, with the occasional user prompt. The Red Hat Package Management system is a largely successful Linux way to do the same thing.

To install the Sun or IBM JDK/JRE from its RPM file, type `rpm IBMJava2-SDK-1.4-0.0.i386.rpm` from a terminal prompt. If you happen to be working from a GUI desktop, open a file manager like Konqueror (in KDE) or Nautilus (in GNOME) and – surprise! – click! From Konqueror, KDE will load the KPackage RPM front end. Check your preferred options and click Install. After verifying that you have Root privileges, RPM checks for all dependencies, then installs the package where it should go (most times there aren't options here).

Installing from a Tarball or Bin File

The Blackdown JDK/JRE only comes in tarball format, though for v1.4 the tarball is wrapped in a self-extracting bin file. For those of you used to Windows, tarballs (i.e., files with a .tar.gz extension) are Unix archives, just like ZIP files. To install the Blackdown JDK, follow these steps:

1. Open a terminal. Log in as Root or SuperUser (su).
2. Change to the directory where the JDK file (j2sdk-1.4.1-beta-linux-i586.bin) is. Ideally, you've downloaded the bin file to the install directory (Blackdown suggests installing to /usr/local). If you downloaded to another directory, copy the file over.
3. Make the bin file executable: `+x j2sdk-1.4.1-beta-linux-i586.bin`.
4. Run the bin file: `./j2sdk-1.4.1-beta-linux-i586.bin`. You'll be asked to agree to the license, then the file will extract, creating a new j2sdk141 directory with several new subdirectories.
5. To give the system a pointer to this SDK, add this path statement: `export PATH=/usr/local/j2sdk1.4.1/bin:$PATH`. This is especially important if you have other JDKs or JREs on your system.

If you download a plain tarball from Sun or IBM, make sure the .tar.gz file is in the install directory, then type this command from the terminal:

```
Tar -xzf j2sdk-141-beta-linux-i586.tar.gz
```

The ultimate Java™ server
and client components

JClass®



Now part of  QUEST
SOFTWARE

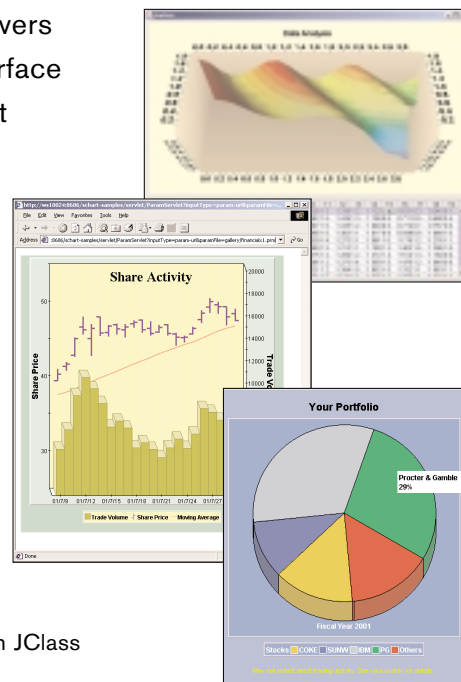
JClass is the only professional-quality Java component family that covers every facet of Java development – sophisticated client-side user interface components, reporting and utility components, server-side web client components, and web services ready components. With unrivaled platform, JDK, web/application server and IDE support, JClass works everywhere your application does, or will.

JClass DesktopViews

The only components you need for Java applications and applets: 2D/3D charts, tables, reporting, data-entry fields, database, tree view, layout managers, and much more. Build enterprise-class user interfaces quickly and cost-effectively.

JClass ServerViews

Now fully XML and Web Services ready! Add professional, dynamic content to your Servlet, JSP, or J2EE applications. Generate interactive charts with JClass ServerChart and dynamic PDF documents and reports with JClass ServerReport.

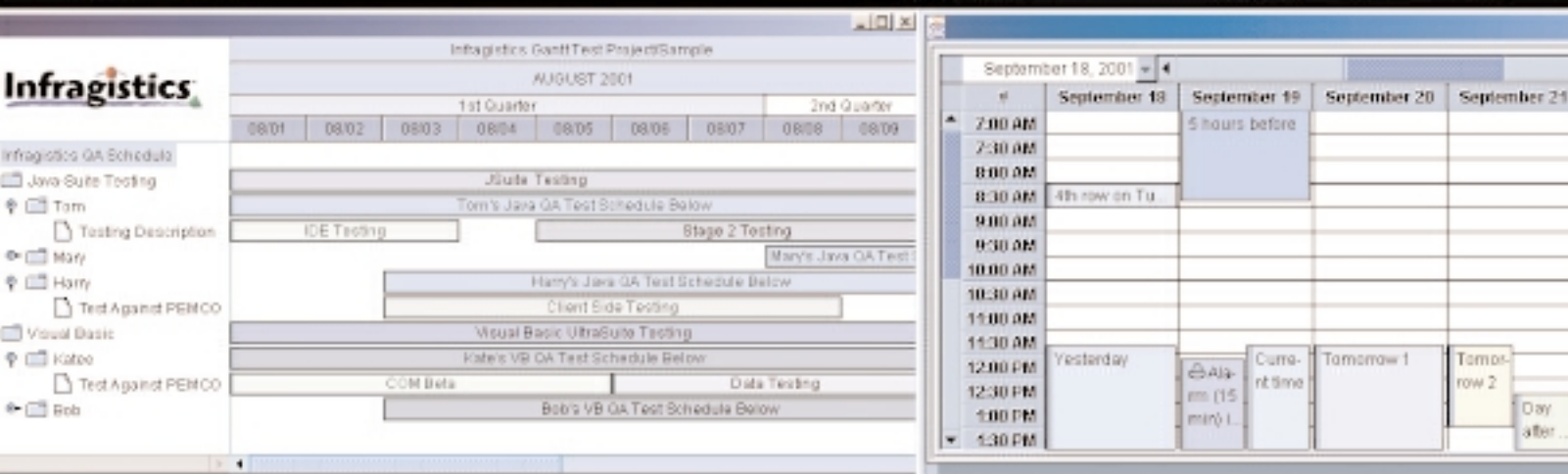


Evaluate and experience JClass for yourself – visit:

www.sitraka.com/jclass/jdj



JSuite™ 6.1—Total Java Solution



JSuite 6.1—AWT, JavaBeans & JFC

Applet Wrappers

- Our applet wrappers allow you to manipulate the appearance and/or data associated with each component without any Java code at all, using JavaScript or VBScript.

Infragistics Data Models™

- Advanced n-tier architecture seamlessly connects streaming data over sockets to front-end applications.

Calendaring

- Our scheduling and time management components include a Calendar, DayView, WeekView and DateEdit with drop-down calendar.

Explorer

- Drill-down through hierarchical data structures, with this familiar UI, to display corresponding tables or custom Java panels in the right-hand pane.

Table

- Bind to any data source using flexible Infragistics Data Models. The DataTable is available in AWT and JFC versions.
- The JFC DataTable extends JTable with cell editing, merging, printing and much more.

Editing Components

- A robust collection of components, available in AWT and JFC versions, essential for data input.

Gantt

- Display hierarchical data in the familiar style of a Gantt chart (tree nodes on the left associated with bar chart data display on the right).

Utility and UI Components

- Tab, color picker, calculator, scrollbar and shapes, as well as flexible, customizable image, round and spin buttons.

TreeView

- Create eye-appealing, feature-rich treeviews for web site navigation and Java applications. Available in both AWT and JFC versions.

Chart

- Advanced 2D and 3D rendering engine to quickly deliver stunning charts to any application.
- **We've Added** server side charting (JFC and JavaBeans™) Quickly connect to data from any source with minimal code. Achieve thin client delivery with the look and feel of a rich client application.

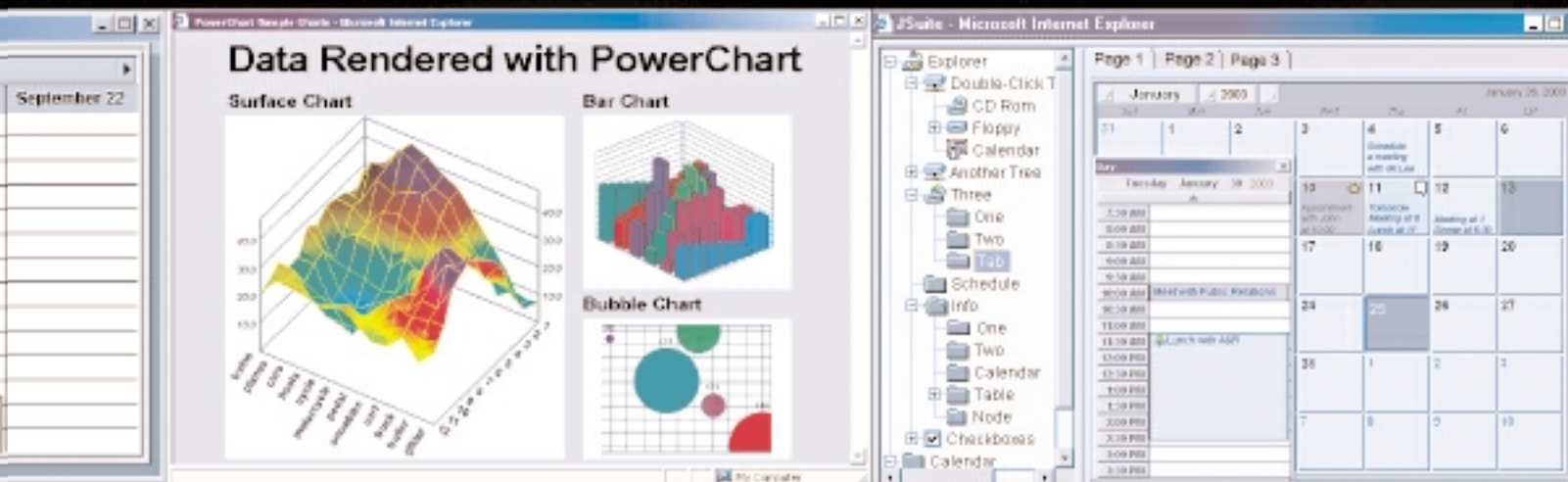
Server Side Classes

- **Access Control List** — Regulate permissions and levels of access based on roles assigned to your application/system user's logon.
- **Password Validation** — Authenticate user ID and password against a directory server or database, with encryption.
- **Connection Pooling** — Maintain a specified pool of connections at startup, eliminating the need for time-dependent "retry connection" code.

Download a free, full-featured trial version!
Order online, or contact us!

www.infragistics.com
800-231-8588

Packaged To Please.



The most comprehensive set of AWT, JavaBeans™ & JFC components

JSuite 6.1

- JSuite provides the most comprehensive set of Java-based components available today. Now we've combined our Java suites to deliver it all: AWT, JavaBeans™ and JFC.
- Create powerful, eye-pleasing applications or browser-based applets with the rich look and feel your users expect.
- We've included everything you need: grid, tree, client-side and server side charting, data explorer, Gantt, calendaring, rich, graphical editing and UI components and convenient utility components.

Source Code for all components included in JSuite — only with subscription or Enterprise Edition!

JSuite 6.1

(includes server side charting)

\$795

with annual subscription

a year's worth of updates, upgrades and new products

→ **includes source code**

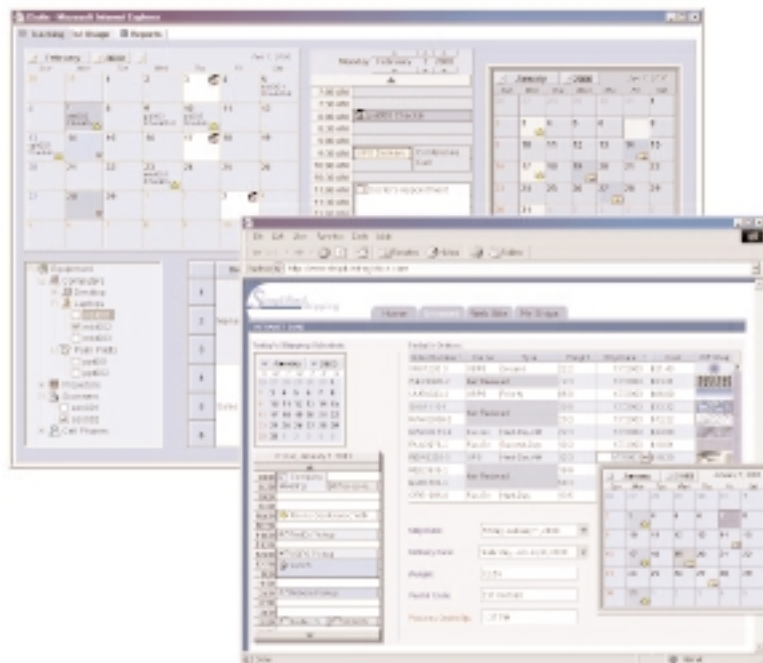
\$995

Enterprise Edition

product, subscription as well as guaranteed priority support

→ **includes source code**

\$1,495



Infragistics™

— Download a trial version today!

DISTRIBUTION	PROS	CONS	WEB SITE
Red Hat	<ul style="list-style-type: none"> • Leading distribution in U.S. • Retail presence • Excellent support • Stable company • Update through Red Hat Network 	<ul style="list-style-type: none"> • None to speak of, though company's focus is on server functions. 	www.redhat.com
SuSE	<ul style="list-style-type: none"> • Leading European distribution • Excellent install/update tool (YaST) • Some retail presence (mostly through technical bookstores) • Professional version includes massive number of apps (8 CDs worth – though you can use a DVD) • Great printed documentation 	<ul style="list-style-type: none"> • Get the Professional version for serious programming • Occasionally you'll find documentation in German • Sometimes slow to add updated software to server 	www.suse.com
Mandrake	<ul style="list-style-type: none"> • Generally rated the easiest Linux install • Oriented toward the standard desktop user • Can get it through some resellers, or preloaded on some new PCs 	<ul style="list-style-type: none"> • Buy the Power Pack edition for the most development-related packages • No JDKs included in any bundle, but downloadable through MandrakeUpdate 	www.linux-mandrake.com
Debian	<ul style="list-style-type: none"> • Most stable distribution, new versions not released unless everything works • Easy command-line updating with apt-get • Oriented to the hobbyist, developer, geek • Versions code named for Toy Story characters 	<ul style="list-style-type: none"> • Standard distribution not easy to install (use Libranet or Xandros Desktop to get all the Debian pluses with an easier install) • Stable distribution not often updated; mixing current "unstable" software can be troublesome (though less so than in earlier versions) 	www.debian.org www.libranet.com www.xandros.com

TABLE 1: Linux distributions

Summary

Yes, you can program Java in Linux. This article showed you how to get and install the three JDKs; introduced the Red Hat Package Manager; and described Sun ONE Studio, Borland JBuilder, Omnicore CodeGuide, JEdit, and the Java Development Environment for Emacs (JDEE).

GETTING LINUX

Want to get going on Linux, but haven't installed it on your box yet? You have choices. Different companies bundle the Linux kernel with different application packages, installation methods, and service/support options. These are called distributions. The practical differences between various Linux distributions are small (especially compared to the differences between the various Unices), so virtually any Linux-specific app will run on any distribution, and all have a JVM to run Java apps.

There are dozens of distributions to choose from, if you're so inclined, but the vast majority of Linux users pick one of the distributions listed in Table 1.

Further Reading

If you are interested in coding Java under Linux, check out *Java Programming on Linux* by Nathan Meyers. Only slightly dated, the book describes everything you need to know, and attempts to be comprehensive in identifying tools. Its companion Web site, www.JavaLinux.net, is an important source for updated information and essential links for both Linux and Java beginners.

Links

- *Blackdown Organization and Java-Linux archives*: www.blackdown.org
- *Links to all Linux JDKs*: www.javalinex.net/JavaLinux/SDK.html
- *Nathan Meyers' Java-Linux FAQ*: www.jguru.com/faq/Linux
- *Blackdown's Java-Linux FAQ*: www.blackdown.org/javalinex/docs/support/faq-release/FAQ-java-linux.html
- *Java Development Environment for Emacs*: <http://jde.sunsite.dk>
- *JEdit*: www.jedit.org
- *Borland JBuilder*: www.borland.com/jbuilder/index.html

- *Sun ONE Studio*: www.sun.com/software/sundev/jde/index.html
- *CodeGuide*: www.omnicore.com
- *A comprehensive list of Java-related RPM packages*: www.jpackage.org

Mailing Lists/Support

The Java-Linux mailing list is a place for news and troubleshooting problems. It's archived at the Blackdown site. Subscribe at java-linux-request@java.blackdown.org with subscribe in the subject.

Run into trouble with JDEE? There's an active listserv of 600+ Emacs Java junkies ready to help. Send a blank message to jde-subscribe@sunsite.dk to check it out. A searchable archive of the list is also at the JDEE Web site.

JEdit handles support through its community site, <http://community.jedit.org>. There are over 3,000 registered members on the site, and on a recent visit there were 300 guests to just 5 members, indicating an even larger community. ☺

workingwriter@prodigy.net

AUTHOR BIO

Mike McCallister is a freelance Linux writer based in Milwaukee and is constantly on the lookout for interesting documentation projects. Mike is the author of *Computer Certification Handbook (2000)*, Arco Press.

Build J2EE Portlets FAST*

**and change them even faster.*

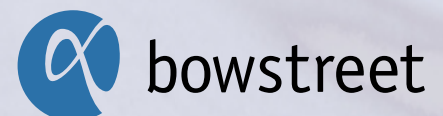
Out-of-the-box portlets aren't enough.
But, you already know that.

Driving directions, stock quotes, and news
are nice, but they're not what you need to run your
business. What you need are customizable portlets that
bring your enterprise IT assets to your enterprise portals.

Bowstreet™ Portlet Factory is the first product to automate
the rapid development, deployment, and maintenance
of highly adaptive portlets that plug right into
the IBM WebSphere Portal stack.



BOWSTREET PORTLET FACTORY
TRY IT FREE FOR 60 DAYS.
WWW.BOWSTREET.COM/EASY



J2EE IS HARD. WE MAKE IT EASY.



Managing HttpSession Objects

Create a well-designed session

written by Brian A. Russell

Java servlet technology provides developers with functionality, scalability, and portability that can't be found in other server-side languages. One feature of the Java servlet specification that's commonly used, and sometimes misused, is the *HttpSession* interface. This simple interface allows you to maintain a session or state for Web site visitors.

In my previous article ("Introduction to Session Management," [JDJ, Vol. 7, issue 9]), I introduced you to session management and the *HttpSession* interface. In that article, we walked through using the *HttpSession* API to create, use, and destroy session objects for Web site visitors. The next step is to better understand how to manage the sessions and those objects in a session. This article will help you achieve this by helping you understand the following concepts:

- Code-based session management through listeners
- Proper design of the session and the objects it contains
- Controlling what is in the session and why it's there
- Session persistence
- Memory management

The Java APIs discussed in this article are from Sun's Java Servlet 2.3 specification.

Listeners

A listener is an object that's called when a specified event occurs. There are four listener interfaces that allow you to monitor changes to sessions and the objects that are in those sessions:

- *HttpSessionListener*
- *HttpSessionBindingListener*
- *HttpSessionAttributeListener*
- *HttpSessionActivationListener*

Figure 1 provides a method summary for each of the listener interfaces. The implementing class that you write will override these methods to provide the functionality you need.

HttpSessionListener

The *HttpSessionListener* interface is used to monitor when

sessions are created and destroyed on the application server. Its best practical use would be to track session use statistics for a server.

The use of *HttpSessionListener* requires a configuration entry in the deployment descriptor, or *web.xml* file, of the application server. This entry points the server to a class that will be called when a session is created or destroyed. The entry required is simple. All you need is a listener and listener-class element in the following format. The listener-class element must be a fully qualified class name.

```
<listener>
  <listener-class>package.Class</listener-class>
</listener>
```

As you can see in Figure 1, the class that implements this listener can override two methods: *sessionCreated()* and *sessionDestroyed()*. These methods will be notified when the server creates or destroys a session.

These methods take an *HttpSessionEvent* object as a parameter. *HttpSessionEvent* is simply a class that represents notifications of changes to the Web application's sessions. *HttpSessionEvent* has one method, *getSession()*, that returns the *HttpSession* object that's been modified.

HttpSessionBindingListener

The *HttpSessionBindingListener* interface is implemented when an object needs to be notified if it's being bound to a session or unbound from a session.

This interface has two methods, *valueBound()* and *valueUnbound()*, that are notified when the status of the object has changed (see Figure 1).

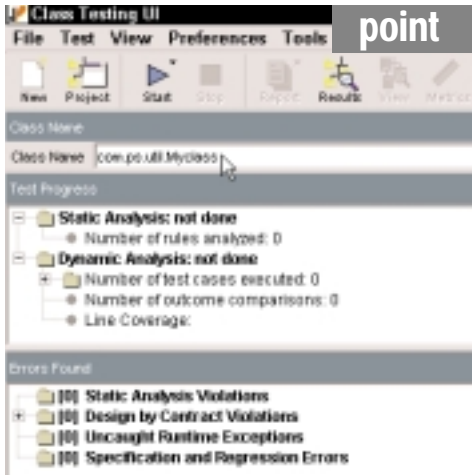
These methods have an *HttpSessionBindingEvent* parameter that can be used to retrieve the session that the object was bound to and the name it was given in the session. In Figure 2, you can see the methods of this object that are used to get the name that's assigned to the object, the session it's bound to, and the actual object.

HttpSessionAttributeListener

The *HttpSessionAttributeListener* interface is used to monitor changes to attributes in any session on the server. This can be useful when you know the name assigned to a specific object that gets put into the session and you want to track how often it's being used.

As with *HttpSessionListener*, *HttpSessionAttributeListener* also requires an entry in the deployment descriptor for the

Automate unit test case generation for JUnit and Java™ with Parasoft Jtest.



point



click



results

(It's as easy as 1-2-3.)

Parasoft **Jtest** is the first and only automated unit testing tool for Java™ development.

With just a click, Jtest reads and analyzes code — quickly creating harnesses, stubs and test inputs — and tests without user intervention. Jtest also enables you to automate regression testing and static analysis. For loyal JUnit users, Jtest is designed to fully support existing test cases and automate the creation of new JUnit-compatible test cases.

Learn how Jtest can enhance JUnit capabilities...

Download a free eval copy of Jtest along with our informative new white paper entitled "Using Jtest With JUnit."

----- For Downloads go to www.parasoft.com/jdj1. Or call 888-305-0041.

Special Offer:

For a limited time, every 100th customer to download an eval copy of Jtest automatically wins a fully licensed copy — FREE OF CHARGE.

Copyright ©2003 Parasoft Corporation. All rights reserved. All Parasoft product names are trademarks or registered trademarks of Parasoft Corporation in the United States and other countries. All other marks are the property of their respective owners.

Platforms:

Linux
Solaris
Windows NT/2000/XP

A part of Parasoft Automated Error Prevention (AEP) Solutions and Services





HttpSessionListener	
void	sessionCreated (HttpSessionEvent event) Called when a session is created.
void	sessionDestroyed (HttpSessionEvent event) Called when a session is invalidated.
HttpSessionBindingListener	
void	valueBound (HttpSessionBindingEvent event) Called when the object is bound to a session.
void	valueUnbound (HttpSessionBindingEvent event) Called when the object is unbound, or removed, from a session.
HttpSessionAttributeListener	
void	attributeAdded (HttpSessionAttributeEvent event) Called when an attribute has been added to a session.
void	attributeRemoved (HttpSessionAttributeEvent event) Called when an attribute has been removed from a session. Also called for each attribute in a session that has been destroyed.
void	attributeReplaced (HttpSessionAttributeEvent event) Called when an attribute has been replaced in a session.
HttpSessionActivationListener	
void	sessionDidActivate (HttpSessionEvent event) Called when the session has just been activated.
void	sessionWillPassivate (HttpSessionEvent event) Called when the session is about to be passivated.

FIGURE 1 Listener APIs

server. This entry tells the server which class to call when an attribute in a session has changed.

The HttpSessionAttributeListener interface has three methods – attributeAdded(), attributeRemoved(), and attributeReplaced(). These methods, shown in Figure 1, are called by the server when attributes of a session are changed.

HttpSessionActivationListener

The final listener, HttpSessionActivationListener, is implemented when an object needs to know if the session that it's bound to is being activated or passivated (moved). You would come across this scenario if your session is being shared across JVMs or your server is persisting the session in a database or file system.

This interface, displayed in Figure 1, has two methods that are overridden by the implementing class: sessionDidActivate() and sessionWillPassivate(). These methods are called when the status of the session in a JVM is changed.

Session Persistence

Today's J2EE-compliant servers allow for fault-tolerance and failover to provide support in the event that a server suddenly becomes unavailable because of hardware, software, or network failure. This support is usually provided by allowing two or more application servers, often called a cluster, to run together and provide backup support for each other. If one server fails, the others pick up the requests and continue on as if nothing happened. This allows your Web site visitors to keep going without interruption.

A proxy server is usually used in front of the application servers. This server is responsible for directing each HTTP request to the appropriate server. The proxy server can be set up to ensure that the server receiving the first request from a

user will continue to receive all subsequent requests from that user. This means that a session created for the user on the application server will continue to be available for that user. If the server suddenly fails, there has to be a system in place to allow the session to continue on without it.

Session persistence allows the session contents to be saved outside the application server so that other servers can access it. Figure 3 shows the relationship between the persisted session data and the application servers that access it. In this figure, you see a client accessing a Web site's HTTP server. The HTTP server is forwarding requests for application resources to one of the application servers through the use of a proxy server. The application servers are persisting the session data in an external form.

There are four types of session persistence:

1. Memory persistence (one server or a cluster of two or more)
2. File system persistence
3. Database persistence
4. Cookie persistence

Every application server will handle session persistence differently and all servers may not support all types of persistence. Objects that are placed in the session must be serializable for persistence to work.

Memory Persistence

In most cases, a single standalone server will store sessions in memory. This allows for fast retrieval and update of the information. It also means that the session information will be lost when the server is shut down. This is usually the default configuration on most application servers. Memory persistence can be used when two or more servers need to share the session information. The application servers can be configured to share any changes made to the session so that the information is available on multiple servers. This redundancy of the session information helps the cluster preserve the session during a failure.

File System Persistence

File system persistence can be used to serialize any objects that are in the session. The object contents are placed in a file on the server. The location of the files created is configurable; however, the files must be accessible by all the servers in the cluster. The speed at which the file system is accessed can be a factor in the performance of your Web site. A slow disk drive, for example, would result in a delay as data is read from or written to the file.

Database Persistence

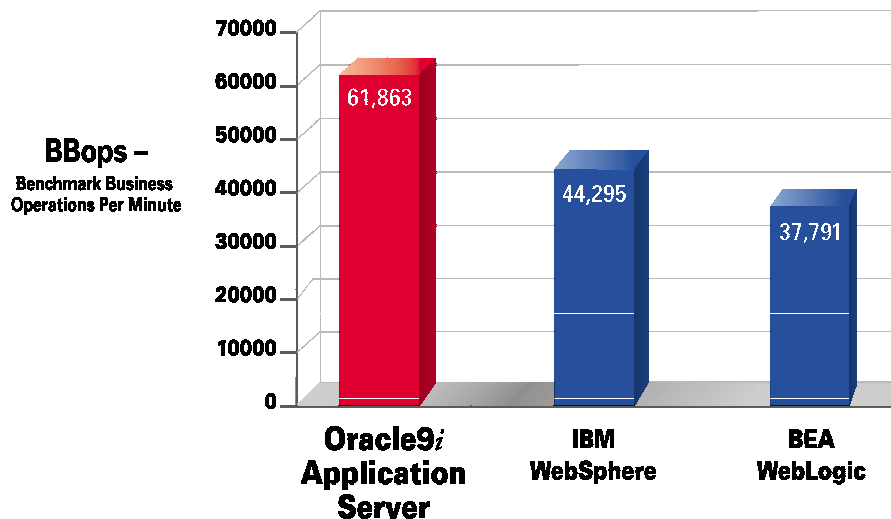
Database persistence can be used to provide a central data store for the session contents. Each application server in the cluster must be able to access the database. When sessions are modified, the changes are immediately persisted in the database. A data source is usually set up for JDBC persistence and the connections are pooled. This provides a quicker response. There's also the issue of database failover, which would be addressed at the database level of the system.

