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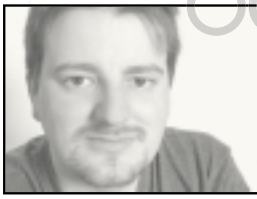

ALAN WILLIAMSON EDITOR-IN-CHIEF

Pulling at a Thread

Have you ever pulled at a small thread, hoping to stop it before it eats into the very heart of the fabric and dismantles the whole garment? What started out as small, insignificant issue has suddenly turned into a major showstopper! I think this may be happening in the J2EE space and if we aren't too careful, we'll be left with nothing of any significant use.

I am, of course, referring to the current and very public debacle with JBoss and their push to become J2EE compliant. This is not a tussle between good and evil, nor is it a tussle of David-and-Goliath proportions (as Sun has been known to refer to it on occasion). To say so would merely dramatize it more than necessary. The media is being played and, all credit to Marc Fleury, he is playing them like a fiddle. Just look at all the free publicity he has managed to stir up for JBoss through all the major news outlets. Bottom line, you don't have to look far to find a JBoss story.

What is the real story? I have talked to both sides over the last few months, trying to get at the fundamental problem. I have talked to JBoss developers and other J2EE licensees to get their views. I have even listened extensively to various users in a variety of mailing lists and Web forums.

There's a lot of noise being made about JBoss becoming certified. Sun's Rick Saletta, group marketing manager responsible for J2EE licensing, claims JBoss needs to license the J2EE compatibility test suite. There are suspicions that JBoss won't pass the Test Compatibility Kit (TCK), but JBoss claims it will. While neither side is legally allowed to use the TCK until JBoss licenses it, I would wager that the tests have probably already been run by both sides. Fleury tells me that issues previously pointed out by Sun that would make them fail the test have been addressed (http://openenterprisetrends.com/cgi-bin/page_display.cgi?193).

So, with that, let's assume for a moment that the issue isn't technical. What else could be stopping the official J2EE logo from being applied to JBoss?

This is the question I asked Fleury.

"The J2EE brand is not a seal of quality; it is just a brand. The Sun reference implementation is certified, yet not fit for development or production." While, technically, I can't argue with him there, the certification is surely a contract of trust. When a developer calls a particular API or utilizes a library, it has to behave as the specification spells out. It is the J2EE logo that tells the developer that the application server has passed all the tests.

Fleury responded by saying that the J2EE specification "is vague, with many issues left to the vendor," and was quick to point out that any failing of expectation from any JBoss API call was quickly reported and fixed by their large community of developers. I imagine this is one of the strengths of the open source model.

JBoss say that the J2EE stack only makes up around 20% of their code base with their AOP framework contributing to the larger part. Fleury has said he and JBoss are still committed to supporting the J2EE standard and will, if asked, even contribute the AOP framework into the JCP process.

Fleury feels he doesn't want to pay for the J2EE brand just yet; the JBoss community at this moment doesn't need it. This stance will surely upset a number of other J2EE licensees who have had to toe the line and pay for the privilege of being J2EE certified. I asked a number of them about this, and while they didn't want to be named, it's fair to say they weren't too impressed with JBoss, and many of them were asking for JBoss to simply remove all mention of "J2EE" from their documentation and Web site until they are certified.

The question remains: Where will it all lead? Is JBoss pulling at the thread of the J2EE T-shirt? Is the J2EE "brand" at risk? Or is the API still safe?

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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.

Do Java and .NET Really Compete?

WRITTEN BY JOSEPH OTTINGER

It's with continued amusement that I constantly read about how Java should be defended from .NET, and how .NET will destroy Java. I understand the invective used by both sides, but the shine is starting to wear off; it's time to stop hurling insults, and examine what the future really holds. In my opinion, Java and .NET don't truly compete on a meaningful technological front – because both include easy hooks that allow for convenient interoperability.

.NET marshals information transfer through the use of formatters, sort of like interceptors that translate data into an internal format. If this sounds easy to do in Java as well, you should get a cookie – it is, and it's something some SOAP providers for Java do already. The concept is very similar to aspect-oriented programming, in which an interceptor sits in front of the method call, accepts the parameters, converts them into a format appropriate for the method, and then when the method has finished execution, translates the method results back into a format appropriate for the caller.

The similarity in the process is a critical factor. .NET may not be the grail – or the dragon – but it's not difficult to see how it's done from a conceptual standpoint. The process of enabling formatters for .NET method calls is fairly simple, only slightly more difficult than The Mind Electric's GLUE product (www.themindelectric.com