Cookie Persistence

The fourth type of session persistence, cookie persistence, is so ineffective and insecure that it doesn't deserve consideration when designing a fail-safe system. Cookie persistence, as the name implies, persists session data by storing the session information in browser cookie(s). There's a limitation on data handling because cookies store only text, not objects, and the amount of data that can be transmitted in a cookie is limited. There's also the fact that cookies transmit data back and forth

Faster and Cheaper than IBM or BEA

Best Performance – Any Computer
ECperf Industry Standard Java Benchmark



Oracle's Application Server also has the lowest price
Oracle \$5/Bbop; BEA \$7/Bbop; IBM \$11/Bbop

ORACLE®

As of July 9, 2002:
Oracle: Sum: 61,862.77 BBops/min@SID, \$29/BBops/min@SID
IBM: 44,294.97 BBops/min@STD, \$23/BBops/min@STD
BEA on HP: 37,791 BBops/min@STD, \$38/BBops/min@STD
Oracle: 24,638.37 BBops/min@STD, \$6/BBops/min@STD
BEA: 7,639.90 BBops/min@STD, \$7/BBops/min@STD
IBM: 32,661.47 BBops/min@STD, \$11/BBops/min@STD
Source: <http://ecperf.theseventide.com/ecperf/>

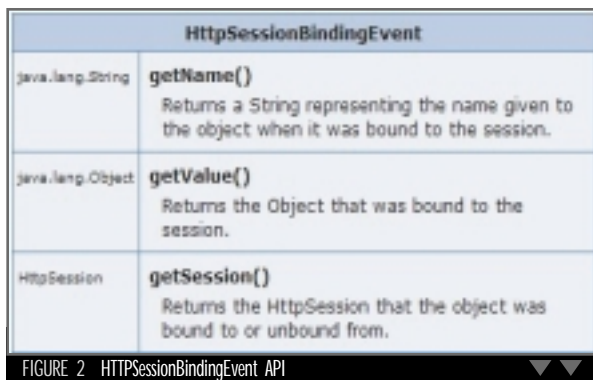
oracle.com/javafaster
or call 1.800.633.0546

between the client and the server. This prevents you (at least it should) from saving sensitive information, like a social security number. This type of persistence should be used in only the smallest of Web sites, and only if there's a good reason not to store the session in memory.

The most common type of persistence is database persistence. It provides an efficient way of saving session data and it's usually fairly easy to set up on the application server. Memory persistence in a cluster is also easy to use, if your application server supports it. The only drawback is that sessions can sometimes hold large amounts of data. Storing the session in memory reduces the amount of memory available to the other processes on the server. File system persistence can be slow at times and the file system may not always be accessible to multiple servers.

Watching the Session Size

As you and your fellow employees work on a Web application, you may notice that more and more objects are being



HttpSessionBindingEvent	
java.lang.String	getName() Returns a String representing the name given to the object when it was bound to the session.
java.lang.Object	getValue() Returns the Object that was bound to the session.
HttpSession	getSession() Returns the HttpSession that the object was bound to or unbound from.

FIGURE 2 HttpSessionBindingEvent API

thrown into the session, often "for convenience" or "just temporarily." The session becomes a quick catch-all for any information you need to get from your servlets to your JSPs. The HttpSession interface makes sessions easy to use, which can lead to the session being overused. This is a concern because the session takes up space. In most cases that would be memory space. In other cases, it could be database or file system space. In all cases, it means more work for the server and more work for the programmers to manage what is there.

Although the session is convenient because it's accessible from every servlet or JSP, it's not always the best place to put information. Most of the data that's retrieved for display in a Web application will only be used on one page. Instead of putting the information into the session scope, use the request scope and then forward the request from

Some objects should be stored in the session. Objects that may be needed over and over again as a user moves through a Web site are those that should be put into the session. Anything that needs to exist longer than one request can be stored in the session, as long as these objects are removed as soon as they're no longer needed.

Considerations for Managing Sessions

When working with sessions, there are a few things to consider before designing or redesigning a Web application:

- Are sessions needed in the application?
- How long should the session be inactive before timing out?
- Are all the objects in the session serializable?
- Are the objects being bound to the session too large?
- Do the objects that are in the session really need to be there?

A Need for Sessions


If you have unique users on a Web site and need to know who they are or need to get specific information to them, such as search results, then you should be using sessions. If you follow the guidelines set here, there's no reason not to use the HttpSession interface that Java provides. It's easy to use, flexible, secure, and it helps you to build a better Web site.

There's another architecture that deals with maintaining state for a client. Instead of relying on the HttpSession interface, state for clients can be maintained within Enterprise JavaBeans (EJBs). The EJB architecture takes the business logic for an application and places it in components or beans. A session bean is a type of EJB that exists for a given client/server session and provides database access or other business logic, such as calculations. Session beans can be stateless or they can maintain the state for a client, very much like an HttpSession object.

There is still some debate over where the state for a Web site visitor should be maintained. The best design for the application at this time is to continue using the HttpSession object for maintaining the state of the presentation layer of the Web application and to use stateful EJBs to maintain the state of the business logic and data layer. There are many other factors that should be considered with EJBs, one being the better performance of stateless beans over those that maintain state. These issues, which are outside the scope of this article, should be considered carefully when architecting an application.

Session Timeout

By default, on most servers the session is set to expire after 30 minutes of inactivity. The amount of time can be config-



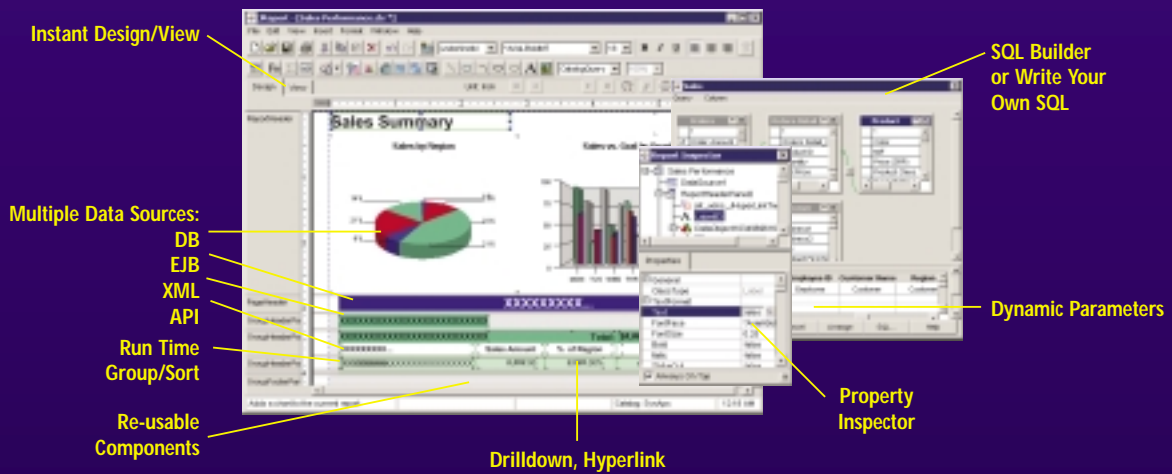
Today's J2EE-compliant servers allow for fault-tolerance and failover to provide support in the event that a server suddenly becomes unavailable"

the servlet to the JSP. This causes the objects to be destroyed after the request has ended, which is after the data is displayed by the JSP. If you put the objects into the session, you would either have to remove them in your code or leave them there. Leaving objects in the session is not a good idea because you're using up valuable resources for no reason. This becomes even more of an issue when your Web site has hundreds or thousands of visitors, all of whom have a session that's loaded with objects.

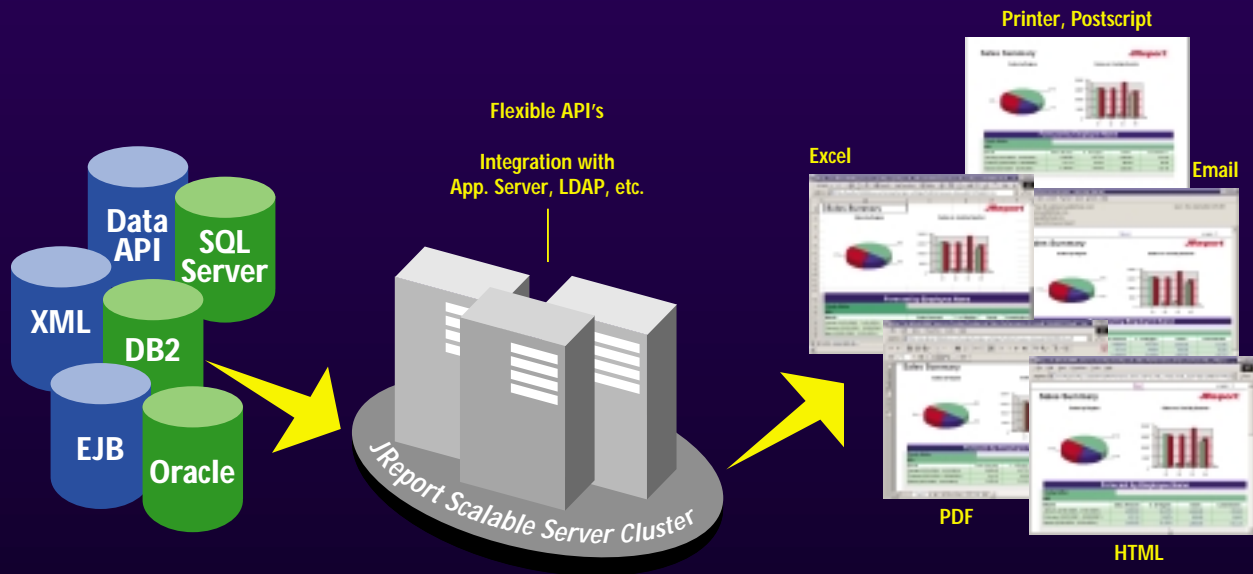
ured in the deployment descriptor of the Web application. The HttpSession API also provides a `setMaxInactiveInterval()` method that you can use to specify the timeout period for a session. The `getMaxInactiveInterval()` method will return this timeout value. The value given is in seconds.

The length of time will vary depending on what your visitors are doing on your site. If they're logging in to check their account balance, a shorter session timeout period can be used because it doesn't take long for a person to read a couple of

DESIGN ONCE...



REPORT ANYWHERE.



JREPORT™

JReport lets you take your reports anywhere you want. Imagine creating reports that pull together data from virtually anywhere, arranging them any way you wish, and delivering them precisely – whether in pure HTML, PDF, Excel, XML, JSP, email, or your network printer. Imagine having ad hoc reporting ability to create or modify reports on the fly, right from the end user's browser.

And all this is built on 100% J2EE architecture, to provide secure, reliable, scalable performance and easy integration with your enterprise systems. You can count on JReport: any report, any format ... anywhere.





J2ME



J2SE



J2EE



Home

numbers. If, on the other hand, the user is logging in to read large amounts of data, you need to be sure that you provide enough time for the user to do what he or she wants without being logged out. If the user is constantly navigating through your site, the session will last indefinitely.

Implement Serializable

It's important to make sure that all objects placed in the session can be serialized. This may not be an issue if you know that your Web application will not run in a cluster, but it should still be done anyway. What happens if your Web site grows too big for one server and you suddenly have to move to two? If you implement Serializable in your code now, you won't have to go back and do it later.

Keep It Simple

You should design objects that are going to be placed into a session so that they're not too big and don't contain unnecessary information. A JavaBean that contains a customer's name, address, phone number, e-mail address, credit card numbers, and order history should not be placed into the session if you're only going to use the object to get the customer's name.

Session Contents

When you're working on a Web site, it's important to know which objects are in the session and why they're needed. The size of the session should be kept as small as possible. If you're building a new Web site, work out ahead of time what goes in

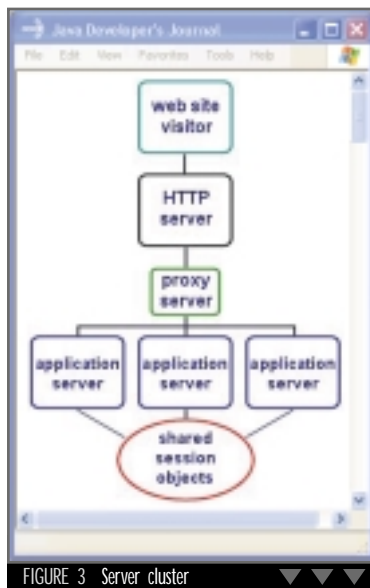


FIGURE 3 Server cluster

the session, why it's there, and where it gets removed. If you're redesigning an existing site, this may be a little tougher, especially when you have hundreds of servlets and JSPs to deal with. In this case, try implementing an HttpSessionAttributeListener to get an idea of what is going into the session. With this information, you may be able to better manage your sessions.

Conclusion

Hopefully this article helped you to better understand the design issues involved in using the HttpSession interface. Java provides a more robust session implementation than other languages. It's because of this power and flexibility that you must take the time to properly lay out the use of the session. A well-designed session will help make a Web application better for the programmers and the users. ☛

References

- Hall, M. (2002). *More Servlets and JavaServer Pages*. Prentice Hall PTR.
- *Java Servlet Technology*: <http://java.sun.com/products/servlet>
- *Enterprise JavaBeans Technology*: <http://java.sun.com/products/ejb>
- *Java BluePrints (J2EE)*: http://java.sun.com/blueprints/guidelines/designing_enterprise_applications

brian.russell@prioritytech.com

AUTHOR BIO
 Brian A. Russell is a software engineer at Priority Technologies, Inc., a leading software solutions provider for the student loan industry, located in Omaha, Nebraska.

You work with objects & xml. Why doesn't your report tool?

Object Reporting

ReportMill is the world's first XML/Object Reporting System. Today's web applications are built with objects and XML - now you can organize and display the data as well formatted web pages with one line of code.

Object Reporting means:

- No Redundant Database Connections
- No Redundant Data Fetching
- Reuse of Existing Business Logic
- Reporting from Any Data Source



Drag n' Drop XML sample into new document and design template

Dynamic PDF & Flash Output

Real web applications demand professional looking output that draws customers to your website and inspires confidence in your product. HTML screen dumps are no longer the answer.

ReportMill generates true WYSIWYG pages in several different formats - all from the same template.

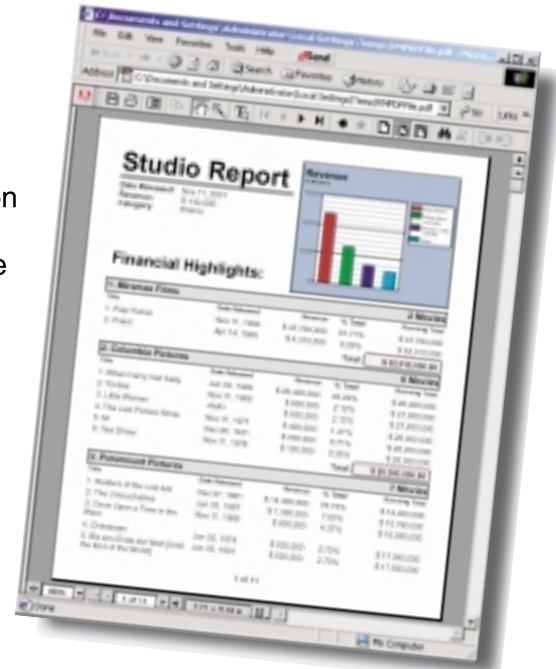
- PDF for paginated documents that are convenient for viewing, archiving and printing
- HTML/Flash for on-screen delivery of documents that are scrollable, interactive and portable

Easy Integration

Creating web pages for your application couldn't be easier. ReportMill's page layout application is powerful and easy-to-use. The developer library has basically one line of API!



Fetch Objects and generate report in PDF and Flash



View in browser, email or write to file!

Supports ColdFusion, WebLogic, WebObjects, WebSphere and any Java based application.

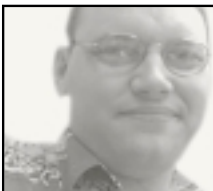
Visit our website to discover how easy and powerful Object Reporting can be!

Fully functional evaluation version available at <http://www.reportmill.com/webstart>

For more information, call (214) 513-1636 or send email to info@reportmill.com.



ReportMill



JASON BELL J2SE EDITOR

Dipping Your Toe in the Water

There's a saying – "Life is about choices" – that can also be applied to Linux. In the mainstream there are about 60 different vendors with a Linux distribution working on a number of hardware platforms. For the enthusiasts that's okay, as they can reinstall as often as they like. A business, on the other hand, may not share the view that the best way to run an operating system is by trial and error. Knowledge is key here – and knowing what to do if something goes wrong.

Planning and preparation are key to a successful Linux install. Be prepared to do a lot of reading before you make a decision. If you don't know which hardware is installed on the machine you're going to use, find out; it could make or break your chance of creating a working system. For example, does your machine have an Intel i810 video card that's supported by your Linux distribution? If not, how difficult will it be to include that in the kernel? Talk to as many people as you can, find a local Linux user group to get involved with, and arrive at the meeting with a list of questions. The nice thing about Linux users is that they like to help.

Choosing a Java version can be a selective task too. First of all find out which Java versions are currently stable within your chosen Linux distribution. At the time of writing, Debian (www.debian.org) is still using JDK 1.1.8 as a stable Java development kit (this is shipped under license). This may suit your needs just fine. You can run a basic setup of Tomcat and a MySQL driver, for example, and run a couple of Web apps from JDK 1.1.8; the only thing you have to take into consideration is that some of the core classes from the Java 2 API will be missing (you'll be surprised how much you miss them).

We're now entering an exciting time in which Java on the server side is taking off. Java on the Linux server side gives us a secure and reliable architecture with which to host our applications, but we have to

understand how the server works, what makes it tick, and what makes it crash. Also it's time to get serious about the way we program and how we manage the way our programs work. For example, do you need to implement a message queue system so you don't throttle the server with processes? You need to know, and it's knowledge like this that will advance your career to bigger and greater things. A good working knowledge of the operating system you're using can create a better foundation for the applications you're building.

Banco do Brasil is in the process of replacing its entire fleet of Windows boxes with Linux. As a result, they are converting their business logic over to Java. They operate with 78,000 employees and serve 12 million customers. From where I'm standing it sounds like they've really done their homework, seen the cost benefits, and are moving forward in quite an aggressive way. I just wish more people were in a position to do the same. If anything the key here is that Java has matured over the last couple of years and people are starting to see the benefits.

With the right amount of research in the areas of Linux and Java, you can transform business practices, cut costs, and show the world that Java doesn't revolve around a PetStore demo. It does come at a price: knowledge and preparation. Once again I can't stress enough the importance of talking to other people, in person or on mailing lists. The chance of someone else being in the same predicament or situation is very high. By sharing knowledge and experiences the Java community stands a very good chance of being able to deliver some exceptional products. ☛

References

- *Full Banco do Brasil story:* www.vnunet.com/News/1137229
- *Debian Linux:* www.debian.org
- *Tomcat:* <http://jakarta.apache.org/tomcat>
- *MySQL:* www.mysql.com

jasonbell@sys-con.com

AUTHOR BIO

Jason Bell is a programmer and chief technical officer for a B2B Web portal in York, England. He has been involved in numerous Web projects over the past five years, the last two of which have been servlet-based.

Dipping Your Toe in the Water

There's a saying – "Life is about choices" – that can also be applied to Linux. In the mainstream there are about 60 different vendors with a Linux distribution working on a number of hardware platforms. Knowledge is key here and knowing what to do if something goes wrong.

by Jason Bell

26

Packaging Java Applications for OS X

Java on OS X is a first class citizen. You can integrate your app so well that users probably won't even know they're using a Java application. This article will show you how apps are packaged on OS X.

by Ian McFarland

28

Java and Linux

One well-known difference between deploying on Linux compared to other Unix operating systems is the implementation of the system threads library. Linux threads are implemented as a cloned process and, consequently, the underlying thread implementation can affect the behavior of the Java runtime.

by Calvin Austin

34



Can your software seamlessly integrate Linux into your enterprise?
Ours can.

Linux isn't a fad anymore. It's a serious, mission-critical part of your enterprise. That's why, since 1999, we've been devoted to creating Linux solutions that truly work for global business. Right now, we have more than 50 distributed and mainframe solutions to manage, secure, protect and integrate Linux into your enterprise. But what do you expect from one of the world's most innovative business software companies? Check out our award-winning Linux solutions today. And see for yourself just how well they fit in. ca.com/linux

Visit us at Booth #229 at Linux World 2003

Business Solutions for Linux



Computer Associates®

Packaging Java Applications for OS X

Have great looking
double-clickable applications



WRITTEN BY
IAN MCFARLAND

Java on OS X is a first class citizen. You can integrate your app so well that users probably won't even know they're using a Java application.

You can package your apps so they have one of those lovely 128x128 icons. Apps can be launched with a double-click, and can even be bound to particular file types so that your app gets launched when the documents are double-clicked. Swing apps also get the luscious Aqua user interface for free, and with a couple of lines of code you can also tell the runtime to let your app use the system menu bar, and even use the hardware acceleration, which you won't find on any other platform.

Let's look at how apps are packaged on OS X.

The Extremely Portable Approach

First, the easiest way to package a Java application for OS X is as a JAR file. As long as your JAR file includes the standard `Main-Class` attribute (and is otherwise properly formatted), you can double-click it and it will launch, or run it from the command line by executing `java -jar filename.jar`. (Without that `Main-Class` attribute, you'll have to specify the main class, just as you would on any other platform.) (The source code for this article can be downloaded from www.sys-con.com/java/sourcecode.cfm.)

Of course, it won't have its own fancy icon, just the standard OS X JAR file icon (see Figure 1). However, in the write once, run anywhere tradition, this exact same file will run on OS X, Windows, Solaris, Linux, or any other Java platform. If all you're writing is a simple utility and you don't want to spend the extra effort to support OS X, then you're done.

The Extremely Well-Integrated Approach

Although the extremely portable approach works pretty well as far as it goes, what you get doesn't look like a

first class application. The first thing you'll notice after the generic icon is that your app looks a little different from other apps when it's running. The application menu, which in other apps contains the name of the application, simply specifies the fully qualified class name of the main class you specified in the manifest or on the command line (see Figure 2). Any menus in your app will show up at the top of the window the `MenuBar` (or `JMenuBar`) is associated with as well. This is not what your Mac users will expect, although it works just as well. With a tiny bit of work packaging your app, you can get full integration with the system menu bar (see Figure 3).

Another advantage is that you can associate file types with your application when you package your app according to the Apple guidelines. That way, you can have your app launch automatically when any of its associated files is double-clicked on. I'll show you how to do that in detail in my next article. For now, though, suffice it to say that the little bit of extra work you do packaging your app gives you a lot nicer integration to the platform on OS X.

In the rest of this article, I'll first dis-

cuss how to package your app using one of the available tools. Then I'll walk you through the file hierarchy these tools create so you'll know what's really going on underneath it all.

Packaging Tools

There are a few tools that you can use to package your app for OS X. We'll look briefly at three of them, `MRJApplicationBuilder`, `Project Builder`, and `OSXize`.

MRJApplicationBuilder

`MRJApplicationBuilder` is included free in the developer tools that ship with every copy of OS X. You can use it to package your own applications or to package up JAR files that someone else wrote. It also has a nice GUI (see Figure 4).

You'll find `MRJApplicationBuilder` and `Project Builder` in `/Developer/Applications` once you install the developer tools. (These tools are found on a separate CD or in `/Applications/Installers` on your hard drive, depending on how you acquired OS X.)

Project Builder

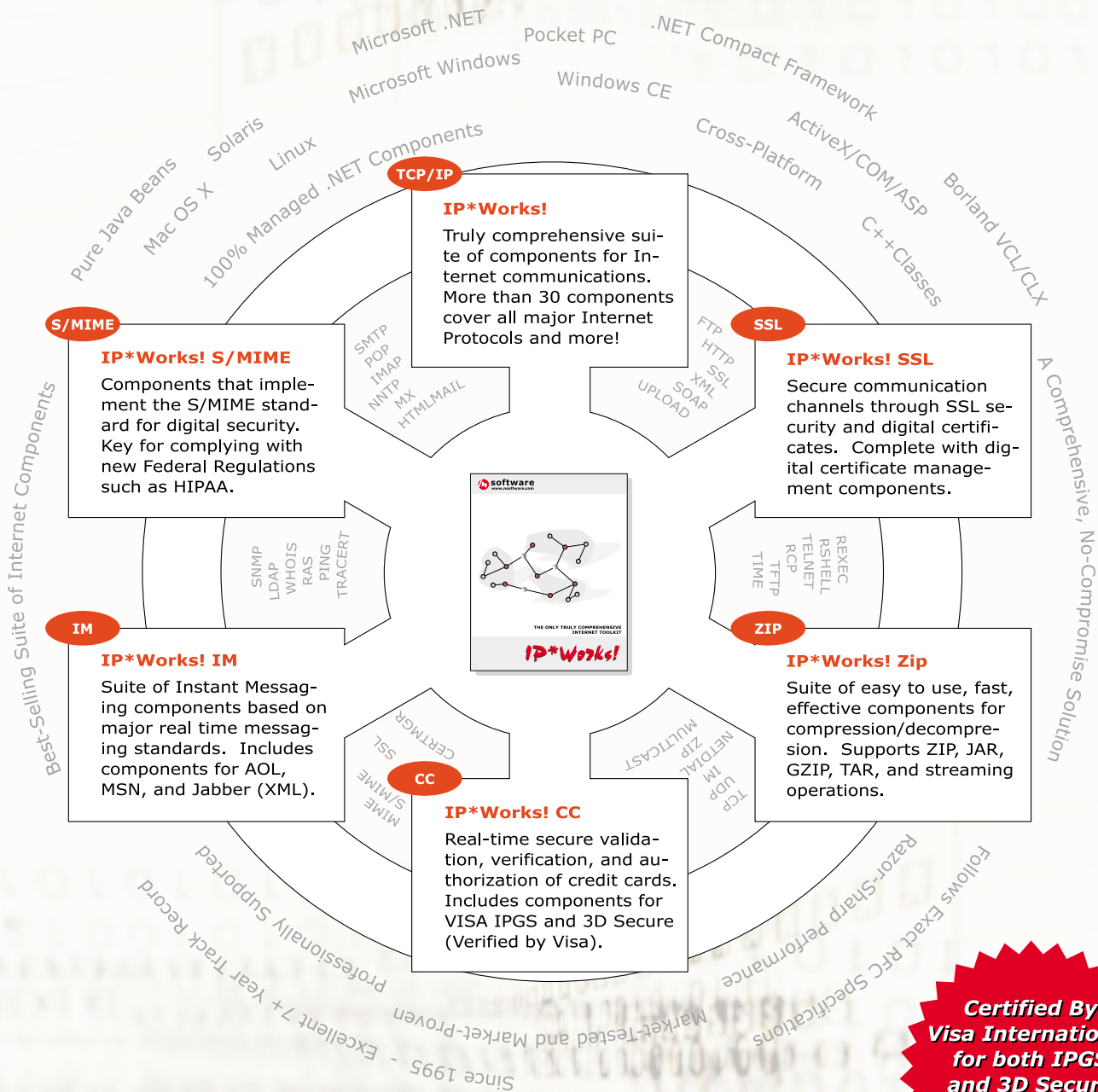
`Project Builder` is the integrated development environment that's included free in the same set of develop-

// The little bit of extra work you do packaging your app gives you a lot nicer integration to the platform on OS X //



FIGURE 1 The JAR Icon

from email to secure credit card transactions, only one component suite does it all!



**Certified By
Visa International
for both IPGS
and 3D Secure
(Verified By Visa)
Compliance**

er tools as MRJAppBuilder. It's a nice IDE, and I use it for a lot of my own development work, whether it targets OS X or not. (I've written a lot of Web applications that were eventually deployed on Linux, Windows, and Solaris using Project Builder and I like it a lot.) It includes project templates for a wide number of Java project types, Swing applications, Swing applets, AWT applications and applets, command-line Java applications (the template is called "Java Tool"), JNI-based applications, and also Cocoa-Java applications.

I won't go into how to build an application with Project Builder here, but any application project you build with Project Builder is automatically packaged as a first class OS X application. (The JAR file inside is quite portable, however, unless you're using some specific native feature.)

OSXize

OSXize is a packaging tool I wrote in Java a while back. It can be used from

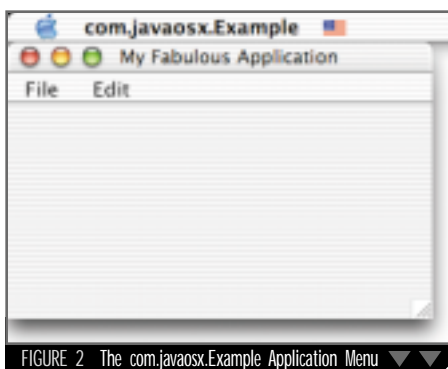


FIGURE 2 The com.javaosx.Example Application Menu

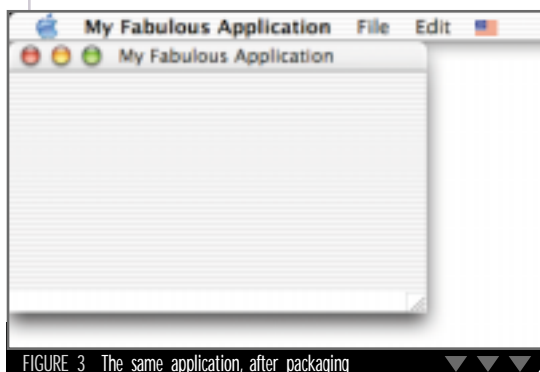


FIGURE 3 The same application, after packaging

the command line to generate a fully packaged OS X application, and can also be used as an Ant task to automate generation of your OS X application, if you're using Ant for build management. (And you should!) It also has the advantage of being fully cross-platform, so if you're building your apps on a Linux box or on Windows, you don't need to forsake your OS X friends. Like MRJAppBuilder, it can also convert any

existing JAR files to fully fledged OS X applications, whether you wrote them or not, and whether you have the source code or not, although since it's a command-line app, you can do it in just a few keystrokes.

In fact, to convert an existing JAR file to an OS X application, all you have to do is run the following command line:

```
java -jar osxize.jar -addjar
MyApp.jar
```

“The .app extension is a magic, or “blessed,” extension that says: treat this directory differently

If MyApp.jar has the Main-Class attribute set, in less than a second you'll have a new application called JavaApplication.app. Okay, so you probably want to specify a more descriptive name for your app. You can handle that by passing the -n attribute:

```
java -jar osxize.jar -n "My Fabulous
Application" -addjar MyApp.jar
```

OSXize then generates My Fabulous Application.app for you. (It also does some nice things that MRJAppBuilder doesn't do, like making sure your app shows up as My Fabulous Application when you look at what processes are running, e.g., through ps or top.)

There are a number of other flags you can specify as well. No Main-Class attribute in the manifest? No problem. Just specify the main class with -m. Want to specify your own icon file? Make a new icon (see Figure 5) using the ICNS Editor (also in /Developer/Applications) and specify the path to the file with the -i option. Want to specify an application version to show up in the Get Info dialog? Use the -version flag. The full set of options is documented on the Web site as well as how to use the OSXize Ant task. You can download it from www.javaosx.com/apps/.

The .app Application Bundle

What exactly have we created when we've used these tools? Happily, all we've created is a file hierarchy that OS X recognizes as a “bundle.” Ever since Mac

OS made the big leap to Unix, it's been a lot more file-oriented than previous incarnations. Gone are the days of complex file formats with separate resource and data forks. Well, almost gone. The OS still supports them, but mostly for backward compatibility reasons at this point.

Instead, the Apple team based most of their packaging on special arrangements of files in the filesystem. Modern OS X applications (with the exception of some monolithic Carbon binaries)

are a collection of files living in a directory with the .app extension, and not much more. The .app extension is a magic, or “blessed,” extension that says: treat this directory differently. (There are a few other magic extensions, such as .kext, that contain other types of bundles, and other special file hierarchies like those in /Library/StartupItems.)

Inside an .app directory, you'll find a special directory hierarchy that's used to contain the files and resources that make up the application. These include the icon file, files with special information for the Finder describing the application, an executable binary file for Java applications, one or more JAR files, the MRJApp.properties file, and a number of other files as well.

The example command line shown earlier would create a file hierarchy as follows:

```
My Fabulous Application.app/
Contents/
PkgInfo
Info.plist
MacOS/
My Fabulous Application
Resources/
MRJApp.properties
NeoAppPackagerDefault.icns
Java/
MyApp.jar
```

In the rest of this article, we'll look at what each of these files is and what it does.

DARE TO COMPARE?



RIP OUT THIS FEATURE LIST AND SEE HOW YOUR SERVER STACKS UP AGAINST MACROMEDIA® JRUN™ 4 SERVER

NEW AND ENHANCED FEATURES OF JRUN 4:	JRUN 4	
Certified J2EE 1.3 Compatible	✓	
High performance web container with JSP 1.2 and servlet 2.3 support	✓	
Advanced EJB 2.0 support including local interfaces, message-driven beans, EJB-QL, and CMP 2.0	✓	
Additional Java® 2 APIs -- JMS 1.0.2, JTA 1.0, JAAS 1.0, JCA 1.0, JAXP 1.1, JavaMail 1.1, JDBC 2.0, JNDI 1.2, RMI/IIOP 1.0	✓	
Support for XML, SOAP, WSDL, and UDDI for web services	✓	
Built-in production quality HTTP server	✓	
Hot modification and auto deployment of applications	✓	
Integrated XDoclet support for simplified component deployment	✓	
Built-in Macromedia® Flash® MX Remoting services for high impact user interfaces	✓	
Type IV JDBC drivers included for Oracle®, MS SQL Server, IBM® DB2, Sybase®, and Informix®	✓	
Highly customizable and extensible JMX-based service-based architecture	✓	
JMX-enabled web-based management console	✓	
Advanced multi-tier server clustering enabled by Jini® technology.	✓	
Leading OS platforms, including Unix, Linux®, and Windows®	✓	
FULL-FEATURED PRODUCTION DEPLOYMENT	\$899/CPU	



**Java Compatible™
Enterprise Edition**

We've packed JRun 4 with features to make it faster, easier, or more affordable than any other J2EE server you can find. Don't just trust what you read, try it out yourself. You'll see why over 10,000 leading organizations deploy their J2EE applications on JRun.

Our **FREE** non-expiring developer version will get you started. Download JRun 4 today for **FREE** at: www.macromedia.com/go/jrun4jdj

Go ahead....we dare you.

Copyright 2002 Macromedia, Inc. All rights reserved. Macromedia, JRun, and the JRun logo are trademarks or registered trademarks of Macromedia, Inc., which may be registered in the United States and other countries. Jini, Java and Java-based trademarks and logos are the trademarks or registered trademarks of Sun Microsystems Inc., in the United States and other countries. IBM and Informix are registered trademarks of IBM Corporation. Sybase is a registered trademark of Sybase, Inc. Linux is a registered trademark of Linus Torvalds. Windows is a registered trademark of Microsoft Corporation. Oracle is a registered trademark of Oracle Corporation. All other trademarks are property of their respective owners.



**macromedia®
JRUN™ 4**

The PkgInfo File

This is an 8-byte file, which must contain "APPL" (in ASCII) as its first 4 bytes, and contains as its last 4 bytes the "creator code" that the finder should associate with this application. Mac OS has had the notion of creator codes from the beginning. These are used to associate files with the applications that created them (thus the name). This is why Mac files of the same type may be associated with different applications. You can register your own creator code on the Apple developer Web site for free. Unless you have an officially recognized creator code, though, you must use the reserved code "?????" (also in ASCII.) This is reserved to mean "Unknown Application" and is guaranteed not to interfere with any other application. Applications built with OSXize have jNeo as their creator by default.

The Info.plist File

The Info.plist file is one of many .plist files used throughout the operating system to hold parameters. Most of them, including Info.plist, are XML files, although there are some other older formats still in use. Info.plist contains most of the information about the application that the Finder keeps track of, like version information, and which .icns file to use for the icon.

The Application Stub

In the previous directory listing,

inside of the MacOS directory, you'll find a file called My Fabulous Application (or if you used MRJAppBuilder, JavaApplication). This is a native OS X executable, which is the file actually launched by the Finder. It then reads the rest of the configuration information in MRJApp.properties and executes the main() method on the appropriate class in the contained JAR file(s).

The big thing to note here is that this file must have the execute bit set in order for the application to work. (In fact, if you use OSXize to generate your application on a Windows machine, you'll need to set the execute bit manually before you can run the app on OS X, since Windows filesystems don't have execute bits.) This execute bit issue is one that often comes up when an app mysteriously won't run. If this happens to you, cd to the /Contents/MacOS directory, and then chmod +x the file you find there. If everything else was okay, your app should now be double-clickable and run appropriately.

The MRJApp.properties File

This file contains important runtime information used to configure, among other things, whether to use the system menu bar for Java menus, whether to use hardware acceleration, at which threshold levels the garbage collector should run, where standard out and standard error should be written, and whether the grow box (in the

lower-right corner of a given window) should intrude into the root pane of your window or if the window should be padded vertically so that it doesn't have to intrude. These are useful for tweaking the final appearance and performance of your Java application. It's just a regular Java properties file, so take a look at it. Much of it is fairly self-explanatory.

The ICNS File

OS X icons are packaged in .icns files, which can be created with the Icon Composer app found in /Developer/Applications. You'll need to create your icon files in another application, the most suitable being Adobe Photoshop. (You can directly import these files with full transparency into Icon Composer.) Icon files should follow the Apple Human Interface Guidelines, and are huge and rich compared to icons on other systems. They are 128x128 with full transparency support, thanks to the power of the underlying Quartz graphics engine. If there is interest, I can write about how to create your own icons in my next column.

The JAR Files

Of course, your application bundle needs to have your actual Java code in order to run it. You can have one or more JAR files packaged together into your .app bundle, although you can't just throw JAR files in there and expect them to show up on the classpath. You have to also add them to the com.apple.mrj.application.class.path property in the MRJApp.properties file. (Both MRJAppBuilder and OSXize do this for you if you specify additional JAR files.)

That's really all there is to a typical packaged Java application. There are some additional attributes to add to the Info.plist if you want to associate a given file extension with your app, for instance, .foo. You'll also need to include additional .icns files in the Contents/Resources directory if you want to associate icons with the files owned by your app, for instance, a foo.icns file containing the icon the finder should use for all .foo files. Here again, there are some tweaks you'll need to make to Info.plist to tell the finder which icon to associate with which file type.

Having great looking double-clickable applications is just something you can use to make your friends on other platforms a little jealous while waiting for Apple to get the kinks out of their J2SE 1.4 port. ☺

AUTHOR BIO

Ian McFarland is the president of Neo Ventures Ltd., a software consulting company in San Francisco, and author of Mastering Tomcat Development (Wiley); he also maintains www.javaosx.com. Ian been a Java developer since release 1.0 alpha 2.

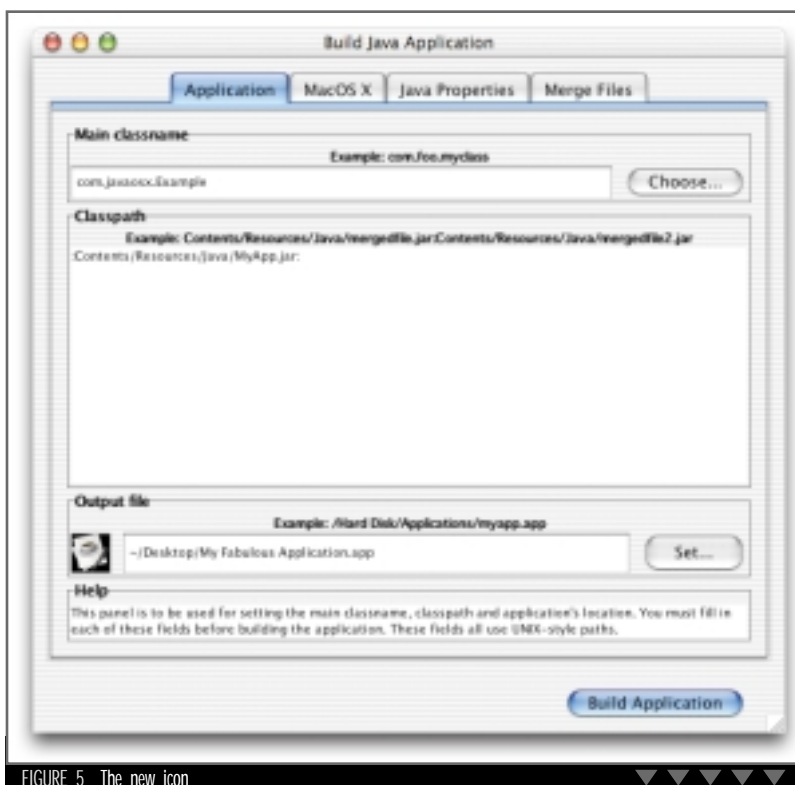


FIGURE 5 The new icon



FIGURE 4 MRJAppBuilder

The first easy-to-use XML Web content management solution!



Fully brandable

Advanced workflow and permissions

100% Browser-based

Intuitive virtual file system

User management with Active Directory

Load balancing

Metadata support

WYSIWYG XML editor—Ektron eWebEditPro+XML

Advanced style sheet support

Scheduling content

Flexible toolbar customization

Customizable XML authoring interface

Auto create user interface with schema import

Ektron family of CMS products for the Microsoft® Windows server environments



Ektron CMS300 incorporates advanced XML capabilities within the Ektron CMS200 robust content management framework.



Ektron CMS200 is Ektron's full-featured Web content management solution. In addition to a robust permission model, a multi-step workflow process ensures Web site integrity.



Ektron CMS100 offers affordable core Web content management functionality and direct migration to Ektron's other solutions.

All Ektron CMS solutions support Microsoft® ASP, ASP.NET, PHP and Macromedia® ColdFusion.

Robust XML editor



Ektron eWebEditPro+XML, a WYSIWYG XML editor integrated within Ektron CMS300, supports schema and DTD validation. It also offers multiple options for how XML tags are displayed while allowing users to manage both XML and XHTML Web site content. Learn more at: www.ektron.com/XML

Top reasons to consider Ektron CMS300:

- **Advanced Web content management** including scheduling of content, content syndication, robust workflow, e-mail notification, automatic creation of teasers, user-maintained navigation, and more!
- **Access the full power of XML:** separates Web content from presentation, serves content across various presentation devices (e.g., PDAs, mobile phones), enforces consistency and formatting of user-created content via schema/DTD validation.
- **Unique component-based model** lets developers easily add content management with their own business logic or third-party components like e-commerce.
- **Easy to integrate** in days — not months!
- **Enforce site consistency** with the ability to fully exploit XSLT and cascading style sheets.
- **Ability to manage HTML and XML content simultaneously** lets developers phase in use of XML technology as needed.
- **Affordability:** pricing starting under US\$5,000.



Since 1998, Ektron's technology has been integrated by more than 5,000 Web developers, system integrators, and major software vendors into Web sites and custom-built Web applications.

To download a free demo of Ektron CMS300 for ASP, ASP.NET, PHP, or ColdFusion platforms, visit:

www.ektron.com/cms300 or contact us at +1 (603) 594-0249

Java & Linux

written by Calvin Austin

Using *Linux*
to develop
and deploy
applications
written
in Java

It's been over two years since I wrote my last article about using the Java runtime on Linux ("Java Technology on the Linux Platform" [*JDJ*, Vol. 5, issue 12]). The Java platform and Linux distributions have not stood still during that time, so I'm taking this opportunity to answer some of the frequent questions that have surfaced since then and provide some insight into some of the more complex issues. If you're a seasoned Java on Linux user or are planning to move to the Linux platform, I trust you'll find the answer you're looking for!



Linux Threads

One well-known difference between deploying on Linux compared to other Unix operating systems is the implementation of the system threads library. Linux threads are implemented as a cloned process and, consequently, the underlying thread implementation can affect the behavior of the Java runtime.

The most visible difference when deploying a Java application on Linux is that each Java thread shows up as its own process. This means that the `/proc` filesystem will have an entry for each thread and the output of the `ps` command will list 10 or so processes for a single Java Virtual Machine. This is normal, but it's also confusing and inefficient. Later releases of the `ps` command (in package `procps` 2.0.7 and later) will hide the Java threads and display only the master process in the `ps` output. The full list of threads can be displayed using `-m` option to `ps`. Only in newer releases of the Linux kernel will the number of entries in the `/proc` filesystem be reduced.

The overhead for implementing threads using this design means that you may need to allow a little more time for Java applications to start up on Linux and reduce the number of concurrent threads if the application is thread heavy.

Why Doesn't Someone Fix This?

The scalability and signal-handling issues of the LinuxThreads implementation are well known, and over the past two years there have been several attempts to improve the situation. The two most well-known thread library projects are Next Generation Posix Threads (NGPT) and a newer library called Native Posix Thread Library (NPTL).

The earlier NGPT project is based on an M:N thread mapping that has been popular with other Unix operating systems. The M:N solution maps multiple user threads, Java threads in our case, and often runs those threads on a smaller number of kernel threads. Kernel threads are traditionally seen as more expensive for an operating system than user threads.

The newer NPTL approach is to keep the 1:1 thread mapping – one user or Java thread to one kernel thread – but optimize the kernel for thread-related operations, including signal handling, synchronization, and thread creation speed.

Both thread libraries also require modifications to the Linux kernel. NPTL requires the 2.5 kernel that's the development version of the official 2.6 Linux kernel. NGPT can be bolted on to existing 2.4 kernel distributions by rebuilding the kernel with an NGPT patch.

There's also a chance that some of the necessary NPTL kernel changes may also be back ported to 2.4 kernels as a patch.

We've been evaluating both these libraries and have seen some encouraging results from the newer NPTL library due to its compatibility with the existing LinuxThreads pthread library. The current level of compatibility means that applications like the Java runtime will not need to be recompiled or ported and will work "out of the box."

Do You Really Need All Those Threads?

The new thread libraries may still take another year before they're adopted by the major Linux distributions. In the meantime, you can make a real difference now to server applications that use many sockets. Before J2SE 1.4, most multithreaded Java server applications used blocking IO to wait for requests from the client. Blocking IO in this scenario resulted in a single thread for every server socket connection.

You can reduce the number of threads by using either a connection pool of listening threads or the new New IO Selector and `ServerSocketChannel`. The `Selector` class available in J2SE 1.4 manages a list of registered channels and returns those with an event pending. Each `ServerSocket-`

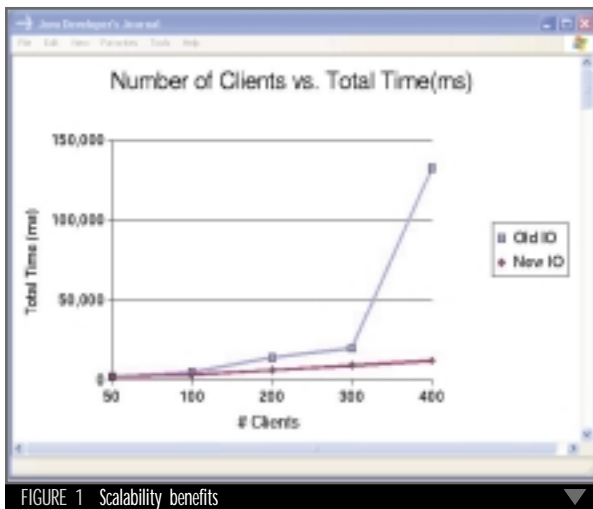


FIGURE 1 Scalability benefits

Channel can be placed in a nonblocking mode; in this mode the Selector can be used to multiplex sockets in a way that's similar to the Unix poll command. The scalability benefits of using one thread to manage socket connections can be seen in Figure 1.

The chat server used in this test was first implemented using blocking IO (Old IO), and then rewritten to use the multiplexing sockets (New IO). The Linux thread overhead becomes apparent after as little as 100 connections.

The Java Runtime and GCC 3.2

Over the past year there have been significant changes to the GNU C++ Application Binary Interface (ABI). This means that programs built against an earlier C++ library are not compatible with newer C++ libraries and vice versa.

This change in compatibility is apparent if you try to use a Java plug-in with a build of the Mozilla Web browser that was compiled with GCC 3.2. Fortunately, most

2. Change directory (cd) to the Mozilla installation directory. The default installation directory is /usr/local/mozilla.
3. Find the plugins directory.
4. Remove the libjavaplugin_oji.so file from the plug-in directory, if it exists.
5. Link the libjavaplugin_oji.so file from the JRE or JDK you downloaded to the plug-in directory. The libjavaplugin_oji.so file is either in the directory jre/plugin/i386/ns610 or plugin/i386/ns610, depending on whether you installed the JDK or JRE, respectively

The following small script can be used if you have installed JDK 1.4.1_01 and are using the default Mozilla install directory.

```
(cd /usr/local/mozilla/plugins; rm libjavaplugin_oji.so;
ln -s
/usr/java/j2sdk1.4.1_01/jre/plugin/i386/ns610/libjavaplugin_oji.so
libjavaplugin_oji.so)
```

To verify that you have successfully upgraded your plug-in, look at the Java console output. This can be configured using the ControlPanel command from the Java runtime.

Linux Debugging Tools

Whenever possible try to use a Java IDE to debug Java programs. The Linux debug and tracing tools do work but are not as advanced as other operating systems. The most useful tools are ltrace, used to trace library calls; strace to trace system calls, especially useful for catching files that can't be opened or permission problems; and finally the GNU debug tool GDB. The ltrace and strace tools are available on most distributions, but are not always installed by default.

Using GDB on a Running Process

As Linux threads are implemented as Linux processes, this



Whenever possible try to use a Java IDE to debug Java programs. The Linux debug and tracing tools do work but are not as advanced as other operating systems

Linux distributions still supply a browser based on the earlier C++ interface. We're working with the Mozilla team to remove the C++ plug-in dependency; this would enable the plug-in to work with a browser built with either compiler. If the Java runtime were built with GCC 3.2 today, then the plug-in wouldn't work on an earlier browser.

We are planning to build the next major J2SE release on Linux with GCC 3.2, and it should work on both old and new browsers. Our friends at blackdown.org are also planning to release a special GCC 3.2 version for testing.

Java Plug-in Installation Tips for Mozilla

If you've just downloaded the latest Mozilla browser (1.2) and then loaded a page with a Java applet, you'll be prompted to download the Java plug-in. However, the latest plug-in available on the download server is only JRE 1.3.1. To use a later plug-in, such as 1.4.1_01, you need to do the following:

1. Download JRE 1.4.1_01 or J2SDK 1.4.1_01 from <http://java.sun.com>.

makes debugging Java programs running on Linux a little more complicated. If the JVM is already running, you can attach the system GDB tool to the JVM as follows:

```
gdb /usr/java/j2sdk1.4.1_01/bin/java 11712
```

The 11712 number in the example is the parent Java process thread ID. Most of the Java processes in a ps listing will have a common parent process; this is the parent thread that you'll use as the process number to pass to the GDB.

With the GDB attached to the JVM, you can run any GDB commands. If you've used GDB before, these commands will look familiar. The info threads command lists the Linux threads, the t command selects a thread to be the current thread, and the where command lists the stack frames in that thread.

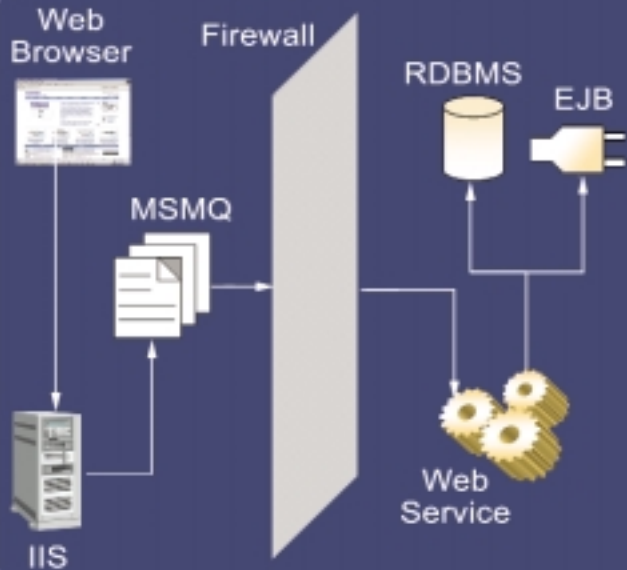
Starting a Java Virtual Machine Using GDB

Attaching a GDB trace to an existing program is normally the simplest way to debug a deadlocked JVM; however, you might

Orchestrate J2EE, WebServices, .NET and Legacy assets - Deliver systems 10X faster !

Tifosi

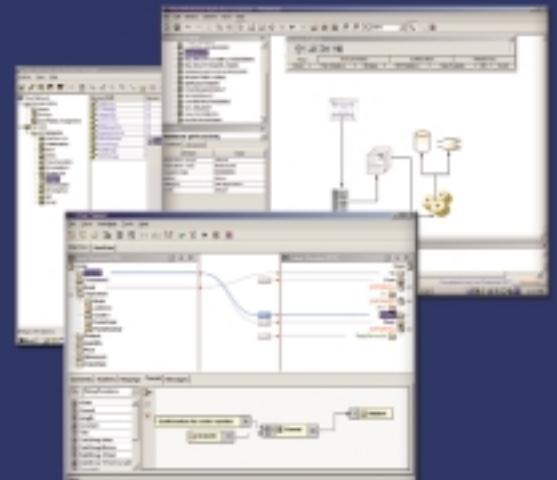
Distributed Application Composer



The Tifosi Application Composer allows developers to rapidly compose distributed systems using components derived from existing J2EE, WebServices, .NET and Legacy Software Assets.

Use live component assembly to deploy your distributed systems faster!

- ▶ Build easy-to-modify flow-based processes with loosely coupled components derived from existing J2EE applications and WebServices.
- ▶ Easily mix and match J2EE with multi-language (Java, C, C++, C#, Scripts and more) components, .NET and WebServices in a single multi-platform business process.
- ▶ Perform Distributed data debugging on live business processes.
- ▶ Selectively deploy application components on different production machines across the network.
- ▶ Create componentized, reusable business process flows at the click of a button.



Reduce Time to Market with Componentized Development Today !

Download FREE evaluation software at www.fiorano.com

Fiorano

Enabling Change at the Speed of Thought™

want to start the JVM from within the GDB debug tool, especially if you're trying to debug some native code from a JNI library.

To enable the JVM to run from inside GDB on Linux with J2SE 1.4.0 and later, use the following steps.

First, set the LD_LIBRARY_PATH environment variable to point to the Java installation directories; the example shown is for the J2SE 1.4.1_01 release. You can add your own LD_LIBRARY_PATH to point to a JNI library, for example, but add those directories to the end of the LD_LIBRARY_PATH variable.

```
export
LD_LIBRARY_PATH=/usr/java/j2sdk1.4.1_01/jre/lib/i386/client
:/usr/java/j2sdk1.4.1_01/jre/lib/i386:/usr/java/j2sdk1.4.1_
01/jre/./lib/i386
```

Next start GDB. From J2SE 1.4.0 onward the Java shell script wrapper used to start the JVM has been replaced by a small executable program. The GDB session can simply be started as follows:

```
gdb /usr/java/j2sdk1.4.1_01/bin/java
```

All that remains is to instruct GDB to ignore some of the common signals used by the Hotspot Virtual Machine, and then provide the arguments to the Java program, in this instance the Java2Demo.jar file.

```
gdb /usr/java/j2sdk1.4.1_01/bin/java
> handle SIGUSR1 nostop noprint pass
> handle SIGUSR2 nostop noprint pass
> run -jar Java2Demo.jar
```

If you want to stop in your own JNI library, enter the following GDB command to trap each time a dynamic library is loaded.

```
>set stop-on-solib-events 1
```

Use the cont GDB command to continue execution until you can see that your library has been loaded; this should occur after a dozen attempts. You can list the shared libraries by running the sharedlibrary GDB command.

Finally, to break on a function in your JNI library, enter the GDB command break with the function name you want to stop in.

Summary

Using Linux to develop and deploy applications written in the Java programming language has become increasingly popular as the Linux platform has reached new heights. With the introduction of the new threads libraries and the transition to the new C++ ABI complete, the next year promises to be an exciting one for Java and Linux users. ☺

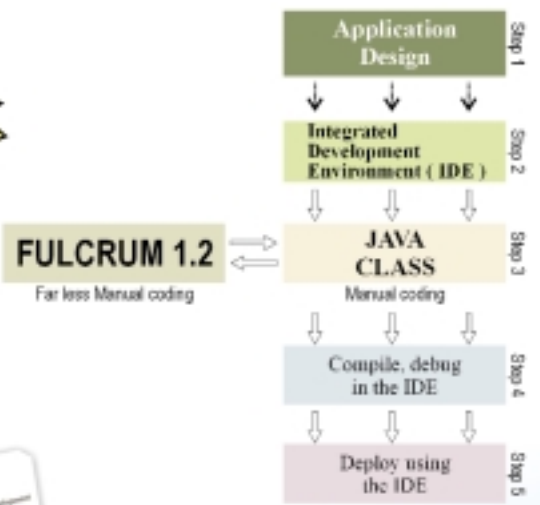
Resources

- *Native POSIX Thread Library*: <http://people.redhat.com/drepper/nptl-design.pdf>
- *Next Generation POSIX Threading*: www-124.ibm.com/pthreads
- *Java technologies on Linux*: <http://java.sun.com/linux>
- *Blackdown Java porting team*: <http://blackdown.org>

AUTHOR BIO

Calvin Austin is the J2SE 1.5 specification lead and lead engineer for the Java 2 Standard Edition Linux project at Sun Microsystems, Inc., and works with the Blackdown.org Java porting group. He is cofounder of the Java Developer Connection, and also the coauthor of *Advanced Programming for the Java 2 Platform* (Addison-Wesley, 2000).

calvin.austin@sun.com



FULCRUM

A Java Code Assembler

"map & assemble Java code based on templates"

FULCRUM is a unique productivity improvement software tool for Java development - it uses a proprietary concept of code templates that can be used as 'building blocks' to construct efficient Java objects and applications. It is easy to use, requires little training and hence reflects positively on productivity within a few days.

Try FULCRUM for free - log on to : www.AccelTree.com and download the FULCRUM Professional Edition L2 (complete version) to accelerate your Java coding today.



AccelTree Software
e-mail: Info@AccelTree.com
www.AccelTree.com

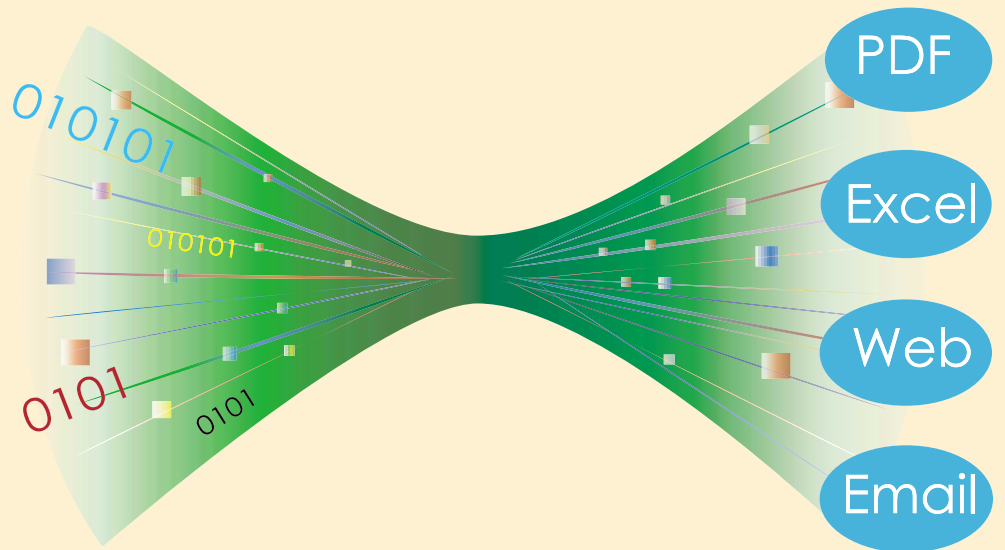


FULCRUM™
Your productivity tool for Java development

Java and all Java based trademarks are trademarks or registered trademarks of Sun Microsystems, Inc. JBuilder and all JBuilder based trademarks are trademarks or registered trademarks of Borland Software Corporation. All trademarks are the property of their respective owners.

My Enterprise Reporting Solution Must:

- (1) be built on open-standards
- (2) support end-user ad-hoc queries on the web
- (3) have reusable logic/ components



STYLE REPORT

InetSoft provides open standards based, innovative component technologies. Style Report is a 100% Java, integration oriented retrieval solution that aggregates data from any source into intelligent, actionable, decision making information. Flexible delivery channels, such as Web, email, PDF, and Excel ensure that information is available where and when it's needed. Zero client Ad-Hoc web reporting is provided inside a comprehensive framework that maximizes end user's self-service productivity. Style Report instantly becomes a seamless part of any infrastructure.

STYLE REPORT

JDJ special <http://www.inetsoft.com/jdj>

www.inetsoft.com



InetSoft, Style Report, Style Report/Enterprise Edition are trademarks or registered trademarks of InetSoft Technology Corp. Java, Swing and Sun are trademarks or registered trademarks of SUN Microsystems, Inc. Adobe, Acrobat, PDF, Postscript are trademarks or registered trademarks of Adobe Systems, Inc. Excel and Word are trademarks or registered trademarks of Microsoft Corporation. JBuilder is a trademark or registered trademark of Borland Software Corporation.



JASON R. BRIGGS J2ME EDITOR

A United Front

Along with many others, I've believed for quite some time now that there must be a change in the custodianship of Java for the platform to survive these uncertain times. My personal belief is that any future custodian of the Java platform must be an organization of community members (both corporate and individual) working toward definable open-source goals. Take the best from the JCP, the Apache model, the Linux/Kernel semi-dictatorship model, etc., and build something new to lead us forward.

I have numerous reasons for thinking this – too many to go into detail here – and I recently added a new reason to the list (a comment that has been said before by wiser minds than myself): Sun might talk the talk, but they definitely don't walk the walk.

Case in point: the early access release of the J2ME Wireless Toolkit 2.0 (Beta 1), now available for the following platforms:

Windows

Does this strike anyone else as vaguely sacrilegious? Why is it not completely Java and available to any supported platform? Why is there not a download available for Solaris, Linux, Mac, and any other Java 1.4.x supporting platform I care to think of?

I'm sure someone will come up with the argument that there are platform-specific facilities built into the Toolkit that make porting it to other platforms more difficult; hence a Solaris/Linux port won't be immediately available, and certainly not available for the first beta. That's not the point. Ninety-nine percent of the Toolkit should be built in Java. Call me a die-hard purist if you want, but anything that simply has to be coded in C/C++ (and therefore rewritten for each platform) should be an optional feature that isn't required in order for the software to run.

This unwillingness to toe the philosophical line, in my view, is yet another

reason why Sun is the wrong guardian for Java. However, don't get me wrong; this doesn't come out of some misguided dislike for Sun as a whole, rather it comes from a desire to see the platform – in all its forms, not just J2ME – survive an increasingly embattled position. A united front by definition has to be stronger, and you're more likely to see a united front if companies feel they can have more personal ownership of the platform.

Of course, the other advantage of having a more open custodianship of Java is that when they release a toolkit for only one platform, people like me can say things like...“Doesn't this strike anyone else as vaguely sacrilegious...blah blah blah.” And maybe, just maybe, they might actually be heard.

• • •

“Crud.” If you have an e-mail address, you get a lot of it. If you're one of the editors of a magazine, there must be a Murphy's Law somewhere that says you're in for an exponential increase in the amount of “crud” that filters through your inbox. Occasionally, among all the “you might already be a winner, click now!,” “try our natural remedy for guys who have trouble rising to the occasion,” and “me and my 18-year old sister took photos of ourselves at the beach, check them out here” e-mails (yes, I actually did get that last one; where do these people get my address?) that magically filter themselves into my trash can, something comes along that might actually be worth reading. Of course, among all the other rubbishy titles, it can sometimes be hard for a poor, defenseless e-mail to attract my attention. But “Java [mobile] games to be worth over US\$3 billion” will definitely do it.

As many will already be aware, I don't put much credence in the opinions of most analysts – a certain choice few, with the prerequisite of actually having a sense of humor being the exception (you know who you are, John J.). Hence, I view any claims

A United Front

Along with many others, I've believed for quite some time now that there must be a change in the custodianship of Java for the platform to survive these uncertain times. My personal belief is that any future custodian of the Java platform must be an organization of community members (both corporate and individual) working toward definable open-source goals.

by Jason R. Briggs

40

JCP Expert Group Experiences – JSR-118

The Java Community Process defines the way Java standards are created. Through this process, members of the community are invited to work together in expert groups (EG) to create new Java specifications. This article describes my experiences at leading the expert group for a recent JSR – JSR-118 – Mobile Information

Device Profile 2.0.

by Jim Van Peursem

42

The New PDA Profile

J2ME developers have long desired the opportunity to build sophisticated applications for the personal digital assistant (PDA) market, applications common to resource-rich desktop computers. One thing stood in their way: most PDAs lacked resources to efficiently execute those applications.

by Jim Keogh

46

of enormous amounts of money rolling in by a certain date and time with a degree of skepticism. However, the amount isn't really the important issue in this case. What is important is that there is a realization outside of the immediate J2ME developer community that Java games for mobile phones will be a big thing in the years to come. US\$3 billion or not, if you need any validation that J2ME is the space to be in, this is it. ☘

▼▼▼ jasonbriggs@sys-con.com

AUTHOR BIO

As well as being the J2ME editor for Java Developer's Journal, Jason R. Briggs is a Java programmer and development manager for a wireless technology company, based in Auckland, New Zealand.



Name: Hartmut Neven
Company: Eyematic®
Most recent titles: Shout Messenger™ & MyGenie™
Dream: To make wireless communication as visual as it is verbal.



As CTO of Eyematic, Hartmut Neven is responsible for creating the most viable and cutting-edge wireless applications imaginable. Two prime examples are the new BREW™ applications Shout Messenger – the first U.S. multimedia messaging app to wirelessly deliver animated content – and MyGenie Daily Horoscope. “BREW is extremely convenient for the developer because it’s a one-stop solution,” Neven said. “After an app is tested, it is immediately made available to all other BREW carriers, and consumers can literally begin downloading within hours.” And Neven isn’t alone. Commercial services are launched and BREW applications such as games, email, news, weather, stock trades, position location and ringers are now heading to market – a market of millions upon millions. If you aren’t developing for BREW, you aren’t developing to your potential. To get started, go to www.qualcomm.com/brew.



JCP Expert Group Experiences — JSR-118

An inside look at the process



WRITTEN BY
JIM VAN PEURSEM

The Java Community Process (<http://jcp.org>) defines the way Java standards are created. Through this process, members of the community are invited to work together in expert groups (EG) to create new Java specifications.

If you wanted to create a new specification, you would file a Java Specification Request (JSR) with the JCP Program Management Office (PMO). To date, there have been over 200 JSRs filed, and they're at various phases of development. Some have been finalized and are being deployed in products, while others are just getting started.

In this article, I describe my experiences at leading the expert group in a recent JSR — JSR-118: Mobile Information Device Profile 2.0. (To see a list of the JSRs and learn more about what their goals and statuses are, please visit <http://jcp.org/jsr/all/index.en.jsp>.)

As you would expect, the Mobile Information Device Profile (MIDP) 2.0 expert group created a new revision of the MIDP 1.0 (JSR-037) standard, which was finalized in September 2000 and is shipping in many devices around the world. Mark VandenBrink from Motorola was the specification lead for JSR-037, which means Motorola is the specification lead for the revised MIDP standards, including version 2.0. However, this time around, Motorola tapped me on the shoulder to lead, which turned out to be an interesting and challenging experience.

Creating the Expert Group

The expert group experience for JSR-118 was interesting both in terms of the technology we developed and the fact that it pushed the envelope of the JCP process. The JCP Executive Committee (EC) approved the JSR in April 2001 and the work began shortly thereafter. The first step is to form the expert group through a process called the Call for Experts (CAFE). During this phase, experts in the industry and members of the community are invited to join the expert group. For JSR-118, even this was a challenge. For a typical CAFE, the specification lead receives 15–25 applications to join the expert group, and accepts somewhere around 15–20. However, it was clear that MIDP

was taking off in the marketplace and the number of individuals and companies involved was becoming significant.

For our CAFE, we received approximately 60 responses, so a choice had to be made whether to keep the group small and focused and include only a fraction of these applicants in the expert group, or to be inclusive and let everyone become involved. We ultimately decided upon the latter; the advantage of this choice is that it assisted the further adoption of MIDP in the marketplace by letting all interested parties have a voice in the direction it should go in. The risk, however, was the schedule. As you can imagine, getting 60 companies to reach a consensus on a decision is a lot more difficult and can take significantly longer than with 20 companies. We decided that the potential advantages outweighed the risks, and so jumped in with both feet. As a result, JSR-118 became the largest expert group attempted (and finished) in the Java Community Process, with approximately 60 companies and over 120 individuals participating from countries all around the world. This became a tremendous challenge in terms of communication (during the peak, I typically got 250+ e-mails per day), program management, diplomacy, reaching consensus, scheduling, etc.

With such a large expert group and the large number of people involved, some structure had to be provided to make the group manageable. The Java Community Process had defined the concepts of *participants* and *reviewers* so the specification lead could distinguish the levels of involvement of an individual or company. For JSR-118 the members of the expert group were each assigned one of these roles; however, in practice this distinction was rarely used. It was only utilized to decide participation in our face-to-face meetings.

Coordinating our face-to-face meetings was an interesting challenge. First, imagine

the size of the meeting room (concert hall) we had to find to hold expert group meetings with over 100 people attending. Then imagine how unproductive such a meeting could be! To make the face-to-face meetings manageable, we limited attendance to approximately 30–35 (depending on how large the room was). Even at this size, it was a challenge finding rooms that could accommodate us in a productive round-table style (nonclassroom) setting. For each meeting, the participants were given the first chance at claiming a seat. After the participants responded, the reviewers were given a chance to claim the remaining seats. For each subsequent meeting, preference (after participants) was given to reviewers who had not previously participated in a face-to-face meeting. In this way, all reviewers were given a chance to attend at least one meeting.

The vast majority of our expert group communications took place via e-mail. To make this manageable, several topic-specific e-mail lists were set up. In the MIDP 2.0 JSR, several technical areas were listed for development; one list was created for each of the 13 topics being developed in the expert group. Then all members of the expert group were invited to subscribe to the lists they were interested in, and more than one person from each company could participate. In this way, the relevant experts on each topic from within each company could participate in each of the subareas. This was advantageous for three reasons:

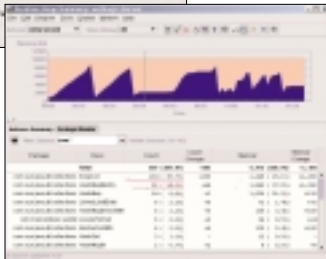
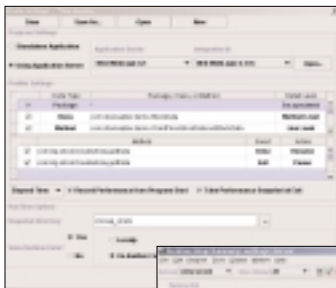
1. It was easier to keep the discussion threads together so they could be followed more clearly.
2. Not all members had to deal with all the messages (they subscribed only to the areas they were interested in).
3. The experts from each company associated with each topic could participate, which made the discussions more efficient than if all communications had to be funneled through one representative per company.

Ensure high-performing
Java™ code, wherever it runs

JProbe®



Now part of  QUEST
SOFTWARE



Award-winning JProbe provides deep J2EE diagnosis tools that give you a complete picture of your Java application, right down to the offending line of code. JProbe includes everything you need for fast, accurate analysis of your application servlet, JSP and EJB code.

Track down inefficient algorithms, memory leaks, threading problems and untested code. JProbe works virtually everywhere with unrivaled application server, JDK and operating system support.

JProbe Suite

JProbe Profiler

JProbe Memory Debugger

JProbe Threadalyzer

For more info and a free eval, visit:

www.sitraka.com/jprobe/jdj



Defining the Technology

Once the expert group was created, the development process began. As filed, the JSR described the scope for the expert group to be:

- Backward compatibility with MIDP 1.0
- Continued focus on small, high-volume wireless phones
- Maintain tight footprint objectives to limit growth in the core APIs
- Information learned from MIDP 1.0 deployments to fine-tune MIDP 1.0 APIs
- Focus on core functions needed by all devices and applications
- Focus on enabling m-commerce, service-based applications

The JSR also listed the functional areas to investigate, including:

- Domain security model, including signing of applications and verification of certificates
- HTTPS and secure networking
- Network connectivity via sockets and datagrams
- Formal inclusion of OTA Provisioning (i.e., Recommended Practice 1 for MIDP 1.0)
- Push architecture – external events and messages routed to appropriate MIDlets
- User interface – extensions to low-level LCDUI to allow greater game functionality and layout control for larger screen sizes
- A small, efficient XML parser to enable platform-independent data exchange
- Base sound API

Given broad goals and functional descriptions like these, the expert group's first step was to examine each area and agree on the requirements. Our first face-to-face meeting in June 2001 was therefore dedicated to refining the scope of the JSR and coming to an agreement on these requirements.

After we reached consensus, it gave us a basis for agreement upon which we could start the design of the APIs. A call for design proposals was issued, and several proposals from different companies and individuals were distributed and discussed via e-mail. In some areas, only one proposal was received, while in others there were competing proposals. The expert group members then focused on comparing the features and merits of each proposal. After the debates and discussions evolved for a while, it became clear that the competing proposals in some areas were starting to evolve independently, not driving

toward a merger. Since ultimately it made sense to specify only one API for a given functionality, I set a deadline for choosing one basis proposal in each area. This basis would then be the API that the expert group would focus on improving to meet the requirements we defined in the first meeting. In some cases, this meant combining the best elements from multiple proposals, but in most areas one of the proposals was chosen over others.

Once the basis proposal was chosen for each area, the expert group collaborated on refining the designs. This was the part of the process where the most debate and disagreements occurred. Most of the arguments centered around the naturally recurring tension between new features and the added cost that came with the associated increase in implementation size. On the one hand, since the target devices for this technology are extremely resource limited, we had to keep a close eye on the implementation budgets. This meant that some members of the expert group were constantly trying to reduce the feature set to lower the cost of implementation. On the other hand, there was obvious value to adding more functionality, as it enabled a richer set of applications. This tension is what caused most of the interesting debates in the expert group.

One of the unfortunate victims of these debates was the XML functionality. As we were developing this portion of the specification, it became clear that the implementation size was a very large percentage of our overall budget. Even after we trimmed its functionality down as far as we could without significantly crippling the design, it was still too large. As a result, we decided that a new JSR (JSR-172) should be filed for developing an XML specification for the MIDP market. In this way, those devices that can afford the extra implementation budget can incorporate this functionality, while those very cost-sensitive devices can choose to leave it out. It also allows the new expert group to have more freedom in terms of implementation budgets and features. The disadvantage is that XML developers can't rely on parsers being available on every MIDP platform.

Opening the Specification for Review

Once we brought the specification to what we considered a relatively stable point, it was time to get a larger audience to review it. In the JCP, the first step in this process is the Community Review. This is where the specification is published to JCP members so they can send their comments and feedback

to the expert group. This review lasted 30 days, and we received around a dozen comments, which helped us improve the specification. During this time, the expert group continued to debate the features and improve the specification as well. We created a new draft of the specification, incorporating improvements both from internal debates and from the Community Review feedback.

The next step for getting an even broader review was to submit the specification for Public Review. This is where the specification is published openly so that anyone with network access can download it and send in their comments and feedback. This review also lasted 30 days, during which time we received nearly 100 comments. Reviewing and responding to all these comments was a significant effort that I had not anticipated. However, many of the public review comments resulted in new features being added, changes in design, and even simple (and useful) editorial clean up. Even though this created a lot of work, this feedback was beneficial and I would encourage you to get involved in providing feedback when JSRs are in Public Review.

The expert group continued to review the specification and work on clarifications when areas were found to be vague in meaning. At the same time, the Reference Implementation (RI) and Technology Compatibility Kit (TCK) teams started working on their implementations. As a part of the JCP process, an expert group must complete the specification, as well as an RI and TCK. At the time of this writing, the Proposed Final Draft of the specification has been submitted, and the RI and TCK are nearing completion. With any luck, by the time you read this, the specification, RI, and TCK will all be complete and available for download and implementation in your products.

Summary

Participating in the JCP is a challenging and rewarding experience. I would recommend it for anyone interested in the technologies being specified. Even if you don't have the bandwidth to become directly involved, you should become involved in the Public Reviews. The comments you send in are taken seriously and can have a direct impact on the designs being specified. This is your opportunity to shape and influence the APIs that you may want to use in the future. Don't pass it up! ☘

▼▼ jim.van.peursesem@motorola.com

AUTHOR BIO

James E. Van Peursesem is chief architect for the J2ME platform at Motorola. He has been actively involved in the application of Java technologies in mobile wireless devices for as long as Java has existed. His contributions to external forums include being the specification lead for JSR-118 (MIDP 2.0) and interpretation guru for JSR-037 (MIDP) as well as being involved in the development of the JavaPhone APIs and the MExE standard within ETSI/3GPP. Jim received his PhD in computer engineering from Iowa State University.

Building J2EE and Web Services?

Accelerate development and deployment with AltoWeb

Java™ 2 Platform, Enterprise Edition (J2EE™), XML and Web Services are widely recognized as the foundation for e-business applications. But building, deploying and managing applications on top of application servers is challenging. To succeed, developers need to:

1. Learn and manage a lot of different technologies that are always changing—JSP™, servlets, EJB™, JMS, JDBC™, XML, UDDI, WSDL, and SOAP, to name a few.
2. Choose the right architecture and use the best J2EE practices—because the wrong decisions can lead to performance problems and costly rework later on.
3. Select reusable application components that let them focus on new development.
4. Assemble, test, deploy, monitor, and manage J2EE applications and Web Services.

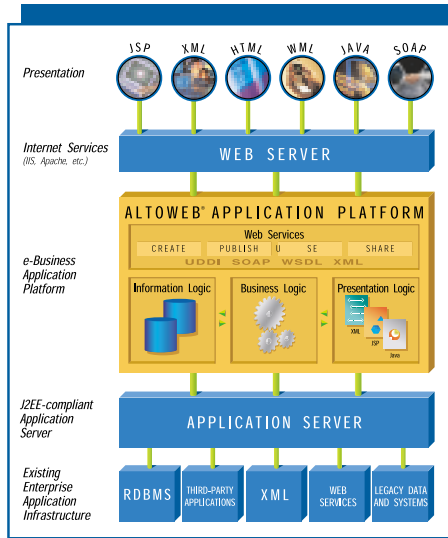
AltoWeb delivers up to 10x faster productivity and time to deployment

The AltoWeb Application Platform lets developers build, deploy, manage, and maintain e-business applications up to 10x faster by replacing the lengthy, custom, and complex coding for J2EE, XML, and Web Services with a packaged solution that shields developers from the low-level complexities involved in building J2EE applications and Web Services. With the AltoWeb Application Platform, developers focus on building 20% of the application specific to their business, and use Java IDEs and Web authoring tools of choice.

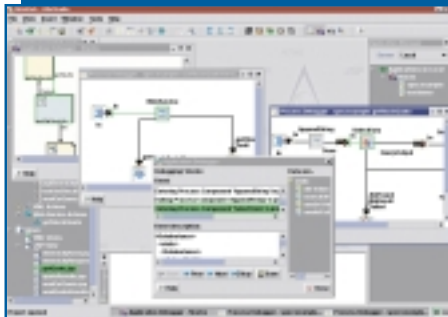
Packaged components and reusability out of the box

With AltoWeb, developers get a comprehensive set of pre-packaged EJB components and services that provide the foundation for e-business applications and promote true reusability and maintainability:

- Information logic components enable fast integration to existing enterprise infrastructure elements—including relational databases, file servers, Web servers, and legacy systems.



The AltoWeb Application Platform lets you assemble, deploy, test, monitor, and manage J2EE applications.



Live component assembly shrinks the time spent on assembly, testing, deployment, and maintenance from months to days.

- Business logic components deliver process control flow and rich functionality.
- Presentation logic lets developers rapidly build rich user interfaces using a variety of open industry standards—including HTML, XML, JSP, WML, and Java.

- Built-in support for XML integration and Web Services enables developers to create, publish, monitor, and use Web Services as an integral part of each application.

Accelerated and simplified development, deployment and management

AltoWeb adds the tools development teams need to accelerate and simplify the entire application lifecycle: from development through assembly, testing, deployment, and runtime management.

With AltoWeb, developers move to rapid, visual, live assembly and testing of packaged, reusable J2EE components. They move away from the lengthy, error-prone custom development, integration, component deployment, and low-level testing that consumes most of the time and resources in projects today.

- Application developers who know the business define application logic directly.
- Web page developers focus on the overall look and feel using their Web authoring tools.
- Java developers now focus on developing specialized application logic with their existing Java IDEs.

AltoWeb automates deployment and runtime management by building these facilities into your applications.

Find out more about how AltoWeb has helped its customers become 10x more productive, and deliver applications up to 10x faster. Visit www.altoweb.com to download a complimentary 30-day evaluation copy of our software and get more information.

© 2001, AltoWeb, Inc. All rights reserved. AltoWeb is a registered trademark of AltoWeb, Inc. in the United States and other countries. EJB, Java, J2EE, JDBC, and JSP are trademarks of Sun Microsystems, Inc. All other trademarks are the property of their respective owners.



FREE 30-DAY TRIAL!
Download at www.altoweb.com

The New PDA Profile

The right tool for J2ME developers



written by Jim Keogh

J2ME developers have long desired the opportunity to build sophisticated applications for the personal digital assistant (PDA) market, applications common to resource-rich desktop computers. One thing stood in their way: most PDAs lacked resources to efficiently execute those applications.

However, that's about to change with the introduction of ARM processor-based PDAs and the PDA Profile that's soon to be incorporated in SDKs and VMs.

Improvements in processor design have transformed new PDAs into a powerhouse platform capable of running sophisticated J2ME applications and clients of enterprise Java systems. New PDAs bring higher performance previously known only on desktop computers.

With performance and power barriers removed from the new PDA, a committee of the Java Community Process that included PalmSource, the software division of Palm, defined a new profile called the PDA Profile (PDAP) that introduces classes for building highly responsive J2ME applications.

PDAP is an extension of the Connected, Limited Device Configuration (CLDC) 1.1 and the Mobile Information Devices Profile (MIDP) 1.0. New PDAs powered by an enhanced processor are capable of running both MIDP applications and PDAP applications using a PDAP-enabled VM. There are two key features introduced with the PDAP: the capability to develop sophisticated graphical user interfaces for a PDAP application using the Abstract Windowing Toolkit (AWT – a subset of the J2SE AWT), and the capability to access a PDA's native personal information data. A PDAP application can access data managed by the PDA device's address book, calendar, and to-do list applications.

The New PDA

I use the term “new PDA” to describe the latest incarnation of a PDA, but that doesn't help you know if a PDA can run PDAP applications. A better definition of “new PDA” is to describe the footprint required to run a PDAP application.

A PDA must have a minimum of 1,080KB of memory: 500KB for CLDC and MIDP, 540KB for the PDAP user interface libraries, 20KB reserved for the PIM API, 10KB for the Generic Connection Framework, and another 10KB for the PDAP security model. Table 1 describes other hardware configurations that are required to run a PDAP application.

PDAP and MIDlets

A PDAP application is called a PDAlet, which is a variation of the MIDlet application model. Actually, a PDAlet is a MIDlet that uses the PDAlet API and follows the same principles used in a MIDlet and MIDlet suite.

There isn't a PDAlet class because a PDAlet is a conceptual entity that refers to the capabilities and requirements of a PDAlet. A PDAlet is created by defining a class that extends the MIDlet class. Think of it as an extension of a MIDlet; those rules that apply to a MIDlet also apply to a PDAlet.

Listing 1 shows an empty MIDlet and Listing 2 converts this empty MIDlet into an empty PDAlet by calling the `getDefaultToolkit()` method within the `startApp()` method. The default toolkit is a subset of AWT and is used to create a GUI for the PDAlet. The `getDefaultToolkit()` method makes the PDAP API available to the PDAlet.

Although many developers will use AWT components to build a GUI for their PDAP application, a GUI isn't required for a PDAlet. You can create a PDAlet without having a GUI by calling the `Display.setCurrent(null)` method within the `startApp()` method. The PDAlet is then placed in the active-without-UI state, which means the PDAlet is still active but the implementation determines what, if anything, is displayed on the screen.

The PDAlet Suite

A PDAlet suite's functionality is similar to a MIDlet suite's in that both are packages of PDAlets and MIDlets, respectively. Suites make it easy for the developer to group related PDAlets and MIDlets for deployment and installation.

A PDAlet suite is a bundle of PDAlets and MIDlets that's implemented simultaneously on a PDA. All PDAlets (and MIDlets if any) within a PDAlets suite are considered a group and must be installed and uninstalled as a group. Each PDAlet and MIDlet within the PDAlet suite must be listed in the PDAlet suite's manifest, which is also contained in the PDAlet suite.

Members of a PDAlet suite share the same resources from the host environment and share the same Java class instances, and run within the same JVM. This means if three PDAlets from the same PDAlet suite run the same class, only one instance of the class is created. A key benefit of the relation-



Some people say the convergence of application development and integration is difficult.

Three days in Orlando doesn't sound all that difficult to us.



The 8th Annual Technology Conference
Gaylord Palms Resort & Convention Center, Orlando, FL
March 2 - 5, 2003

[One place. One time. One idea.]

Join us at BEA eWorld 2003-Converge, our 8th Annual Technology Conference. Where trends in enterprise computing are reshaping everything in the software industry. And where the brightest minds—with the most provocative ideas, most innovative approaches to solving difficult problems, and richest store of practical information—will shake the foundations of the industry.

During these three groundbreaking days, you will learn how building, integrating and extending software applications are converging into a single, powerful framework that promises to drive dramatic increases in developer productivity. Which is precisely why you can't afford to miss a moment.

»»» **REGISTER TODAY! It's easy at www.bea-eworld.com** <<<

Brought to you by:



Diamond Sponsors:



Community Sponsor:





CHARACTERISTIC	REQUIRED CHARACTERISTIC
Display	Ranges from a resolution of 128x128 pixels to 240x320 pixels Minimum display depth of 1 bit Color support from 1-bit black and white to 64K colors
Input	A stylus or other pointing device and a method of character input
Power	Battery
Network	Two-way wireless networking with a limited bandwidth. The network connection can be intermittent.
Processor ROM and RAM	Performance range from 15MHz up to 206MHz. Range from 2MB to 32MB. Minimum of 1,000KB total memory (ROM and RAM) that is available for Java runtime and libraries
Heap Space	Range from 64K to 64MB
User Interface Capabilities	Text based, windowing, dialogs, buttons, text input fields, and images

TABLE 1 Hardware requirements for running a PDA profile application

ship between PDAlet suite members is that they share the same data, including persistent storage such as that used to store user preferences.

Sharing data among PDAlets exposes each PDAlet to data errors caused by concurrent read/write access to data. However, this risk is reduced because synchronization primitives on the PDAlet suite level restrict access to both volatile and persistent data.

Data cannot be shared between PDAlets that are from another PDAlet suite because the PDAlet suite name is used to identify data associated with the PDAlet suite. A PDAlet from a different PDAlet suite is considered an unreliable source.

A PDAlet suite is installed, executed, and removed by the application manager running on the device (the manufacturer of the PDA provides the application manager).

Once a PDAlet suite is installed, the application manager gives each member of the PDAlet suite access to JVM and CLDC classes. Likewise a PDAlet can access classes defined in the MIDP and PDAP to interact with the user interface, network, and persistent storage.

The application manager also makes the Java Archive File (JAR) file and the Java application descriptor file (JAD) available to members of the PDAlet suite. Note that the JAD file is optional.

All the files that are necessary to implement a PDAlet suite must be contained within a production package called a Java Archive File (JAR). These files include PDAlet classes, graphic images if required by a PDAlet, and the manifest file.

The Manifest

A PDAlet suite is created almost the same way you create a MIDlet suite except PDAlets are identified within the PDAlet suite's manifest using the PDAlet=<name> attribute, where name represents the name of the PDAlet class.

The manifest file contains a list of attributes and related definitions that are used by the application manager to install the files contained in the JAR onto the small computing device. There are 10 attributes that are defined in the manifest file; all but seven of these attributes are optional.

Table 2 lists attributes contained in a manifest file. Of these, the following attributes are required for every manifest file. Failure to include them causes the application manager to halt the installation of the JAR file.

MIDlet-Name
MIDlet-Version

MIDlet-Vendor
MicroEdition-Profile
PDAlet-n
MIDlet-n
MicroEdition-Configuration

Listing 3 is a manifest file that contains the minimum number of attributes. All these attributes are required for a PDAlet manifest. Create a manifest file as a text file with the .txt file extension using an editor. The manifest file's file extension is changed to .mf when the PDAlet suite is prepared for deployment.

Entries in the manifest are name:value pairs and can therefore appear in any order within the manifest file. Each pair must be terminated with a carriage return. Whitespace between the colon and the attribute value is ignored when the application manager reads the manifest file.

Let's step through the manifest file shown in Listing 3. The MIDlet-Name attribute specifies the name of the PDAlet suite. The MIDlet-Version and MIDlet-Vendor attributes identify the version number of the PDAlet suite and the company or person who provided it.

The MIDlet-n attribute and the PDAlet-n attribute contain information about each MIDlet and each PDAlet that is in the JAR file. The number of the MIDlet and PDAlet replaces the letter *n*. The MIDlet-n attribute and the PDAlet-n attribute can contain three values that describe the MIDlet/PDAlet. A comma separates each value.

The first value is the name of the MIDlet/PDAlet. Next is an optional value that specifies the icon that will be used with the MIDlet/PDAlet. The icon must be in the Portable Network Graphics (PNG) image format. The last value for the MIDlet/PDAlet attribute is the MIDlet class name. The application manager uses the class name to load the PDAlet.

The next MIDlet/PDAlet attribute is the MicroEdition-Profile, whose value is the J2ME profile that's required to run the PDAlet. In this example the PDAP-1.0 profile is required. And the last MIDlet/PDAlet attribute is the MicroEdition-Configuration, which identifies the J2ME configuration that's necessary to run the MIDlet/PDAlet.

Attributes can be listed in any order in the PDAlet manifest and may contain spaces. The PDAlet manifest cannot have the MIDlet-Jar-URL and MIDlet-Jar-Size attributes. Both these attributes are permitted in the MIDlet manifest.

PDAlet/MIDlet Options

A PDAlet suite can contain PDAlets and MIDlets, and both are listed in the manifest as illustrated in the previous example. Both a PDAlet and a MIDlet listed in the manifest can provide the same functionality except that the PDAlet uses the PDAP API and the MIDlet uses the MIDP API.

If the implementation doesn't support the PDAP API in the VM, both PDAlets and MIDlets in the PDAlet suite won't run. However, you can specify that a MIDlet should run in place of a PDAlet by assigning the same index number to a PDAlet and a MIDlet. The PDAlet runs if the implementation supports the PDAP API, otherwise the MIDlet runs.

Listing 4 illustrates this technique. Notice there are two poker programs in this manifest. The first is MIDlet-2 and is called poker. The other is PDAlet-2 and is called PDAPoker. Since MIDlet-2 and PDAlet-2 have the same index number, the PDAPoker is the preferred poker program if the device supports the PDAP API. The MIDlet-2 program is used if the device does not support the PDAP API.

It's critical that the numbering sequence of MIDlets and PDAlets remain sequential without duplication except to resolve preferences, as in the case of PDAlet-2. Although there are six programs in the manifest in Listing 4, only five pro-

Does your Java web site cost you more than \$500 a month?

If you switch to Evolution by the end of Q1 '03, **we guarantee your monthly hosting bill will drop by at least 25%.** And you will finally have the pleasure of dealing with a hosting company that knows as much about Java as you do.

Maybe more.



Deploy WAR's, EAR's, and SAR's **for free** in just minutes via the myEvolution Java Hosting Control Center at www.evolutionhosting.com.

For answers to questions about hosting Java applications, call toll-free **866.257.4809** or e-mail Sales@EvolutionHosting.com.

grams are visible to the implementation. Only one program is visible per index number.

Both the PDAP 1.0 and CLDC 1.1 APIs must be present on the device to install and execute the PDAlet suite, because these values are specified in the MicroEdition-Profile and MicroEdition-Configuration attributes in the manifest. The MIDP 1.0 API is implied whenever you specify the PDAP 1.0 profile in the MicroEdition-Profile attribute. However, you can explicitly specify the MIDP 1.0 API and the PDAP 1.0 profile together by including the MIDP 1.0 in the MicroEdition-Profile attribute as shown here:

```
MicroEdition-Profile: PDAP-1.0 MIDP-1.0
```

A PDAlet suite that contains both MIDlets and PDAlets requires both the PDAP API and the MIDP API-compatible VM to install and execute the PDAlet suite. However, there are times when you want the PDAlet suite to be installed and execute only the MIDlets within the PDAlet suite if the VM is only MIDP 1.0. In this situation, you can specify that the PDAP API is optional.

To specify that the PDAP API is optional to run the PDAlet use the MicroEdition-Profile-Opt manifest attribute as shown in the following code segment. The PDAlet suite will install and execute on a MIDP 1.0-only VM. Only MIDlet programs will be installed and executed. PDAlets are considered application-specific attributes and are not available for execution.

```
MicroEdition-Profile: MIDP-1.0
MicroEdition-Profile-Opt: PDAP-1.0
MicroEdition-Configuration: CLDC-1.1
```

Java Application Descriptor File

Application management software uses a Java Application Descriptor File (JAD) to manage the PDAlet, and the JAD can be used by the PDAlet to configure specific attributes. You may include a JAD within the JAR file of a PDAlet suite as a way to pass parameters to a PDAlet without modifying the JAR file. A JAD file is also used to provide the application manager with additional content information about the JAR file to determine if the PDAlet suite can be implemented on the device.

A JAD file is similar to a manifest in that both contain attributes that are name:value pairs. Name:value pairs can appear in any order within the JAD file. There are six required system attributes for a JAD file, see below. A system attribute is an attribute that's defined in the J2ME specification. Table 3 contains a complete list of system attributes. All JAD files must have the .jad extension. Listing 5 illustrates a typical JAD file.

```
MIDlet-Name
MIDlet-Version
MIDlet-Vendor
PDAlet-n
MIDlet-n
MIDlet-Jar-URL
```

The JAD file shown in Listing 5 contains a few attributes that are also found in the manifest file. The first three attributes in the JAD are identical to attributes in the manifest file.

The MIDlet-Jar-URL attribute contains the URL of the JAR file, which in this example is called bestmidlet.jar. The last required attribute in the JAD file is the MIDlet-n and PDAlet-n attribute that defines a PDAlet and MIDlet of the PDAlet suite that's identical to the PDAlet-n and MIDlet-n attributes of the manifest. A MIDlet-n attribute is required for each MIDlet in the PDAlet suite, and a PDAlet-n attribute is required for each PDAlet in the PDAlet suite.

A word of caution: the values of the MIDlet-Name, MIDlet-

MANIFEST FILE ATTRIBUTE	DESCRIPTION
MIDlet-Name	MIDlet suite name
MIDlet-Version	MIDlet version number
MIDlet-Vendor	Name of the vendor who supplied the MIDlet
MIDlet-n	Attribute per MIDlet. Values are MIDlet name, optional icon, and MIDlet class name.
MicroEdition-Profile	Identifies the J2ME profile that is necessary to run the MIDlet
MicroEdition-Configuration	Identifies the J2ME configuration that is necessary to run the MIDlet
MIDlet-Icon	Icon associated with MIDlet. Must be in PNG image format. (optional)
MIDlet-Description	Description of MIDlet (optional)
PDAlet-n	Attribute per PDAlet. Values are PDAlet name, optional icon, and PDAlet class name.
MicroEdition-Profile-Opt	A list of noncritical profiles supported and desired by the PDAlet suite. Installation of the suite will proceed even if any of these profiles are not present in the PDAlet suite. This complements the MicroEdition-profile attribute.

TABLE 2 Attributes of the manifest file

Version, and MIDlet-Vendor attributes in the JAD file must match the same attributes in the manifest. If the values are different, the application manager uses the attribute of the JAD file. Failure to include these attributes in the JAD file will prevent the JAR file from loading into the device.

A developer can include application attributes in a JAD file. An application attribute is a name:value pair that contains a value unique to the application. Any name can be given to an application attribute as long as the name does not begin with MIDlet-, PDAlet-, or MicroEdition-.

Abstract Windowing Toolkit

The PDA profile uses common user interface elements of the Java Abstract Windowing Toolkit (AWT) as the user interface solution for PDAlets. These user interface elements are native to many PDAs that use the ARM processor.

The AWT used in the PDA profile is a subset of the J2SE AWT that's designed to utilize the limited display space and memory constraints found in a PDA. This subset contains all the features that you'll require when developing a PDA application.

A subset of AWT is used as the user interface API for two J2ME profiles: Personal Basis Profile (PBP) and Personal Profile (PP). Each is used for a targeted class of devices. As a point of reference, the PDAP AWT is a subset of the Personal Profile.

The PDA Profile subset contains support for all but the following features:

- Serialization of UI components
- Object cloning
- J2SE security model
- Buffered images
- Data transfer APIs
- Alpha composite image manipulation

Characteristics of PDA Profile AWT

PDAlets run on a variety of PDA devices, each having support for some set of graphical user interface elements. Fortunately for developers, PDA devices that run PDAP API-capable VMs must adhere to a minimum of GUI elements

live well **work smart** play hard — wireless makes it possible

Success can be measured.

Whether you climb one rung at a time, or shoot straight up like a rocket, making it to the top in business requires preparation, information and vision. In wireless, that means knowing what's new, what's hot and what's not *before* your competition does.

With **900+** exhibitors, more than **400,000 sq. ft.** of exhibit space, **International Pavilions** and attendees representing more than **90 countries**, CTIA WIRELESS 2003 will place you at the pinnacle of everything that's new in wireless — *globally*.

CTIA WIRELESS 2003's Pavilions for Developers, Mobile Entertainment and "Wireless Lifestyles" will generate more wireless and mobile computing product announcements than any other show. Whether you've seen it on BBC, CNN, in the *Wall Street Journal*, *Wireless Week* or *RCR Wireless News*—when it's news in wireless, it's out of CTIA WIRELESS.

Climb the ladder. Grab the brass ring.

CTIA WIRELESS 2003 is the place to start.

CTIA Educational Sessions – March 17-19

Special Interest Seminars

- Wireless Data University – March 16
- Mobile Entertainment Summit – March 16
- Latin American Conference – March 18

Co-located Conferences

- IEEE Wireless Communications and Networking Conference - WCNC 2003 – March 16-21
- Microsoft® Mobility Developer Conference – March 18-21

Attend the Microsoft® Mobility Developer Conference—the premier developer event for building and bringing to market wireless applications for Microsoft Windows® Powered mobile devices, including Pocket PC and Smartphone. Designed for developers, independent software vendors, wireless operators and IT professionals, this three-day event will provide the tools and strategies to build and market mobile applications, content and services. Register today at www.MobilityDevCon.com/CTIA.

Smart

CTIA WIRELESS 2003

ERNEST N. MORIAL CONVENTION CENTER, NEW ORLEANS, LA, USA



www.ctiashow.com

Register NOW and save up to \$345

Day 3
Ted Turner
Vice Chairman
AOL Time Warner



Hosted by:



Show Partners:



Show Sponsors:



that enable you to design a PDAlet that can take advantage of these GUI elements.

Color choices for your PDAlet GUI might be limited to black and white since these are the only two colors that an implementation is required to support. Realistically, however, many implementations will support a variety of colors through the RGB constructor for the Color class. Therefore it's wise to test your PDAlet on as many implementations as possible to be assured that your color choices don't negatively impact your application.

You also need to be alerted to the fact that some implementations that support a broad color palette may not permit you to change the colors of standard GUI elements such as menus and title bars. However, this lack of support doesn't prevent you from calling methods to change the color of those elements. The implementation won't throw an error, but will simply ignore your request to change the color of the element.

In some PDAlets you may want to set your own cursor using the AWT Component class. While setting the cursor is commonplace in J2SE applications, you might not be able to do so using the PDAP API because some implementations may prohibit such settings. Attempts to set the cursor will cause a silent error. The implementation will continue to run your PDAlet, but ignore your request to change the cursor.

Avoid using a variety of fonts in your application's graphical user interface because they may not be supported by the implementation. The PDAP only requires support for Font.Plain. Support for other fonts is implementation dependent. You can't assume that a font other than Font.Plain is available unless your application is tailored to run on a specific implementation.

Another limitation of running a PDAlet is thread safety. The PDAP does not mandate that AWT be thread safe. Therefore, avoid concurrent access to GUI objects using different threads. However, you can use a system event thread to enable concurrent access by calling the static invokeLater() method and the invokeAndWait() methods of the EventQueue class.

AWT offers window management capabilities that enable you to instantiate frames, windows, and dialogs from anywhere in the PDAlet and then show them by calling appropriate methods. All PDAP implementations support multiple top-level windows that are visible at any given time.

However, there are window management limitations that restrict windowing. Only one top-level window (window, frame, or dialog classes) can be shown (seen by the user) and active (has input focus) at a time. Some implementations

might permit multiple top-level windows to be shown and be active simultaneously.

Tip: The implementation determines the behavior of windowing for the application if your PDAlet does not make a top-level window visible.

Top-level windows may not be resizable by your PDAlet or by the user, and calls to the setSize() method are silently ignored. Therefore, you should assume that resizing is not available unless you're designing an application for a specific PDA that you know enables top-level windows to be resized.

Likewise, you should expect that the implementation might limit or prohibit the resizing of dialogs. Attempts to change the size of a dialog may result in a different size than the size you requested - or no change whatsoever. Implementations that prohibit resizing of dialogs will not notify your application that an attempt to resize has failed. Instead, they ignore your request to resize the dialog.

Always minimize the need to change the size of a dialog within your application. If you must change the dialog size, make sure you test those changes on all the implementations that will be running your application in order to determine the visual effect those changes have on the application's graphical user interface. Failure to do so might result in an unexpected GUI for your PDAlet.

Additional restrictions might apply to the location of dialogs on the screen. Some implementations may limit the location on the screen where you can display the dialog, and other implementations outrightly prohibit the application to determine where the dialog is displayed on the screen. And, as with other prohibitions discussed in this section, your PDAlet continues to run uninterrupted because your request for change is ignored by the implementation.

PDAP does not require that an implementation provide a means to display a title for a dialog. This means that calling the setTitle() method and getTitle() method have no effect on the dialog.

Frames also have many of the restrictions found in dialogs. You can expect that an implementation will support a one-sized frame that can't be resized by a user or an application. An attempt to size or resize a frame causes a silent error to occur without an error message being sent to your application.

Likewise, the location of a frame is determined by the implementation, not by the application or the user of the application. Frames also can't be iconified or titled. As with all the restrictions discussed in this section, an implementation may not have these restrictions.



JAD FILE ATTRIBUTE	DESCRIPTION
MIDlet-Name	MIDlet suite name
MIDlet-Version	MIDlet version number
MIDlet-Vendor	Name of the vendor who supplied the MIDlet
MIDlet-n	Attribute per MIDlet. Values are MIDlet name, optional icon, and MIDlet class name.
MIDlet-Jar-URL	Location of the JAR file
MIDlet-Jar-Size	Size of the JAR file in bytes (optional)
MIDlet-Data-Size	Minimum size (in bytes) for persistent data storage (optional)
MIDlet-Description	Description of MIDlet (optional)
MIDlet-Delete-Confirm	Confirmation required before removing the MIDlet suite (optional)
MIDlet-Install-Notify	Send installation status to given URL (optional)

TABLE 3 Attributes for a JAD file

Personal Information Management

A PDA device has native personal information management (PIM) data that's managed by personal information applications that run on the PDA device. The PDA profile requires that an implementation grant PDAlets access to PIM data. This means that your PDAlet can access data managed by the PDA device's address book, calendar, and to-do list applications. PIM data does not have to reside on the device. Your PDAlet can access the data even if the information is contained on a remote device, such as a PC that's linked to the PDA device.

The PDAP API implementation will handle security management to prevent unauthorized Java applications from accessing PIM databases. The implementation also provides a mechanism to enable a PDAlet to access PIM data efficiently without hindering performance.

PIM data can be imported and exported using a format specified by the Internet Mail Consortium. The vCard 3.0 format is used for address book entries and the vCalendar 1.0 format is used for calendar and to-do entries.

International Call Sign for Projects in Distress:

• - - - • - • • • - • - / • • • - - - • • •

(Morse code for "Java SOS")

- Does your Java application crash and you just don't know why?
- Does performance just not make the grade and support that demand?
- Could your application just work a bit better?
- Over budget already, and still have no clue how to complete all the requirements?
- Been delivered a Java application you just aren't happy with?
- Under pressure to deliver today but your Java application doesn't work?
- Or just want some advice before you start developing?

if this sounds like you, then you need n-ary. We are recognized experts in the Java field, with in-depth knowledge in Java Architecture and Design. We're highly proficient in code and performance analysis, with a team committed to making your project a success. n-ary will put you back on track.

According to the Standish Group,

84%

of IT projects overrun their budget or fail. Don't let your project be one of them. Call us in before it's too late.



Headed up by internationally renowned Java Expert, Alan Williamson, Editor-in-Chief of Java Developer's Journal and author of many Java books.

nary

www.javaSOS.com



You can access PIM data directly from your PDAlet by using the PDAP PIM API found in the javax.microedition.pim package. All PDAP implementations support the PDAP PIM API.

There are three types of PIM databases supported by the PDAP PIM API: Event, Contact, and ToDo. The Contact Database also supports a photo field that can receive and store data in any of the IANA registered image formats or a nonstandard image format. The Photo field is consistent with the definition of the PHOTO field in the vCard specification and must support the Portable Network Graphics (PNG) format.

Connectivity

Every PDAP implementation must have an HTTP connection for networking devices, which is the same requirement for the MIDP profile. However, some implementations may support the Generic Connection Framework API, the logical serial port connection using CommConnection class, as well as the file systems and/or removable memory cards using the FileConnection class.

Support for the logical serial port connection and for the file systems is dependent on the operating system and hardware support that's available on the device running the PDAP implementation. The device is not necessarily required to have a serial port connection if the device's operating system enables an IR port to be configured as a logical serial port.

The file system of a device that implements PDAP is typically located either in the device's memory or on memory cards, depending on the device and the limits of the operating system. Memory cards that contain file systems include:

- SmartMedia Card (SSFDC)
- CompactFlash Card (CF)
- Secure Digital Card (SD)
- MultiMedia Card (MMC)
- MemoryStick (MS)

Security

There are multiple security features imposed by the PDA profile that protect the user of the application and the device from malicious access and use. The PDA employs the sandbox security model that's implemented in CLDC 1.1 and MIDP 1.0. Security is further enhanced by the authorization security that enforces access privileges on resources of the device. These enhanced security policies will also be found in MIDP 2.0.

The enhanced security policies are hidden from the application and become visible only if a security exception occurs when using the PDAP API privilege functionality. Restrictions and permissible actions are associated with all PDAlets and MIDlets in a PDAlet suite and all code that runs on behalf of a member of the PDAlet suite.

The implementation determines how authorization results and configuration settings are presented to the user in the user interface. However, the implementation will require privileges to:

- Read data from and write data to a PIM database
- Read data from and write data to components (i.e., files, directories) of the file system
- Read data from and write data to input/output streams
- Access the AWT system event queue
- Listen to all AWT events

A Welcome Addition

J2ME developers who design and build applications for PDAs will find the PDA Profile an invaluable addition to their development arsenal, enabling the creation of powerful applications that take advantage of a new PDA footprint. The PDA Profile provides specifications for a rich set of AWT components that are used to implement sophisticated graphical user interfaces for PDA applications, GUIs similar to those found on desktop applications.

The PDA Profile also gives J2ME applications access to information stored on a PDA by proprietary, personal information management software that OEMs supply with the devices. This means your J2ME application can interact with a PDA's address book, calendar, and to-do list, including storing your own information in the databases used by these applications. Combining connectivity and security capabilities with AWT and personal information management, the PDA Profile is the right tool for every J2ME developer. ☛

jimkeogh@idt.net

Listing 1: A simple MIDlet

```
public class MyApp extends MIDlet {
    public void startApp()
    {
    }

    public void pauseApp()
    {
    }

    public void destroyApp()
    {
    }
}
```

Listing 2: A simple PDAlet

```
public class MyApp extends MIDlet {
    public void startApp()
    {
        java.awt.Toolkit tk = java.awt.Toolkit.getDefaultToolkit();
    }

    public void pauseApp()
    {
    }

    public void destroyApp()
    {
    }
}
```

Listing 3: A manifest file

```
MIDlet-Name: CardGames
MIDlet-Version: 1.0.0
MIDlet-Vendor: PalmSource, Inc.
MicroEdition-Profile: PDAP-1.0
MicroEdition-Configuration: CLDC-1.1
MIDlet-1: Solitaire, /solitaire.png, com.acme.cards.Solitaire
MIDlet-2: Poker, /poker.png, com.acme.cards.Poker
MIDlet-3: BlackJack, /bj.png, com.acme.cards.BlackJack
PDAlet-4: ScoreManager, /manager.png, com.acme.cards.Manager
PDAlet-5: CardPlayers, /players.png, com.acme.cards.Players
```

Listing 4: Showing preference for a PDAlet over a MIDlet in the manifest file

```
MIDlet-Name: CardGames
MIDlet-Version: 1.0.0
MIDlet-Vendor: PalmSource, Inc.
MicroEdition-Profile: PDAP-1.0
MicroEdition-Configuration: CLDC-1.1
MIDlet-1: Solitaire, /solitaire.png, com.acme.cards.Solitaire
MIDlet-2: Poker, /poker.png, com.acme.cards.Poker
MIDlet-3: BlackJack, /bj.png, com.acme.cards.BlackJack
PDAlet-2: PDAPoker, /PDAPoker.png, com.acme.cards.PDAPoker
PDAlet-4: ScoreManager, /manager.png, com.acme.cards.Manager
PDAlet-5: CardPlayers, /players.png, com.acme.cards.Players
```

Listing 5: A JAD file

```
MIDlet-Name: Best MIDlet
MIDlet-Version: 2.0
MIDlet-Vendor: MyCompany
MIDlet-Jar-URL: http://www.mycompany.com/bestmidlet.jar
MIDlet-3: BlackJack, /bj.png, com.acme.cards.BlackJack
PDAlet-2: ScoreManager, /manager.png, com.acme.cards.Manager
```



AUTHOR BIO

Jim Keogh is a member of the faculty at Columbia University and author of J2EE, The Complete Reference and J2ME, The Complete Reference (Osborne McGraw Hill).

Conference: January 21-24, 2003

Expo: January 22-24, 2003

The Javits Center

New York, NY



Where OPEN Minds Meet

Linux is thriving! Financial services, telecommunications, government and retail are utilizing this amazing technology. **Shouldn't you?**

- **Attend** Keynotes and learn from inspiring visionaries who are devoted to Linux and Open Source.
 - **Hector Ruiz, Ph. D.**, *President & CEO, AMD*
 - **Jeffrey M. Birnbaum**, *Managing Director & Global Head of Enterprise Computing in the Institutional Securities Division, Morgan Stanley*
 - **Michael Tiemann**, *Chief Technical Officer, Red Hat*
 - **Steven A. Mills**, *Senior Vice President & Group Executive, IBM Corporation*
 - **Randy Mott**, *Senior Vice President & Chief Information Officer, Dell Computer Corporation*



All-new - Linux Financial Summit is an executive program created to address the growing demand for quality information and insight on Linux and Open Source solutions for the financial industry.

Sponsored by:



Check out the **all-new Enterprise Solutions Center**, where you'll experience multi-vendor Linux and Open Source enterprise solution demonstrations.

Presented by:



- **Participate** in LinuxWorld's **world-class education** program and learn how Linux has been implemented in financial services, communications and government, gain technical and enterprise know-how in areas such as sys admin, business and emerging technologies.
- **Explore** the newest technologies from **leading Linux and Open Source suppliers** and a growing array of start-ups.
- Take your seat at **The Golden Penguin Bowl**, the lively quiz show.

www.linuxworldexpo.com



Cornerstone Sponsor



Platinum Sponsors



Silver Sponsors



exe4j

by ej-technologies

REVIEWED BY JAN BOESENBERG jan.boesenberg@incors.com

ej-technologies, GmbH

Schwanthalerstr. 178
80339 München
Germany

Phone: +49-89-51086595

Web: www.ej-technologies.com

Specifications

Platform: JDK 1.3 and higher on all Windows platforms

Pricing: \$69/\$99 (single developer license with Basic/Gold support)
\$690/\$990 (site license with Basic/Gold support)

Test Platform

Windows XP on Pentium III 1GHz,
256MB RAM, 20GB hard disk
Windows 98 on Celeron 450MHz,
128MB RAM, 6GB hard disk

Although developing full-featured desktop applications with Java has become a manageable task and performance has improved greatly, developers still face obstacles that make it difficult to get their Java applications more widely accepted. One problem with many Java standalone applications is a lack of integration into the desktop environment, which frequently alienates users.

The Product

exe4j from ej-technologies is a tool that promises to help you seamlessly integrate standalone Java applications into the Windows environment.

Seamless integration into the Windows environment means that the average user will not notice from the installation and launch process that the application is written in Java. To achieve this, exe4j creates an application-specific native launcher that serves as a bridge between the Java application and the Windows desktop environment. It's responsible for:

- Providing the application icon
- Displaying a splash screen at startup (without the usual delay that we know from starting Java applications)
- Looking for available JREs (Java Runtime Environments) on the computer and prompting the user if the required JRE is not available
- Redirecting output streams
- Launching the Java application

To the user the launcher *is* the application, because this is what he or she will double-click on to start the application.

Installation and Usage

exe4j is available only for the Windows platform, which makes sense since testing a finished application requires Windows. Installation is straightforward, just like installing any other standard Windows software. In fact, the exe4j launcher was created using exe4j itself, so the installation and launch process gives you a little taste of how a launcher created by exe4j works.

The user interface is organized as one big wizard. It looks very polished and professional, and can easily compete with native GUIs. Nevertheless, some people with high screen resolutions will probably wish for a slightly larger font.

An exe4j project is divided into nine steps.

1. On the welcome screen, you can open a previously saved project and enter the license information to unlock the full version.
2. On the second screen, exe4j asks for the

product name and the directories used for the project.

3. exe4j distinguishes between the console and GUI application (just like java.exe and javaw.exe). For GUI applications, the output can be redirected into a log file, and for console applications the output will be sent to the console.

For the icon, an icon file (*.ico) can be specified. One feature I'd like to see here is a way to use a .png or another type of graphic file for the icon, since many people don't have an application that creates Windows icon files.

4. exe4j gathers the Java-related information, such as main class, classpath, VM parameters, and command-line arguments. The classpath generation is flexible; for example, it allows you to scan directories for .jar files at runtime.
5. Afterward, exe4j shows its real strength when you determine the JRE search sequence and JRE version requirements. You can configure your executable to search the Windows registry for installed JVMs, evaluate environment variables, or look for a JVM in a directory relative to your executable. The last method also enables you to bundle your own JRE with the application.
6. Now you can determine whether your executable will show a native splash screen. After choosing a bitmap file, you can add some lines of text to the splash screen that can be updated during the startup of your application to provide further feedback (see Figure 1).
7. exe4j's error handling can be international-



ized. You can choose a predefined message set or enter your own messages if your desired language is not present.

8. Now that all necessary information is gathered, exe4j generates the executable.
9. In the final step, you can save your configuration for later use or for integration within an automated build process like Ant.

Most of the steps are self-explanatory, but

if you get stuck, the exe4j documentation will probably solve your problem. It comes in HTML format, and while working with exe4j it's accessed through JavaHelp. All the wizard's steps are explained in detail, which should make it easy for a developer to finish the first project without problems. In addition, it contains some information for experts, such as using exe4j from the command line or with Ant. One thing I noticed about the documentation is that the small demo application that's included with exe4j is not mentioned at all.

Total Integration

Since the launcher that exe4j creates is a normal Windows application, the finished application can be distributed using any Windows install tool. In addition, to completely hide from the user that an application is written in Java, the required JRE can be bundled. This way, installing and launching the application will be exactly the same as installing and launching a native Windows application. Moreover, exe4j does not touch the application's bytecode, which means that platform independence will not be sacrificed.

Summary

exe4j keeps its promise to integrate Java applications seamlessly into the Windows environment. It has an intuitive GUI, and all in all looks like a solid piece of software. If you're developing a standalone desktop application with Java and some of your customers are using Windows (which is more than likely), I recommend downloading the evaluation version to see how much value it can bring to your customers. ☛

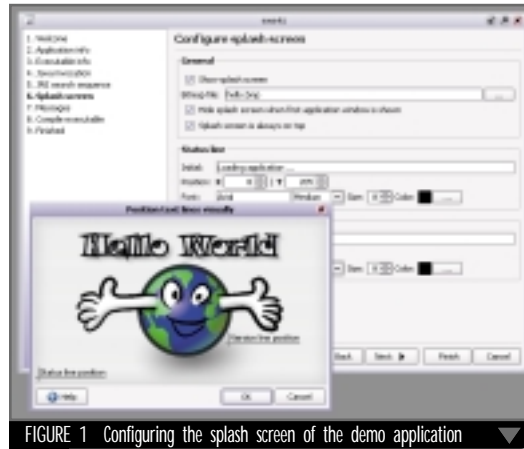


FIGURE 1 Configuring the splash screen of the demo application

Product Snapshot

Target Audience: Java programmers

Level: All

Pros:

- Intuitive and aesthetic user interface
- Keeps promise of seamless integration with Windows
- Well-written documentation

Cons:

- Separate tool needed for creating *.ico-files

WebAppCabaretTM

www.webappcabaret.com

J2EE Web Hosting



Quality Web Hosting at a reasonable price...

<JAVA WEB HOSTING AND OUTSOURCING>

You have developed the coolest mission-critical application. Now you need to deploy it.

Outsource your hosting and infrastructure requirements with WebAppCabaret so you can save time and money and concentrate on other important things. WebAppCabaret is the leading **JAVA J2EE** Web Hosting Service Provider. **30 Day Money Back Guarantee.** WebAppCabaret offers the latest Standards based Servlet containers, EJB servers, and JVMs. We provide options such as e-Commerce, **EJB 2.0**, Failover, and Clustering. Our Tier 1 Data Center ensures the best in reliability and performance. Below is a partial price plan list with a summary of the features. For more details and for \$25 off the total price of your order please log on to <http://www.webappcabaret.com/jdj.jsp>

Features	Basic	Developer	Enterprise	Dedicated
Monthly Cost	\$ 9	\$ 17	\$ 34	\$ 191
Servlet 2.3	✓	✓	✓	✓
JSP 1.2	✓	✓	✓	✓
EJB 1.1	✓	✓	✓	✓
EJB 2.x			✓	✓
Private JVM	✓	✓	✓	✓
Database	✓	✓	✓	✓
e-Commerce		✓	✓	✓

Prices, Plans, and Terms subject to change without notice. Please log on to our website for the latest Prices and Terms. Copyright © 1999-2002 WebAppShowcase • All rights reserved • Various trademarks held by their respective owners.



J2ME



J2SE



J2EE



Home

Java developers will have noticed in the past few weeks that Sun has already begun to crank up a new “unified” approach to its software business. Sun gave *JDJ* an exclusive chance to ask questions, offering you the reader the opportunity to ask Jonathan Schwartz, the dynamic young executive VP of Sun’s new Software Group, what’s going on at Sun.

<kan>: I’ve been working exclusively with Java since its birth. I’m a big fan, especially of Sun’s Java. However, this past year I noticed that Sun’s stock wasn’t doing well. Many people, Microsoft folks included, have started to claim that Sun won’t be around in five years. I’m really concerned; I know Java will be fine because of broad support from the industry, but I would like to see the creator of Java always be the leader of Java.

<jonathan schwartz>: Sun has plenty of staying power. We are coming off a seasonal low period and making some adjustments to get back to profitability. If any tech company is doing well in this economy, it’s Sun. Just take a look at our annual report. We’ve been generating cash every quarter, we have a strong balance sheet, and we’ve been gaining

As Java technology integrates the world of IT with the world of mobile communications, the next generation of computing will open up. Just as every previous generation of computing has brought new efficiencies and better productivity to individuals and enterprises, we think the one developing now will provide great benefit to us all.

I think it’s worth noting that there’s nothing fundamentally wrong with the high-tech sector. It’s a lagging indicator, not a leading indicator. When the leading economic indicators – employment, GDP growth, consumer confidence – point in the right direction, tech will go back to being a shining light of the global economy. And Sun will play an important role. I have no doubts.

<yeshwant satam>: This may sound like a broad question: In addition to Web services, what other technology directions is Java targeting?

<schwartz>: Certainly Web services is the main new feature to use with J2EE and the rest of the Java platform. The Java Community Process has defined cross-platform APIs for all the key Web services technologies: XML, UDDI, ebXML, SOAP, WSDL, etc. They are available for download today – over 217,000 have already been downloaded.

next-generation devices, such as wireless phones, pagers, PDAs, and other handsets, all the way down to smart cards. To speed things along, we’re creating support programs like the Java Application Verification Program for the Enterprise to help ensure that IT is gaining efficiencies by building applications that run across all versions of J2EE. And we have programs for developers, like the Java Blueprints for J2EE and J2ME, that give “best practices” advice.

Then there’s the Java Card, which provides a flexible, semiconductor-based computing environment that can run small Java applications. Like the rest of the platform, it’s highly secure and can be used in a variety of ways: embedded in a credit card, as an identity badge, or as a Subscriber Identity Module in a mobile phone. Sun has built an end-to-end identity solution around the Java Card that’s being put to use in major projects such as the U.S. Department of Defense Common Access Card and the 22 million cards that the Bureau of National Health Insurance of Taiwan is issuing. Altogether, more than 240 million Java Cards have been deployed, providing another new frontier for developers to explore.

“Despite tough times for the high-tech industry and the world economy, we believe network computing is the future”

market share against our competitors in both the high and low ends of the market. And we made those gains even though telecommunications and financial services – two of our bigger markets – have been hit hard in the current economic downturn. That’s what I call resilience. Despite tough times for the high-tech industry and the world economy, we believe network computing is the future. From wireless phones to automobiles, game players to vending machines, embedded controllers to environmental sensors – all kinds of things are being connected to the network. When economic conditions improve, we intend to be ready. We’re managing our resources very carefully in order to protect R&D and to continue bringing out compelling products.

Other technical directions? One would be continuing to build out the J2ME platform – by far the most widely deployed full-featured application and services technology in the mobile marketplace. Thirty million handsets, 19 deployments worldwide – and more to come. Subscribers have the ability to play full-color games, access data from the Internet, take and send digital photos with camera-equipped handsets. Lots of opportunities here.

We also want to help developers leverage the broadest range of compatible application support in the industry. Java gives you a common, compatible application platform that ranges from J2EE on any sized server to J2SE on the desktop to J2ME on

<luis araujo>: Are there plans to bundle JDO into the J2EE environment, in spite of its competition with CMP entity beans? Is Sun going to develop an official implementation?

<schwartz>: As the specification lead, Sun has produced a Reference Implementation of JDO, but there are currently no plans to include JDO as part of the J2EE platform specification. If the J2EE expert group sees sufficient adoption of the JDO specification in enterprise environments, it may consider JDO for inclusion in the J2EE platform.

<bill power>: Will JSR127 (JavaServer Faces) be adopted and supported by Sun ONE products once finalized by the expert group?

<schwartz>: Yes, JavaServer Faces will

be included in the Sun ONE Application Framework 3.0, scheduled for the first half of 2003. Sun wants to have the first compliant product in the market.

<dan wellisch>: I'm concerned about Java on the client side. It has so much potential, yet I feel there's not enough marketing of client-side Java to the industry. Also, is Sun putting enough money behind Java? Are they finding ways to make money in software? I have heard that Sun pushes Java only to the extent that it can sell more hardware. If this is the case, then client-side Java will never be as refined as it can be because desktop hardware is not something Sun is known for.

<schwartz>: We have continued to enhance the J2SE platform with the 1.4.1 release. The Sun implementation has posted a world-record benchmark performance, and we are continuing to add improvements to the user interface technologies. Sun is making major investments in the desktop, not only in the wider distribution of the latest Java Virtual Machine, but in new Linux desktops, which will include Java technology. We invest in Java to advance our anywhere/anytime/any device vision of network computing. We believe it opens up the market, not just for our hardware, but for our software and services as well.

<jon strayer>: Why are you talking up Linux on the desktop and not Java?

<schwartz>: There's no contradiction. We've always made Java available on various platforms, including Linux. It's just that we've decided to sell Linux desktops, bundled with GNOME, Mozilla, Evolution, StarOffice, and the latest desktop Java technologies, including Java Card for secure identification. We think there's a market for these systems in classrooms and call centers, banks and retail outlets – places where the systems may have a limited number of functions but an almost unlimited numbers of users. I mean, why should customers pay Microsoft's monopoly rents if they don't have to?

<rob diana>: What additional APIs do you see being added? There are a large number of APIs in Java already; are there any glaring omissions? I have heard rumors about artificial intelligence APIs being added. Is there any truth to this? Is this really necessary given the number of algorithms and concepts in AI?

<schwartz>: The Java Community decides what new APIs will be developed. Since 1999, the community has approved 190 new specification

requests to add or upgrade functionality, with Sun participating in many of the expert groups. Today, Java reaches from end to end in the world of computing, and part of Sun's focus is to also have the platform reach from top to bottom, to integrate everything that developers need to have a rich and robust application development and deployment environment. The short answer is that APIs track to what the community needs.

<a Java developer>: Why doesn't Sun just hand Java off to a standards body, so it can become dominant and win James Gosling a Nobel prize?

<schwartz>: First of all, James should win a Nobel regardless of how Java is governed. The technology he pioneered has already become virtually ubiquitous. Every major technology company (except one) has adopted Java technology, and 80% of the world's companies are using it in their business systems. It runs on PCs, wireless phones, set-top boxes, smart cards, and network servers – not to mention about 7 million Web pages.

How should it be governed? We believe the Java Community Process is working very, very well. There's broad industry involvement and the platform has matured rapidly as a result. While Sun has representation in the Java Community Process and works on many of the expert groups, it has no blanket veto power. We can veto a change to the language or the creation of a new edition – that's all. And we've never even done that.

We tried twice to work with traditional standards bodies, but in neither case could they find a way to legally secure the continued compatibility of the platform. Compatibility is Java's core value proposition. The JCP has done a great job of making Java open and available, while continuing to build and expand the platform.

<david rosenstrauch>: What are your plans (if any) to improve Java on the client (and Swing), technology-wise? What are your plans (if any) to improve Java on the client, business-wise (i.e., help improve the adoption of Java on the client side)?

<schwartz>: We are constantly working to improve the performance, UI, and distribution of J2SE. We've been gradually increasing the level of hard-

ware acceleration for Java2D graphics in each Java release. As you know, everything that's rendered by Swing is done through Java2D, so this directly benefits Swing. In the current release (1.4.1) the Win32 implementation of Java takes advantage of both DDraw and D3D. We will continue to tune performance.

One new hardware acceleration strategy we're working on is having Java2D target OpenGL, as Apple does in their Java implementation. This approach provides cross-platform hardware acceleration for the Java2D implementation and the work we've done looks very promising.

Distribution of the Java Virtual Machines on the desktop is an issue we are still working on. We need to get an up-to-date version of the JVM on the new desktop systems being sold and upgrade the older versions on existing PCs. We are working with PC OEMs to bundle the JVM on their systems, and we have decided to offer the industry an alternative Linux and open software-oriented desktop system. The Java JVM is a key part of the software that will make up the system.

For future Ask JDJ sessions and to have your questions answered, please check www.n-ary.com/java/jdj/askjdcfm.



Build Incredible Interactive Graphics
New Release of JGo supports SVG and XML

JGo, written entirely in Java, makes it easy for your Java applications to create interactive diagrams of all kinds. Create network editors, schematics, process flow diagrams, visual languages, organization charts, family trees, etc.

The JGo class library provides containers, connectors, links, orthogonal routing with automatic node avoidance and optional jump-overs, drag-and-drop, scaling, in-place text editing, tooltips, printing, SVG/XML, nested graphs, lots of new sample nodes and applications, a high performance Auto Layout Option, and more...

FEATURE PACKED NEW VERSION

- **FREE Evaluation Kit**
- **No Runtime Fees**
- **Full Source Code**
- **Excellent Support**

For more information, visit www.nwoods.com/go
800-434-9820
1-603-886-5780

Northwoods
SOFTWARE CORPORATION

▶ **IntelliJ IDEA 3.0 Unleashed** (Prague, Czech Republic) – JetBrains, Inc., has released IntelliJ IDEA 3.0, the latest version of its Java development environment. IntelliJ IDEA 3.0 comes fully equipped with industry-setting refactoring support, intelligent code editing assistance, a wide range of J2EE development features for rapid Web application and other enterprise development, a powerful Code Inspection tool, and many other productivity features for Java developers.

Developers may also download a free 30-day evaluation copy of IntelliJ IDEA from IntelliJ's Web site at www.intellij.com/idea/download.jsp.

▶ **Mindreef Releases SOAPscope Personal 1.0** (Boston) – Mindreef, LLC, has announced the availability of Mindreef SOAPscope Personal 1.0, the first offering in the company's flagship product family and the industry's first Web services diagnostics system. This emerging category of products addresses the challenges of isolating and solving problems in applications built with Web services.

SOAPscope Personal 1.0 is an easy-to-use, platform-independent diagnostics aid for developers, testers, and application support technicians. It provides a scalable logger and intelligent viewer for

SOAP-based Web services, enabling users to quickly track and troubleshoot problems such as errant data, performance issues, and interoperability issues. www.mindreef.com

▶ **CodePro Studio Supports IBM WebSphere Studio 5.0 Development Tools** (Portland, OR) – Instantiations, a provider of advanced Java development and deployment solutions, has begun shipping CodePro Studio 2.0, a comprehensive suite of products that enhance IBM WebSphere Studio and Eclipse development environments. CodePro Studio now fully supports IBM WebSphere Studio 5.0 and ensures that Java developers deliver high-quality software in record time at a reduced cost.

CodePro Studio gives developers a rich set of tools that includes Java coding best practices features like code audit, code metrics, and design patterns. www.instantiations.com

▶ **Metrowerks Provides Advanced Java Tools for PDAs** (Austin, TX) – Mobile Java developers are empowered to create professional applications for PDAs with Metrowerks' CodeWarrior Wireless Studio 7, PDA Edition. This toolset provides extensive support for building PersonalJava applications for Sharp Zaurus handhelds, HP/Compaq iPAQs, and other Pocket PC-based devices.

CodeWarrior Wireless Studio 7, PDA Edition, will provide developers with a debugging-enabled version of the Insignia PersonalJava Virtual Machine and Metrowerks proprietary launch/debug agent and world-class debugger. www.metrowerksstore.com www.wireless-studio.com

▶ **Java Developer's Journal Projects Record Print Circulation of Over 115,000** (Montvale, NJ) – SYS-CON Media has announced that it is projecting a new record circulation for *Java Developer's Journal* – a more than 115,000(*)-copy average for the most recent six months ending in December 2002. *JDJ* is reaching

BEA SYSTEMS AND COMPONENTSOURCE FORM STRATEGIC ALLIANCE

(San Jose, CA / Atlanta) – BEA Systems, Inc., an application infrastructure software company, and ComponentSource, a marketplace and community for reusable software components and a software reuse infrastructure provider, have announced a strategic alliance to increase Java developer productivity by expanding the range of third-party components and tools available on the market. Under the alliance, both companies have agreed to work with the global Independent Software Vendor (ISV) community to create new reusable components, including Web services and tools for the BEA WebLogic Enterprise Platform and other Java platforms.

www.bea.com www.componentsource.com



another 25,000–30,000 readers per month via its digital edition, which is an identical copy of its print version (www.sys-con.com/java/pdf/lucene.pdf).

“Our research shows that most of our readers are corporate i-technology buyers of software and IT services, decision makers, and developers who evaluate, recommend, or approve purchases,” said Carmen Gonzalez, executive vice president of sales and marketing at SYS-CON Media. “With an average pass-along rate of 2.7 readers per copy, *JDJ*'s reach exceeds an unmatched 310,000 i-technology professionals.”

(*) – All circulation figures provided here are the publisher's own data, and an audited circulation statement will be published as soon as this information becomes available.

▶ **Wireless Industry and Sun Deliver MIDP 2.0** (Hong Kong) Sun Microsystems Inc. has announced the completion of the Mobile Information Device Profile (MIDP 2.0) standard and the availability of the final MIDP 2.0 specification, reference implementation, compatibility test suite, and beta version of the J2ME Wireless Toolkit 2.0. Developed by more than 50 wireless industry leaders worldwide to extend the base collection of Java technologies for mobile devices, MIDP 2.0 supports new and enhanced gaming, graphics, video, audio, security, and many other features for mobile devices. www.sun.com 

PARASOFT SUPPORTS INDUSTRY PLATFORM FOR OPEN SOURCE DEVELOPMENT

(Monrovia, CA) – Parasoft, a provider of automated error-prevention software, has joined the Eclipse consortium to help support, create, and define policies, practices, and technology for the open-source tool development platform. Parasoft joins industry leaders on the Eclipse Board of Stewards, including IBM, Sybase, Fujitsu, Red Hat, and Rational. Roman Salvador, Parasoft vice president of research and development, will represent Parasoft on the board.

The Eclipse platform allows system development, testing, and management tools from multiple vendors to be integrated providing a complete solution for users. Parasoft tools, including Jtest, SOAPtest, and WebKing, plug into and extend the platform with automatic static analysis, functional testing, load testing, and Web services verification. www.parasoft.com www.eclipse.org





IS IBM SLOWLY AND SURELY BECOMING MICROSOFT TWO?

by JDJ News Desk

SPEAKING TO INDUSTRY ANALYSTS and the world's leading technology publications, including *Java Developer's Journal*, IBM elaborated on the details and intentions behind its biggest announcement since its purchase of Lotus Development Corporation in June 1995, namely its upcoming acquisition of Rational Software for a staggering sum in excess of \$2 billion. J2EE Editor Ajit Sagar asked the senior vice president of IBM's Global Software Business, Steve Mills, whether the purchase would in any way diminish IBM's commitment to Java.

Since Rational's heritage is cross-platform, Sagar quizzed Mills as to whether the perception of IBM as one of the de facto champions of Java infrastructures would change in any way.

"We've always been cross-platform," Mills replied. "Clearly from a standards/open platform standpoint," he continued, "we build things around Java; we principally write to Java and to C++. We don't write things in Visual Basic, and we're not working on C# in any direct sense. So we're not explicitly building to the Microsoft infrastructure. What we're doing is enabling on top of their infrastructure - any infrastructure we build focuses very heavily on the Java/J2EE environment, though not uniquely. We mix in and extend to other languages - for example XML, another language-type structure that's a key part of our strategy going forward."

Sagar asked Mills if the move heralds a closer integration

with IBM's infrastructures such as WebSphere and other middleware frameworks. "Yes, we see a stronger integration with the WebSphere Suite and other infrastructures," Mills said. "And this is primarily in the Java middleware space," he added, "as IBM has always been a big player there."

Sagar himself views the Rational acquisition, which is still, of course, subject to formal approval by Rational's shareholders, as "a great move" for IBM and for the Java community. "There will be more support in terms of integrated offerings both in design and infrastructure products," he explains. "I can see more comprehensive design environments in IBM's products as well as in open-source Java products coming out of this acquisition."

Is there a "but"? There's always a but.

"All this comes at a cost," says Sagar. "Rational has been the Microsoft of the design and development process world, while IBM has been seen as a champion of things 'not-Microsoft,' meaning effectively, Java- or IBM-specific. The combination gets them to a much more 'single source for all technologies' stance."

Which begs a startling question: "Will we see IBM buy Sun next?" wonders Ajit Sagar. "Are we seeing another Microsoft in the making?"

• • •

To respond to this article go to www.sys-con.com/java/articlenews.cfm?id=1789.



OBJECTFOCUS INC.
Leader in Enterprise Software Recruitment

The Right Person
The Right Job
The First Time

Looking for
Enterprise
Software
Engineers?

Looking for
Enterprise
Software Jobs?

J2EE
EJB
Web Services
Architects
Senior++ Engineers
XML / XSL
Swing WebLogic / WebSphere



Our core focus is enterprise class architects and senior developers with distributed computing and OO backgrounds, who understand how to build and deploy scalable, high-performance and robust systems through the full life cycle.

We've been working with over 700 engineers, filling critical enterprise software positions in Fortune 1000 and emerging growth companies since 1995.

ObjectFocus...We're technologists too!

CONTACT US TODAY

phone 408.973.8200 fax 408.873.8090 www.ObjectFocus.com



Go Wireless with Linux®

- StrongARM® processor
- 802.11b WLAN connectivity
- Enhanced power management
- IrDA communications port
- Open source, embedded Linux® architecture

Great Performance. Great Features. Great Price.

Packed with features typically associated with more costly devices, AML's M7100 Wireless Data Collection Terminal provides comfort, ease of use, and computing flexibility in real-time, scan-intensive applications.

Find out more about how AML wireless products can benefit your business.

800-648-4452  **www.amltd.com**
American Microsystems, Ltd.
Innovation | Performance | Service | Commitment

Well-Versed in Design Patterns

It was great reading Alan Williamson's editorial "Design Pattern Snobs" (Vol. 7, issue 11). His synopsis matches mine. These snobs are getting so bad, if you're not well versed in design patterns, they make you feel like a second-class citizen. I've been in software development much longer than a lot of these people. In a few recent job interviews, the interviewer asked about my knowledge of design patterns. After answering his questions correctly, I asked him if his company applied any of these patterns. What do you think his answer was? You guessed it, no. He was trying to demonstrate his



superiority. This is becoming a pattern, no pun intended, in this tough technology job environment. The requirement for knowledge of design patterns is overshadowing a solid knowledge of designing and building shipped enterprise applications.

Ravil A. Desai
ravil@anshul.net

SSL in MIDP 2.0

Roger Ritter's article "MIDP 2.0: Mobile Computing Arrives" (Vol. 7, issue 11) is a good review but asserts the common misconception that HTTPS/SSL/TLS is a "requirement" for IT security. In fact, SSL is broken and it also depends on PKI, which is a pain. SSL/TLS is mostly a "feel good" requirement for security that gets worse in a wireless environment. SSL cannot prevent server spoofing. And SSL, contrary to popular belief, cannot prevent man-in-the-middle attacks either for about 95% of all Internet users.

About 95% of all browsers today are MSIE 5.0, 5.5, and 6.0, and they contain a vulnerability allowing for an active, undetected, man-in-the-middle attack. No dialogs are shown, no warnings are given.

Ed Gerck
egerck@nma.com

Timely Tidings...

I don't think Alan Williamson knew how timely his editorial would be ("Stuff and Nonsense," [Vol. 7, issue 12]), what with the announcement that IBM is buying Rational. I can't tell you how many times I've heard managers say, "No one



ever got fired for choosing IBM." With modeling tools integrated with their platform that can generate a lot of the more challenging code, we may finally have a challenger for VB-itis. While Rational can also help develop .NET apps, I think I would be safe in predicting a slant toward Java in the near future that will significantly level the development playing field.

Bill Reister
breister@mmsincentives.com

No Respect

If there wasn't something to the J2EE framework, do you think Microsoft would have traveled down the .NET road? ("Tis the Season for Amalgamations" by Ajit Sagar [Vol. 7, issue 12]). After all, isn't .NET just Java resculpted by Microsoft to be proprietarily run on their OS? It is the way of the future, so hold on to any thoughts of taking any steps backward into C++ land. I'm not a big fan of Microsoft, but they are huge and I don't think they would bet so much of their stakes on a framework that wasn't going to be around for a while.

via e-mail

Kudos to Sun

This is a great way to build GUIs ("SpringLayout: A Powerful and Extensible Layout Manager" by Joe Winchester and Philip Milne [Vol. 7, issue 12]). The Mac folks have been building UIs with springs with Apple's Interface Builder. It's great to be able to visualize what will happen to a UI before it's run. I'm glad to see that Sun is imitating best practices like this in the industry. Let's hope that Apple will push Swing even further (directly or indirectly).

Dave Paules
dnp@quantumleap.us



Jini! RMI

Jini depends on RMI" is not a true statement ("Java and the Future of Ad Hoc Networking" by Karl McCabe [Vol. 7, issue 12]). This is, unfortunately, a common misconception – many software

engineers at Sun think Jini relies on RMI. Sun's Jini implementation currently does, but Jini is a specification and is protocol agnostic. Indeed, you mention Psinaptic, which has created LUSes without using RMI. The whole idea is you obtain a proxy to a service, and they communicate with each other however they choose (if at all; the proxy might be the service!).

William Swaney
wrswaney@netscape.net

Wake Up

All the responses I've seen so far reek of defensiveness and crying on the part of Java developers ("Review of The PetStore Revisited" by Rickard Öberg [Vol. 7, issue 12]). As with statistics, the numbers never tell the true story and can always be manipulated to suit one side or the other. I'm a Java programmer, but have also worked a little with C# and the .NET Framework. The real issue here is that Sun and others in the Java community have, in their dislike/distaste for anything Microsoft, made the cardinal mistake of underestimating their opponent. Clearly, history has not taught us anything (Apple comes to mind) about disregarding Microsoft.

Having worked in both environments, I must say that building Web services with Visual Studio .NET and C# was a breeze (and I was using C# for the first time). I was able to deploy a useful application in two days, complete with content delivery to an IP phone. That's the kind of productivity improvement that the Java community should be focused on, rather than getting into meaningless contests that have no real-world bearing.

Raghavan
rkolliva@cisco.com



THE LARGEST WEB SERVICES, JAVA, XML AND .NET CONFERENCE AND EXPO IN THE WORLD

Boston
2003

London
2003

Berlin
2003

Hong Kong
2003



Register by
February 14th
SAVE \$400
Register by
March 14th
SAVE \$200

3rd Annual

EAST

Web Services Edge Conference & Exposition



Connecting the Enterprise with Web Services, Java, XML & .NET



March 18-20, 2003
Hynes Convention Center
Boston

Call TODAY
TO REGISTER
201-802-3058
[www.sys-con.com/
webservicesedge2003
east/registernew.cfm](http://www.sys-con.com/webservicesedge2003east/registernew.cfm)

Featuring FREE Tutorials, Training Sessions, Case Studies and Exposition

Special Insert: Web Services Edge East Conference & Expo

MEDIA SPONSORS



Special Insert: Web Services Edge East Conference & Expo

Featuring FREE Tutorials, Training Sessions, Case Studies and Exposition



We are pleased

to bring the latest edition of the very successful Web Services Edge Conference & Expo to the city of Boston this March 18-20, 2003. Now in our third year, we will continue to build on our past success to make available the most current and relevant information to you, our valued attendee.

With the widespread adoption of Web services across the industry, developers are facing new challenges. In this year's conference program, we will address these challenges with our most comprehensive program to date. Web Services Edge 2003 will provide practical approaches and solutions to overcome the hurdles in developing and deploying Web services in today's competitive markets.

Once again Web Services Edge will feature four distinguished tracks - Java, Web Services, .NET, and XML - along with the newly added Vendor Track. The Vendor Track will allow specific sponsors, along with their customers, a platform to present their latest technical developments and real world applications across all the related technologies.



Your three days will include highly informative keynotes, conference sessions, tutorials, industry-leading university certification programs, case studies, and demo presentations. The Expo Hall will be open on March 19 and 20, featuring the largest grouping of quality exhibitors prepared to field your questions and solve your development needs.

All the best,
SYS-CON Events

Features & Attractions

TO ALL CONFERENCE & EXPO REGISTRANTS

- **3 Days Packed with Education and Training**
- **5 Keynotes & 3 Panel Discussions**
- **60 Hard Hitting and Current Seminars**
- **FREE .NET with Russ' Tool Shed Tutorial**
- **Web Services & XML Tutorials**
- **Java University Certification Training**
- **HOT Industry-Leading Certification Programs**
- **NEW Extended Learning: Evening Conference Session & Certification Classes**
- **INFORMATIVE Round Table Discussions**
- **Opening Day Welcome Reception**
- **SAMS Meet the Authors Hot Topics Lounge**
- **COMPELLING Case Studies & Best Practices**
- **FEATURED Product Demonstrations on the show floor**
- **RIVETING Real-time SYS-CON Radio Interviews**

Keynotes and Highlighted Speakers

Dave Chappell

VP, Chief Technology Evangelist, Sonic Software

Dave Chappell is the vice president and chief technology evangelist for Sonic Software. He has more than 18 years of industry experience building software tools and infrastructure for application developers, spanning all aspects of R&D, sales, marketing, and support services. Mr. Chappell has also been published in numerous technical journals, and is currently writing a series of contributed articles for Java Developer's Journal.



Eric Newcomer

Chief Technology Officer, IONA

In the role of Chief Technology Officer at IONA, Eric is responsible for IONA's technology roadmap and the direction of IONA's Orbix E2A e-Business Platforms as relates to standards adoption, architecture, and product design. Eric joined IONA in November 1999, and most recently served as IONA's Vice President of Engineering, Web Services Integration Products. Eric is a member of the XML Protocols and Web Services Architecture working groups at the W3C and IONA's Advisory Committee representative to UDDI.org.



Simon Phipps

Chief Technology Evangelist, Sun Microsystems

Simon Phipps, currently chief technology evangelist at Sun Microsystems, speaks frequently at industry conferences on the subject of technology trends and futures. He was previously involved in OSI standards in the 1980s, in the earliest collaborative conferencing software in the early 1990s, and in introducing Java and XML to IBM.



John Magee

Vice President, Oracle9i Oracle

John Magee is Vice President, Oracle9i at Oracle. He has more than 14 years experience in the enterprise software industry and has held positions in product development, product management, and product marketing. In his current role, he manages technical product marketing for Oracle's application server and development tools products, and is responsible for evangelizing Oracle technology initiatives around



Event Sponsors

ORACLE

Microsoft



ALTOVA

Rational
the e-development company



REGISTER BY PHONE-201-802-3058



SUN MICROSYSTEMS Java™ University Program

Web Services Programming Using Java™ Technology and XML

Thursday, March 20, 2003
9:00 am - 5:00 pm

Who Should Attend

Web services designers and programmers, application developers and programmers using the Java programming language who have experience using the Java™ 2 Platform, Enterprise Edition (J2EE™).

Prerequisites:

Experience using the Java programming language and basic knowledge of XML.

Overview:

This one-day seminar provides in-depth knowledge of Web services and shows how to develop Web services using the Java programming language and XML, the technologies of portable code and portable data respectively. The session will start with an introduction on fundamental concepts and characteristics of Web services. This will be followed by a detailed explanation of how to implement, how to describe, how to register, how to discover, and how to invoke Web services using core Web services standards - Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL) and Universal Description, Discovery, and Integration (UDDI). In addition, the ebXML standard, which defines the framework for the global electronic marketplace, will be talked about in detail. Also, the tools for building and deploying Web services will be discussed. Each topic will be presented with concrete examples and demonstrations when possible.

Attendees will also learn how to use standard Java APIs for Web services, mainly Java API for XML Messaging (JAXM), Java technology API for XML-based RPC (JAX-RPC), and Java technology API for XML Registries (JAXR), for developing and deploying Web services.

Benefits

- Learn the fundamental concepts and characteristics of Web services
- Gain detailed understanding on core Web services standards: SOAP, WSDL, UDDI
- Gain detailed understanding on ebXML, the standard framework for electronic business
- Learn Java programming language APIs for Web services - JAXM, JAX-RPC, JAXR

Outline

- Web services and Sun™ Open Net Environment (Sun ONE) overview
- Web services standards
- Java APIs for Web services
- J2EE technology and Web services

Java™ 2 Platform: Architect Certification Fast Path

Wed, March 19, 2003
9:00 am - 5:00 pm

Who Should Attend

This session is designed for enterprise application architects, system analysts, experienced technologists and developers using Java™ technology seeking certification as an architect for the Java 2 Platform, Enterprise Edition (J2EE™).

Prerequisites

Understanding the benefits of Java technology solutions; experience with object-oriented analysis and design; familiarity with concepts of distributed computing.

Overview

Gaining recognized competency architecting J2EE platform-based solutions is vital to your success as an architect and increases your career opportunities.

Developed and presented by Mark Cade, this one-day session helps prepare attendees to pass the Sun Certified Enterprise Architect for J2EE Technology exam. Cade provides an overview of the components comprising the J2EE architecture as a whole, emphasizes the incorporation of J2EE technology into an architecture, and reviews the exam's testing objectives. Multiple real-world case studies demonstrate correctly architected J2EE technology-based solutions and pinpoint key topics within the exam.

Additionally, you'll learn how to interpret exam objectives, what each of the three exam phases contains, and guidelines and resources to use after the course.

Benefits

- Receive an intensive review of the topics covered on the Sun Certified Enterprise Architect for the Java 2 Platform, Enterprise Edition Exam
- Increase understanding and knowledge of architecting solutions using J2EE technology
- Understand the system qualities: scalability, availability, extensibility, performance, and security
- Understand trade-offs of different architectural choices
- Describe the benefits and weaknesses of potential J2EE technology-based architectures.
- State benefits and costs of persistence management strategies
- Review case studies of J2EE technology-based architecture
- Review practice tests and questions

Outline

- Architect examination overview
- Part multiple choice
- Part assignment
- Part essay

Java™ 2 Platform: Programmer Certification Fast Path

Tuesday, March 18, 2003
9:00 am - 5:00 pm

Who Should Attend

This session is designed for programmers who have some exposure to the Java™ programming language, and are ready to prepare for the Sun Certified Programmer for Java 2 Platform exam.

Prerequisites

Object-oriented software development experience and familiarity with the syntax and structure of Java technology-based development.

Overview

The development community recognizes that certified competency in developing solutions using Java technology is vital to productivity, reaffirms your value to your organization, and increases your career advancement opportunities.

This valuable session, developed and delivered by Philip Heller, author of the two leading Java technology certification preparation manuals and president of Philip Heller Associates, helps to prepare you for the Sun Certified Programmer for the Java 2 Platform exam. In a comprehensive one-day seminar, Philip provides code-level, detailed review of the Java skills and knowledge you need to confidently approach the exam.

Benefits

- Receive an intensive review of the advanced topics covered on the Sun Certified Programmer for the Java 2 Platform Exam
- Increase your understanding and knowledge of Java programming language syntax and structure
- Prepare for the exam by reviewing practice tests and questions
- Gain a strong understanding of Java technology fundamentals

Outline

- Operating on data
- Shifting
- Shallow and Deep Comparison
- The Literal String Pool



XML Certified Developer *Fast Path*

Tuesday, March 18, 2003
9:00 am - 5:00 pm

Audience

This tutorial is for programmers who have some knowledge of XML and related technologies and would like to pass the IBM Certified Developer Test 141 on XML and Related Technologies.

Prerequisites

Background in object-oriented programming and knowledge of Hypertext Markup Language (HTML). Exposure to XML and related technologies.

Overview

XML is the foundation of two important emerging

technologies: Web Services and the Semantic Web. XML expertise and certification is critical for developers who want to remain competitive in the current tight IT job market. The practice tests and questions in this course are specially designed to teach you XML essentials and the key concepts to successfully pass IBM® Test 141 on XML and related technologies.

Outline

- Well formed XML documents
- XML Infoset
- XML namespaces
- Document analysis and modeling
- Document Type Definitions (DTDs)
- XML schemas
- The SAX API
- The DOM API
- XPath and XSLT

- XSL Formatting Objects (XSL FOs)
- Formatting XML with CSS
- XLink and XPointer
- XML Encryption
- XML Signatures
- SOAP, UDDI, and WSDL
- XML architectures based on business and technical considerations
- Optimization and testing of XML applications

Presenter Bio: Joel Amoussou is Founder and Chief Learning Architect of XMLMentor. Joel is the author of the first XML training course specially designed to prepare developers for IBM® Test 141 on XML and related technologies. Joel has created XML content management applications for the aerospace, pharmaceutical, and publishing industries.

Special Insert: Web Services Edge East Conference & Expo

Featuring FREE Tutorials, Training Sessions, Case Studies and Exposition

Conference at-a-Glance

	JAVA	WEB SERVICES	.NET	
TUESDAY MARCH 18	8:00AM – 4:00PM Registration Open			
	9:00 – 9:50AM	(JV1) Squeezing the Best Out of Java	(WS1) Security: SAML, WS-Security and related issues	(NT1) .NET Framework Overview
	10:00AM – 10:50AM John Magee, ORACLE			
	11:00AM – 11:50AM	(JV2) Testing Your Java Using JUnit	(WS2) Web Services Management	(NT2) Introduction to ASP.NET
	12:00PM – 2:00PM Break			
	2:00PM – 2:50PM Panel - WS-I "A road Map for Web Services Standards"			
	3:00PM – 3:50PM	(JV3) Building/Deploying the Anti Way	(WS3) Web Services Integration	(NT3) Introduction to Web Services
	4:00PM – 4:50PM	(JV4) Unlocking the Secrets of JDK1.4	(WS4) Using Web Services to Integrate J2EE and .NET Enterprise Applications	(NT4) How To Build Mobile Solutions Using the Microsoft Mobile Internet Toolkit
WEDNESDAY MARCH 19	8:00AM – 4:00PM Registration Open			
	9:00AM – 9:50AM	(JV5) Java and .NET	(WS5) Combining BPM and BRM technologies: a major step towards corporate agility	(NT5) ASP.NET with Visual Studio.NET
	10:00AM – 10:50AM KEYNOTE - Sun Microsystems, Speaker TBA			
	11:00AM – 6:00AM EXPO OPEN 11:00 a.m. - 6:00 p.m.			
	11:00AM – 11:50AM	(JV6) To Not Swing is to SWT! The Swing Alternative	(WS6) Web Services Fundamentals: UDDI, WSDL, XML	(NT6) Best Practices for .NET Development
	12:00PM – 2:00PM BREAK & EXPO			
	2:00PM – 2:50PM Panel - Web Services & .NET			
	3:00PM – 3:50PM	(JV7) Talking Back to the Server; the SOAP Way	(WS7) Portals and Web Services	(NT7) Best Practices for ADO.NET Development
4:00PM – 4:50PM	(JV8) Unlocking the Power of XML	(WS8) Web Services: Next Steps After the Hype	(NT8) Developing Pocket PC applications using the Smart Device Extensions for Visual Studio .NET	
THURSDAY MARCH 20	8:00AM – 4:00PM Registration Open			
	9:00AM – 9:50AM	(JV9) Writing SOAP Services	(WS9) Web Services Best Practices	(NT9) How to Debug with .NET
	10:00AM – 10:50AM KEYNOTE - Microsoft, Speaker TBA			
	11:00AM – 6:00AM EXPO OPEN 11:00 a.m. - 4:00 p.m.			
	11:00AM – 11:50AM	(JV10) Working with Data the JDO Way	(WS10) Web Services Startups: Teltales of the Future	(NT10) XML and Web Enabling Legacy Applications Using BizTalk
	12:00PM – 2:00PM BREAK & EXPO			
	2:00PM – 2:50PM PANEL - "The Future of Java", Moderated by Alan Williamson			
	3:00PM – 3:50PM	(JV11) Enterprise: The Next Generation	(WS11) Web Services Interoperability: The Last Mile	(NT11) Migrating Visual Basic Applications to Visual Basic.NET
4:00PM – 4:50PM	(JV12) Moving Around the Limitations of J2ME	(WS12) Web Services Case Study	(NT12) How to Develop an End-to-End .NET-Connected Application	

XML

VENDOR

(XM1) XML - A Managers Guide	Session TBA
(XM2) OASIS Standards Update	XMLSPY 5 Altova
(XM3) A Definitive Introduction to XML Schemas	SOAP and Java - Parasoft
(XM4) XML in Print - XSL:FO	Session TBA
(XM5) XML in Financial Services	Session TBA
(XM6) Case Study: XML in Life Sciences Oracle	Pattern Driven Application Development- Compuware
(XM7) Using XML for EAI - Best Practices	Managing the Developer Relationship - Sun Microsystems
(XM8) Take XML with You: XML and Mobile Computing	Session TBA
(XM9) Analyzing XForms IONA	Session TBA
(XM10) XML Query	SOAP Security-Rational
(XM11) XPath & XSLT 2.0 BEA	Why Web Services Management? - HP
(XM12) Third Generation XML Tools	Session TBA

Conference Overview

Java Technology Track



The Java track has been specifically designed to allow you to squeeze as much information out of each session as possible. This track is

designed for the Java developer, and will be led by industry-leading speakers and authors. Not a track for the beginner or the novice, this track is designed for the experienced developer who wishes to catch up on the latest techniques and APIs.

The Java Track has been designed with you, the more experienced Java developer, in mind. We know you don't have a lot of spare time, and we've designed the track to ensure that your time is maximized and you are armed with all the necessary tools to take your development to the next level.

Microsoft .NET Track



Microsoft .NET represents a major evolution in how applications are developed deployed and managed on the Microsoft platform. The

.NET Framework gives developers an object oriented development environment for building all types of applications including desktop, client/server, dynamic web page, wireless devices, server based as well as complete support for XML Web Services and the related XML standards. The sessions in the .NET Track will give you a broad as well as deep understanding of the capabilities in the .NET Framework and how applications built on .NET are easily integrated with applications running in a heterogeneous environments including mainframe, UNIX and J2EE platforms.

Web Services Track



The Web Service track is focused on issues and topics that are at the forefront of development efforts in Web Services. Although the current

specifications provide a minimum set of protocols, issues such as security, transaction management, service management and coordination remain in flux. This track presents some of the leading authorities in the field on these urgent topics and addresses all of the questions that currently concern designers, developers and consumers of Web Services.

XML Technology Track



Whether you're looking to understand different XML standards, application techniques, or development tools; or using XML to develop

the next generation of Web applications and services, the XML Track is your ultimate training, collaboration, and innovation ground. Sessions include fast-track, in-depth training on XML Schemas and XSL-FO. We will update you on standards development and offer a comprehensive review of the various technologies related to XML that are essential for today's IT manager. The XML Track is armed with real-world applications of XML in financial services, life sciences, enterprise and B2B integration, and mobile computing. We will discuss new developments around XForms, a recent W3C Standards which marks another era of standards based application development; XPath and XSLT 2.0 XML; and Query.

The XML Track explores the technology and standards, real-world applications, and trends which will set the course for the future.

Microsoft® FREE .NET
Web Services Tutorial 

Russ' Tool Shed

Wednesday, March 19, 2003

9:00 a.m. – 5:00 p.m.

Join Russ as he shows you how to use Visual Studio.NET

9-12:15 Intro to Web Services using VS.NET by Russ Fustino

One of the key ideas behind the .NET strategy is the concept of software as a service, or in short, Web Services. This session will explain what a Web Service is and provide an overview of its related technologies like XML, SOAP and UDDI. We will demonstrate how the .NET Framework makes it easy to implement them for new and existing applications. This session will also provide concrete best practices for building XML Web Services using Visual Studio.NET. We'll answer many common questions like: How will my Web Service scale? How can my XML Web Services enable interoperability with Web Services from other vendors as well as within my own organization? We'll delve into building highly reliable and secure Web Services. Also, we will discuss issues such as dealing with complex data types using WSDL (Web Services Description Language), as well as securing SOAP messages using encryption. We'll see how developers can use enterprise level XML Web Services to simplify customer solutions.

1-2:30 - Advanced Web Services Using ASP .NET Thom Robbins

This session we will explore some of the more advanced areas of SOAP in ASP.NET's support for Web Services. ASP.NET Web Services are the preferred way for Web developers to expose Web services on the Internet. The goal is quick, easy, and high-performing SOAP services. We will look at how to use the SOAP extension classes to create some very interesting applications on top of the core SOAP architecture found within .NET Framework. For instance, you can implement an encryption algorithm or screen scraping on top of the Web Service call. We'll dig into more advanced topics, explore the SOAP headers, and see ways to ensure security in our Web Services.

2:45-4:15 - .NET Remoting Essentials Thom Robbins

Microsoft .NET Remoting is the .NET technology that allows you to easily and quickly build distributed applications. All of the application components can be on one computer or they can be on multiple computers around the world. .NET Remoting allows client applications to use objects in other processes on the same computer or on any other computer to which it can connect over its network. During this presentation we will discuss what you will need to know to get started with .NET Remoting. We will talk about how .NET Remoting compares with DCOM, how to host remoted objects in a variety of applications, how to call remoted objects from a client application, how to control the life time of remoted objects, and how to secure remoting applications.

To learn more, visit
www.sys-con.com/webservicesedge2003

Advisory Board



Sean Rhody
 Editor in Chief, Web Services Journal
 Partner, CSC



Alan Williamson
 Editor in Chief, Java Developers Journal
 Chief Technology Officer, n-ary



Derek Ferguson
 Editor in Chief, .NET Developers Journal
 Chief Technology Evangelist, Expand Beyond Corp.



Bob Familiar
 .NET Architect, Microsoft
 New England



Thomas Robbins
 Senior Technology Specialist, Microsoft
 New England



Hitesh Seth
 Editor in Chief, XML Journal, Chief Technology Officer, ikigo



J.P. Morgenthal
 Chief Services Architect, Software AG

Hotel Arrangements Are Easier Than Ever!

Special arrangements have been made with some of Boston's finest hotel, priced well below regular rates. Hotels are located within walking distance, if not connected to the Hynes Convention Center. To learn more about hotel savings, call ETI at (800) 829-2281 or (201) 444-0060 (direct) or fax reservations to (201) 444-0062. To make online reservations visit www.expotravel.com by Feb 24th, 2003.

SPECIAL RATES

Official Hotels	Address	Single	Double
Sheraton Boston Hotel	39 Dalton Street	\$159	\$159
Hilton Boston Back Bay	40 Dalton Street	\$149	\$149

RESERVATIONS

To make reservations call (800) 829-2281 or (201) 444-0060 (direct). Fax reservations to (201) 444-0062. Credit card information is required to guarantee reservations and expedite confirmation. Confirmations will be mailed directly from the hotel, time permitting. All changes and cancellations should be made directly through ETI.

REGISTRATION FORM

CONFERENCE: March 18 – 20, 2003 EXPO: March 19 – 20, 2003

John B. Hynes Veteran Memorial Convention Center • Boston, MA

THREE WAYS TO REGISTER FOR CONFERENCE

- 1) On the Web:** Credit Cards or "Bill Me" Please make checks payable to SYS-CON Events
- 2) By Fax:** Credit Cards or "Bill Me" 201-782-9651
- 3) By Mail:** 135 Chestnut Ridge Road, Montvale, New Jersey 07645, Attention: Registration

Please note: Registrations are not confirmed until payment is received.

Please complete sections 1, 2, 3 and 4

1 YOUR INFORMATION (Please Print) Mr. Ms.

First Name _____ Last Name _____
 Title _____
 Company _____
 Street _____
 Mail Stop _____
 City _____
 State _____ Zip _____ Country _____
 Phone _____
 Fax _____ E-Mail _____

2 PAYMENT METHOD: (Payment in full due with registration)

Check or Money Order Enclosed (Registration confirmed upon receipt of payment)

Check # _____ Amount of Check \$ _____

Charge my Visa MasterCard American Express Discover

Name on card _____

Card # _____ Exp. Date _____

Signature _____

Billing Address (if different from mailing address) _____

3 PLEASE INDICATE YOUR CONFERENCE CHOICE:

Total Registration fee \$ _____

	Before 2/14/03	Before 3/14/03	On Site
<input type="checkbox"/> GP Gold Passport includes Edge Conference march 18-20, and Select one: Web Services Programming Using Java™ Technology and XML (Mar.18) Java™ Fast Path: Architect (Mar.19) Java™ Fast Path: Programmer (Mar. 20)	\$1,495.00	\$1,695.00	\$1,795.00
<input type="checkbox"/> 3D Three Day Conference (Does not include Sun Java™ Education)	\$1,295.00	\$1,495.00	\$1,695.00
<input type="checkbox"/> 2 Day Conference (Does not include Sun Java™ Education) (select any two days: <input type="checkbox"/> Tue, <input type="checkbox"/> Wed, <input type="checkbox"/> Thurs.)	\$1,195.00	\$1,295.00	\$1,395.00
<input type="checkbox"/> 1 Day Conference (Does not include Sun Java™ Education) (select any one day: <input type="checkbox"/> Tue, <input type="checkbox"/> Wed, <input type="checkbox"/> Thurs.)	\$495.00	\$695.00	\$895.00
<input type="checkbox"/> JU1 Sun Java™ University Class Select one: <input type="checkbox"/> Web Services Programming Using Java™ Technology and XML (Mar.18) <input type="checkbox"/> Java™ Fast Path: Architect (Mar.19) <input type="checkbox"/> Java™ Fast Path: Programmer (Mar. 20)	\$695.00	\$895.00	\$995.00
<input type="checkbox"/> JU2 Sun Java™ University Class Select two: <input type="checkbox"/> Web Services Programming Using Java™ Technology and XML (Mar.18) <input type="checkbox"/> Java™ Fast Path: Architect (Mar.19) <input type="checkbox"/> Java™ Fast Path: Programmer (Mar. 20)	\$1,295.00	\$1,495.00	\$1,595.00
<input type="checkbox"/> JU3 Sun Java™ University Class Select three: <input type="checkbox"/> Web Services Programming Using Java™ Technology and XML (Mar.18) <input type="checkbox"/> Java™ Fast Path: Architect (Mar.19) <input type="checkbox"/> Java™ Fast Path: Programmer (Mar. 20)	\$1,495.00	\$1,695.00	\$1,895.00

4

A. Your Job Title

CTO, CIO, VP, Chief Architect
 Software Development Director/Manager/Evangelist
 IT Director/Manager
 Project Manager/Project Leader/Group Leader
 Software Architect/Systems Analyst
 Application Programmer/Evangelist
 Database Administrator/Programmer
 Software Developer/Systems Integrator/Consultant
 Web Programmers
 CEO/COO/President/Chairman/Owner/Partner
 VP/Director/Manager Marketing, Sales
 VP/Director/Manager of Product Development
 General Division Manager/Department Manager
 Other (please specify) _____

B. Business/Industry

Computer Software Travel/Hospitality
 Computer Hardware and Electronics Government/Military/Aerospace
 Computer Networking & Telecommunications Health Care/Medical
 Internet/Web/E-commerce Insurance/Legal
 Consulting & Systems Education
 Integrator Utilities
 Financial Services Architecture/Construction/Real Estate
 Manufacturing Agriculture
 Wholesale/Retail/Distribution Nonprofit/Religious
 Transportation Other (please specify) _____

C. Total Number of Employees at Your Location and Entire Organization (check all that apply):

	Location	Company
10,000 or more	01 <input type="checkbox"/>	01 <input type="checkbox"/>
5,000 - 9,999	02 <input type="checkbox"/>	02 <input type="checkbox"/>
1,000 - 4,999	03 <input type="checkbox"/>	03 <input type="checkbox"/>
500 - 999	04 <input type="checkbox"/>	04 <input type="checkbox"/>
100-499	05 <input type="checkbox"/>	05 <input type="checkbox"/>
100 or less	06 <input type="checkbox"/>	06 <input type="checkbox"/>

D. Please indicate the value of communications and computer products and services that you recommend, buy, specify or approve over the course of one year:

\$10 million or more \$10,000 - \$99,999
 \$1 million - \$9.9 million Less than \$10,000
 \$500,000 - \$999,999 Don't know
 \$100,000 - \$499,999

E. What is your company's gross annual revenue?

\$10 billion or more \$1 million - \$9.9 million
 \$1 billion - \$9.9 billion Less than \$1 million
 \$100 million - \$99.9 million Don't know
 \$10 million - \$99.9 million

F. Do you recommend, specify, evaluate, approve or purchase wireless products or services for your organization?

01 Yes 02 No

G. Which of the following products, services, and/or technologies do you currently approve, specify or recommend the purchase of?

Application Servers
 Web Servers
 Server Side Hardware
 Client Side Hardware
 Wireless Device Hardware
 Databases
 Java IDEs
 Class Libraries
 Software Testing Tools
 Web Testing Tools
 Modeling Tools
 Team Development Tools
 Installation Tools
 Frameworks
 Database Access Tools / JDBC Devices
 Application Integration Tools
 Enterprise Development Tool Suites
 Messaging Tools
 Reporting Tools
 Debugging Tools
 Virtual Machines
 Wireless Development Tools
 XML Tools
 Web Services Development Toolkits
 Professional Training Services
 Other [Please Specify] _____

SYS-CON Events, Inc. and SYS-Con Media make no warranties regarding content, speakers or attendance. The opinions of speakers, exhibitors and sponsors do not reflect the opinion of SYS-CON Events and SYS-CON Media and no endorsement of speakers, exhibiting companies products, or sponsors is implied.

Featuring FREE Tutorials, Training Sessions, Case Studies and Exposition

Special Insert: Web Services Edge East Conference & Expo



If you require special assistance covered under the Americans with Disabilities Act, please call 201-802-3058 by March 4, 2003.

CANCELLATIONS, SUBSTITUTIONS, REFUNDS
 Fax written request to SYS-CON Registration 201-782-9651. Requests for refunds received prior to February 15, 2003 will be honored, less a 10% handling charge; requests received after February 15, 2003, and before March 1,

2003, will be honored less a 20% handling charge. No requests for refunds will be honored after March 1, 2003. Requests for substitutions must be made in writing prior to March 14, 2003. No one under 18 is permitted to attend. No warranties are made regarding the content of sessions or materials. Speakers,

sessions and schedule are subject to change without prior notice.

No solicitation by anyone other than official exhibitors, sponsors or marketing partners is permitted. Such behavior is cause for expulsion without refund.

Special Insert: Web Services Edge East Conference & Expo

Featuring FREE Tutorials, Training Sessions, Case Studies and Exposition



Meet with the industry experts, professionals, and managers building today's Web Services enterprises!

Conference
March 18-20, 2003

Exposition
March 19-20, 2003

Hynes Convention Center, Boston

Past Exhibitors & Participants

www.sys-con.com/webservicesedge2003east/registernew.cfm

SUBSCRIBE TODAY TO MULTIPLE MAGAZINES

AND SAVE UP TO \$400 AND RECEIVE UP TO 3 FREE CDs!



Pick a 3-Pack, a 6-Pack or a 9-Pack



3-Pack
Pick any 3 of our magazines and save up to \$275⁰⁰
Pay only \$175 for a 1 year subscription plus a FREE CD

- 2 Year – \$299.00
- Canada/Mexico – \$245.00
- International – \$315.00

6-Pack
Pick any 6 of our magazines and save up to \$350⁰⁰
Pay only \$395 for a 1 year subscription plus 2 FREE CDs

- 2 Year – \$669.00
- Canada/Mexico – \$555.00
- International – \$710.00

9-Pack
Pick all 9 of our magazines and save up to \$400⁰⁰
Pay only \$495 for a 1 year subscription plus 3 FREE CDs

- 2 Year – \$839.00
- Canada/Mexico – \$695.00
- International – \$890.00

TO ORDER:

Choose the Multi-Pack you want to order by checking next to it below. Check the number of years you want to order. Indicate your location by checking either U.S., Canada/Mexico or International. Then choose which magazines you want to include with your Multi-Pack order.

<input type="checkbox"/> 3-Pack <input type="checkbox"/> 1YR <input type="checkbox"/> 2YR <input type="checkbox"/> U.S. <input type="checkbox"/> Can/Mex <input type="checkbox"/> Intl. <input type="checkbox"/> 6-Pack <input type="checkbox"/> 1YR <input type="checkbox"/> 2YR <input type="checkbox"/> U.S. <input type="checkbox"/> Can/Mex <input type="checkbox"/> Intl. <input type="checkbox"/> 9-Pack <input type="checkbox"/> 1YR <input type="checkbox"/> 2YR <input type="checkbox"/> U.S. <input type="checkbox"/> Can/Mex <input type="checkbox"/> Intl.	<input type="checkbox"/> WebLogic Developer's Journal U.S. - Two Years (24) Cover: \$360 You Pay: \$169.99 / Save: \$190 + FREE \$198 CD U.S. - One Year (12) Cover: \$180 You Pay: \$149 / Save: \$31 Can/Mex - Two Years (24) \$360 You Pay: \$179.99 / Save: \$180 + FREE \$198 CD Can/Mex - One Year (12) \$180 You Pay: \$169 / Save: \$11 Intl' - Two Years (24) \$360 You Pay: \$189.99 / Save: \$170 + FREE \$198 CD Intl' - One Year (12) \$180 You Pay: \$179 / Save: \$1
<input type="checkbox"/> Java Developer's Journal U.S. - Two Years (24) Cover: \$144 You Pay: \$89 / Save: \$55 + FREE \$198 CD U.S. - One Year (12) Cover: \$72 You Pay: \$49.99 / Save: \$22 Can/Mex - Two Years (24) \$168 You Pay: \$119.99 / Save: \$48 + FREE \$198 CD Can/Mex - One Year (12) \$84 You Pay: \$79.99 / Save: \$4 Intl' - Two Years (24) \$216 You Pay: \$176 / Save: \$40 + FREE \$198 CD Intl' - One Year (12) \$108 You Pay: \$99.99 / Save: \$8	<input type="checkbox"/> ColdFusion Developer's Journal U.S. - Two Years (24) Cover: \$216 You Pay: \$129 / Save: \$87 + FREE \$198 CD U.S. - One Year (12) Cover: \$108 You Pay: \$89.99 / Save: \$18 Can/Mex - Two Years (24) \$240 You Pay: \$159.99 / Save: \$80 + FREE \$198 CD Can/Mex - One Year (12) \$120 You Pay: \$99.99 / Save: \$20 Intl' - Two Years (24) \$264 You Pay: \$189 / Save: \$75 + FREE \$198 CD Intl' - One Year (12) \$132 You Pay: \$129.99 / Save: \$2
<input type="checkbox"/> Web Services Journal U.S. - Two Years (24) Cover: \$168 You Pay: \$99.99 / Save: \$68 + FREE \$198 CD U.S. - One Year (12) Cover: \$84 You Pay: \$69.99 / Save: \$14 Can/Mex - Two Years (24) \$192 You Pay: \$129 / Save: \$63 + FREE \$198 CD Can/Mex - One Year (12) \$96 You Pay: \$89.99 / Save: \$6 Intl' - Two Years (24) \$216 You Pay: \$170 / Save: \$46 + FREE \$198 CD Intl' - One Year (12) \$108 You Pay: \$99.99 / Save: \$8	<input type="checkbox"/> Wireless Business & Technology U.S. - Two Years (24) Cover: \$144 You Pay: \$89 / Save: \$55 + FREE \$198 CD U.S. - One Year (12) Cover: \$72 You Pay: \$49.99 / Save: \$22 Can/Mex - Two Years (24) \$192 You Pay: \$139 / Save: \$53 + FREE \$198 CD Can/Mex - One Year (12) \$96 You Pay: \$79.99 / Save: \$16 Intl' - Two Years (24) \$216 You Pay: \$170 / Save: \$46 + FREE \$198 CD Intl' - One Year (12) \$108 You Pay: \$99.99 / Save: \$8
<input type="checkbox"/> .NET Developer's Journal U.S. - Two Years (24) Cover: \$168 You Pay: \$99.99 / Save: \$68 + FREE \$198 CD U.S. - One Year (12) Cover: \$84 You Pay: \$69.99 / Save: \$14 Can/Mex - Two Years (24) \$192 You Pay: \$129 / Save: \$63 + FREE \$198 CD Can/Mex - One Year (12) \$96 You Pay: \$89.99 / Save: \$6 Intl' - Two Years (24) \$216 You Pay: \$170 / Save: \$46 + FREE \$198 CD Intl' - One Year (12) \$108 You Pay: \$99.99 / Save: \$8	<input type="checkbox"/> WebSphere Developer's Journal U.S. - Two Years (24) Cover: \$360 You Pay: \$169.99 / Save: \$190 + FREE \$198 CD U.S. - One Year (12) Cover: \$180 You Pay: \$149 / Save: \$31 Can/Mex - Two Years (24) \$360 You Pay: \$179.99 / Save: \$180 + FREE \$198 CD Can/Mex - One Year (12) \$180 You Pay: \$169 / Save: \$11 Intl' - Two Years (24) \$360 You Pay: \$189.99 / Save: \$170 + FREE \$198 CD Intl' - One Year (12) \$180 You Pay: \$179 / Save: \$1
<input type="checkbox"/> XML-Journal U.S. - Two Years (24) Cover: \$168 You Pay: \$99.99 / Save: \$68 + FREE \$198 CD U.S. - One Year (12) Cover: \$84 You Pay: \$69.99 / Save: \$14 Can/Mex - Two Years (24) \$192 You Pay: \$129 / Save: \$63 + FREE \$198 CD Can/Mex - One Year (12) \$96 You Pay: \$89.99 / Save: \$6 Intl' - Two Years (24) \$216 You Pay: \$170 / Save: \$46 + FREE \$198 CD Intl' - One Year (12) \$108 You Pay: \$99.99 / Save: \$8	<input type="checkbox"/> PowerBuilder Developer's Journal U.S. - Two Years (24) Cover: \$360 You Pay: \$169.99 / Save: \$190 + FREE \$198 CD U.S. - One Year (12) Cover: \$180 You Pay: \$149 / Save: \$31 Can/Mex - Two Years (24) \$360 You Pay: \$179.99 / Save: \$180 + FREE \$198 CD Can/Mex - One Year (12) \$180 You Pay: \$169 / Save: \$11 Intl' - Two Years (24) \$360 You Pay: \$189.99 / Save: \$170 + FREE \$198 CD Intl' - One Year (12) \$180 You Pay: \$179 / Save: \$1

OFFER SUBJECT TO CHANGE WITHOUT NOTICE

Subscribe Online Today www.sys-con.com/suboffer.cfm



Looking into the Java Future . . .

New growth areas for Java developers

WRITTEN BY
BILL BALOGLU &
BILLY PALMIERI



None of us can change the direction or trends of an industry. What we can do, however, is take control of our own future.

Inevitably, in the software engineering industry as in every other sphere of business, some of today's jobs and skills may be phased out and tomorrow's jobs will require different skills. It's therefore always wise to consider just where the future of Java jobs and Java engineers is heading and why.

One significant change in the way technology will be conducting business in the very near future is the trend among a number of large companies, such as I2, Sun, HP, and Oracle, toward moving more of their development offshore. Time and effort is being invested

For Java developers, as for all professionals, the beginning of a new year is a good time to review what new directions the technology world is moving in, what changes in the job environment those new directions will bring with them, and what changes you may need to make, as a Java developer, in order to continue conducting business successfully in this complex new world.

Where previously many offshore adventures were merely exploratory – any actual success they achieved was considered an unforeseen bonus – today's companies are much more committed to making investments and changes pay off, and they make significant efforts and investments to be successful.

Where will the outsourcing trend lead? Well, one way to predict the future is to look at the past. We could look back to the industrial age, for example, and see if the histories of the garment, automotive, or steel industries can give us a hint as to what to expect.

In those instances, when the expense of doing business became prohibitive at home, companies went abroad. The jobs

solid is for high-level engineers and architects, specifically in product companies building enterprise-wide core technologies or core frameworks. This continues to be a strong area of employment. Such companies will always need the skills and experience of high-level engineers and architects to build their products. Companies like Oracle, BEA, and TIBCO have both core and applications groups. Engineering in the core or platform groups looks stable job-wise.

Another area already experiencing new growth is customer-facing positions such as pre- or post-sales engineers, integration engineers, and implementation engineers. Just think of the automotive industry, for example. Car parts may be made abroad and the car may even be assembled there, but if customers need service or want to customize a car, they do it locally. In the high-tech world, implementation, customization, and integration contribute significantly to the bottom line of every company, so they will go on needing highly skilled engineers with excellent communications and customer skills to successfully complete the work. There should be great opportunities for a long time to come in these areas.

One final thought: doomsayers sometimes speculate that one day software developers may be replaced by applications that allow almost anyone with a high school diploma to take over the job. Or they foresee the day when developers could be replaced by applications that do the work all by themselves. That's not going to be happening in this decade though. So don't worry!

As ever, we're very interested in your comments and feedback. ☺

“Oracle, BEA, TIBCO...these companies will always need the skills and experience of high-level engineers and architects to build their products”

into facilities abroad in order to achieve payroll savings.

Of course, we've all heard outsourcing nightmare stories from VPs, directors, managers, and engineers who in the past may have been involved with groups working on development abroad. We've all heard about the logistical and managerial problems, about the lack of experienced engineers. However, today the stakes have changed and so have company attitudes.

“they moved abroad were the ones on the production line. Assembly lines were costly and the workers dispensable. They were initially replaced by cheaper foreign workers and then later by robots.

If we then look at the people who are the “production line workers” in today's high-tech world, they are coders and developers, especially in IT. Some of their jobs are inevitably headed offshore.

At the other end of the skills spectrum, one area where job demand remains rock

AUTHOR BIOS

Bill Baloglu is a principal at ObjectFocus (www.ObjectFocus.com), a Java staffing firm in Silicon Valley. Bill has extensive OO experience and has held software development and senior technical management positions at several Silicon Valley firms.

Billy Palmieri is a seasoned staffing industry executive and a principal at ObjectFocus. His prior position was at Renaissance Worldwide, where he held several senior management positions in the firm's Silicon Valley operations.

jdcolumn@objectfocus.com

ADVERTISER	URL	PHONE	PAGE
AccelTree	www.acceltree.com		38
Altova	www.altova.com		9
AltoWeb	www.altoweb.com		45
American Microsystems	www.amltd.com	800-648-4452	61
BEA Systems, Inc.	www.dev2dev.bea.com/useworkshop		7
BEA eWorld	www.bea-eworld.com		47
Bowstreet	www.bowstreet.com/easy		17
Computer Associates			27
CTIA Wireless 2003	www.ctiashow.com		51
Ektron	www.ektron.com/cms300	603-594-0249	33
Evolution Hosting	www.evolutionhosting.com	866-257-4809	49
Fiorano Software, Inc.	www.fiorano.com		37
InetSoft Technology Corp.	www.inetsoft.com/jdj	888-216-2353	39
Infragistics, Inc.	www.infragistics.com	800-231-8588	14-15
INT, inc.	www.int.com	713-975-7434	24
Jinfonet	www.jinfonet.com/jdj1.htm	301-838-5560	23
LinuxWorld Conference & Expo	www.linuxworldexpo.com		55
Macromedia	www.macromedia.com/go/jrun4jdj		31
Motorola	www.motorola.com/developers/wireless		4
/n software inc.	www.nsoftware.com/subscriptions		29
n-ary	www.javaSOS.com		53
Northwoods Software	www.nwoods.com/go/	800-434-9820	59
Oracle	oracle.com/javafaster	800-633-0546	21
Parasoft Corporation	www.parasoft.com/jdj1	888-305-0041	19
QUALCOMM Incorporated	www.qualcomm.com/brew		41
Rational Software	www.rational.com/offer/javacd2		11
ReportMill Software	www.reportmill.com/webstart	214-513-1636	25
Sitraka (now part of Quest Software)	www.sitraka.com/jclass/jdj	800-663-4723	13
Sitraka (now part of Quest Software)	www.sitraka.com/jprobe/jdj	800-663-4723	43
Sitraka (now part of Quest Software)	www.sitraka.com/performance/jdj	800-663-4723	Cover IV
Sonic Software	www.sonicsoftware.com/jdj	800-989-3773	Cover II
SpiritSoft	www.spiritsoft.com/climber		Cover III
SYS-CON Subscription Offer	www.sys-con.com/suboffer.cfm		71
WebAppCabaret	www.webappcabaret.com/jdj.jsp		57
Web Services Edge 2003	www.sys-con.com/webservicesedge2003east/registernew.cfm201-802-3069		63-70
Zero G	www.zerog.com/install	415-512-7771	3

This index is provided as an additional service to our readers. The publisher does not assume any liability for errors or omissions.

General Conditions: The Publisher reserves the right to refuse any advertising not meeting the standards that are set to protect the high editorial quality of *Java Developer's Journal*. All advertising is subject to approval by the Publisher. The Publisher assumes no liability for any costs or damages incurred if for any reason the Publisher fails to publish an advertisement. In no event shall the Publisher be liable for any costs or damages in excess of the cost of the advertisement as a result of a mistake in the advertisement or for any other reason. The Advertiser is fully responsible for all financial liability and terms of the contract executed by the agents or agencies who are acting on behalf of the Advertiser. Conditions set in this document (except the rates) are subject to change by the Publisher without notice. No conditions other than those set forth in this "General Conditions Document" shall be binding upon the Publisher. Advertisers (and their agencies) are fully responsible for the content of their advertisements printed in *Java Developer's Journal*. Advertisements are to be printed at the discretion of the Publisher. This discretion includes the positioning of the advertisement, except for "preferred positions" described in the rate table. Cancellations and changes to advertisements must be made in writing before the closing date. "Publisher" in this "General Conditions Document" refers to SYS-CON Publications, Inc.

What's in the next issue of *JDJ*?

JDJ ASKS...

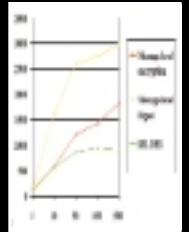
IBM

Don Ferguson is IBM's lead for the EJB and J2EE specification evolution. His work has focused on CORBA-based SM solutions and frameworks, and evolved into an effort to define frameworks and system structure for CORBA-based object transaction monitors. The early design and prototype of these systems produced the IBM Component Broker and WebSphere family of products. *JDJ* readers were able to ask him questions about IBM and Java.



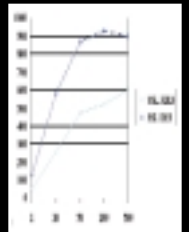
THE LONG ROAD AHEAD

Lately it's been easy to dislike Sun. Their JVM is slow; Sun ONE is certainly nowhere near the fastest J2EE application server; Forte, while capable, is far from what coders actually want to use if they want to write code in a reasonable amount of time; and MS's constant marketing and technical assaults eat away at Sun's armor.



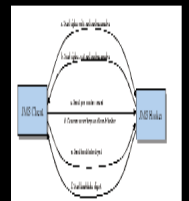
ENTERPRISE MESSAGING SECURITY

JMS-based enterprise messaging has emerged as the ideal backbone for mission-critical and business-sensitive data across the extended enterprise. As the need for more robust security measures arises, SSL is frequently used to secure messaging communications. But is this using a sledgehammer to crack a nut? This article discusses different encryption technologies that are used to secure JMS and how to find the best compromise between your security and performance demands.



REBEL WITHOUT A CLAUSE: SIX WAYS TO MISUSE EXCEPTION HANDLING

Do you consider yourself a Java expert? Think you know everything about exception handling? Rather than provide general guidelines (most of which are well known), we decided to reveal what we call antipatterns: common bad programming practices that we've seen time and again in Java code. Our purpose is to familiarize you with these counterexamples so that you can quickly spot and avoid them.



SALMON OPEN FRAMEWORK FOR INTERNET APPLICATIONS: A REVIEW

SOFIA is a J2EE-based class and tag library for building database-driven Web applications. Conceptually it's similar to other open source frameworks like Apache Struts. What makes SOFIA stand out from other frameworks is the built-in tools integration.





WRITTEN BY
BLAIR WYMAN

Back in high school, I worked as a roadie for my friends' rock and roll band. It was a great job, since I didn't need to make much money. Good thing, that. My take from our fabulous two-week, Christmas '74, "Wyoming Tour" was \$9.

The band covered tunes in the emergent heavy metal genre – Uriah Heep, Deep Purple, Led Zeppelin, Grand Funk Railroad – and got regular gigs all over the Black Hills and Wyoming. I made literally dozens of dollars a week, when the band was busy, just helping with unloading, setup, and aloof swaggering.

The swaggering came easy for me, because I also ran the band's light show. Oh, I tried to be part of the band, proper, when I first met the guys. "Go ahead and sing this Black Sabbath song for us" they said, so I sidled up to the microphone to belt out the definitive rendition of "Sweet Leaf."

A few seconds later, as the auditory threshold of pain dwindled in my vibrating memory, it was obvious that I needed to be able to hear myself sing – in my own ears – to have any hope of carrying a tune. Since it was uncertain, just then, whether I would ever hear again, I decided to just participate in a "supportive" role.

To put the era in musical perspective, a big hit of the time was Deep Purple's "Smoke on the Water," which tells the nostalgic story of a flaregun-sparked building fire at some European resort. Our band covered the tune really well – it was sort of our "signature song" – though we never expected it to be prophetic...

For a bit there, we were exploring spacey visual effects: Radio Shack strobe light kits, black lights with white T-shirts, incredibly bright flash bulbs...anything was fair game. One day, as I was devour-

ing some countercultural reading material, I happened upon a simple recipe for a powerful – yet nontoxic and nonirritating – smoke bomb. It was really simple to compose, but it had to be "cooked," so the author advised taking great care in its preparation.

I carefully cooked up a batch on my Mom's stove, mixed in the necessary matchheads, and took it out in the backyard to light. After a few false starts, the cakelike material finally took off, momentarily filling the discovered universe with impenetrably dense white smoke. I walked through it, took a deep breath, and didn't immediately die coughing, so I figured we had the band's next Great Special Effect!

Back then, I started every road trip with an entire Sara Lee cheesecake, just out of principle. It never took long to polish one off, but this one went particularly quickly since we needed the aluminum pie plate to cook up our first "official" smoke bomb. One of the guys brought along a little alcohol burner, so right there in the back seat of the band's '65 Impala, we mixed up the ingredients in the pie tin and heated them ever-so-gently.

When it was time to cool this concoction down so we could knead in the matchheads, one of the guys had the bright idea of holding the pan out the window. The windy subzero winter air would certainly speed up the cooling process, but this turned out to be a Bad Plan. The wind caught that pie plate and delivered it, rolling like a wheel,

across the prairie to oblivion. We didn't even slow down; it was gone.

What next? What can we use now? Ah, the ashtray! We can force one tine of the fork into that hole you use to extinguish smoking material, like so, and cook a batch of smoke bomb stuff here in the back seat! Yeah!

I had no idea that cigarette ashes could catalyze a reaction so violently.

"Fun with chemistry" ended with a trip into the fiery mouth of Mt. Vesuvius, there at the end of my right arm. Even factoring in the perceived time-dilation, allegedly unavoidable in such acutely extreme circumstances, I feel I can safely say that the car filled with opaquely dense white smoke "instantly." I can only imagine how that vehicle must have looked from the outside – probably like the car suddenly filled up with milk.

Later, the driver told me what happened in the front seat, but I didn't see any of it. I didn't see anything at all, until my buddy finally rolled down his window. The wind blew into the car, so out of reflex I held up my hand. In the airstream from the open window my hand was absolutely the only thing I could see, appearing to float with me in our own fluffy white pillowcase.

Since snow is water, our snow-packed Wyoming highway adventure was our own personal "Smoke on the (Frozen) Water." (I'm just glad the band never learned "Highway to Hell.")

blair@blairwyman.com





No Room for Error

Application integration is an intimidating challenge for any enterprise; the downtime costs of unreliable integration are unthinkably expensive. To keep profits climbing, enterprises are adopting open standards-based messaging, caching and integration solutions.

The SpiritSoft framework integrates your legacy applications into a single JMS-compliant environment. SpiritSoft technology goes beyond JMS to give you a secure, scalable and robust enterprise-integration strategy to provide for your future messaging and Web Services requirements.

Secure your integration foothold ... there's no room for error.
Download our white paper www.spiritsoft.com/climber

spiritsoft.
go beyond jms

Get beyond
metrics.

PerformaSure™



Now part of  QUEST
SOFTWARE

Reach your J2EE performance goals.

Metrics are useful. In fact, they're often the first step in uncovering a performance problem in your J2EE systems. But let's face it, it's not enough to detect the symptoms of a problem. You still need to solve it. That's why PerformaSure correlates all metrics with individual transaction response times. It's the difference between performance intelligence and just plain data.

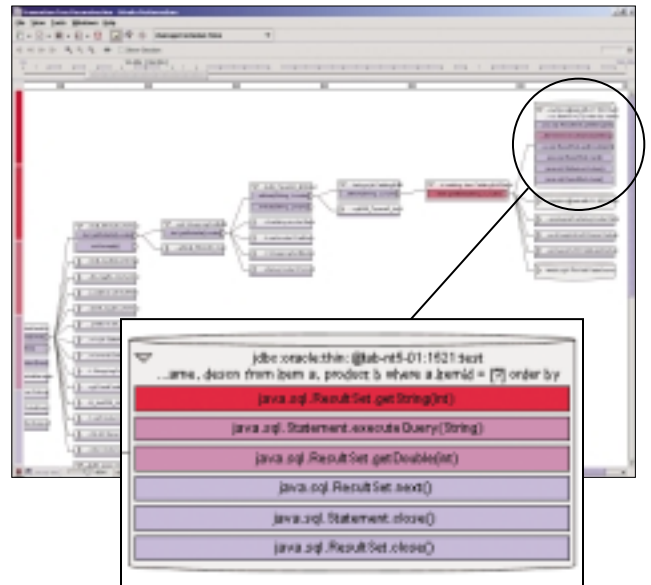
Our exclusive Tag and Follow technology traces the end-to-end execution path of transactions through each component and server of a distributed J2EE system, with method-level timing captured every step of the way. Hotspots are intuitively color-coded for further drill-down. The result? Faster, more accurate performance analysis so you can reach your performance goals sooner.

Track down J2EE performance problems including:

- inefficient and excessive database calls
- inefficient servlets, JSPs, EJBs, and Java classes
- network misuse including frequent/large object serialization
- application server settings that limit scalability (EJB caching, JDBC pool sizes, etc.)

Take a walkthrough of PerformaSure today at:

www.sitraka.com/performasure/jdj



The Transaction Tree provides an end-to-end method-level view of any transaction's path through the distributed J2EE system. Clearly see component interactions within the application architecture on a per-transaction basis, with performance hotspots highlighted in red.

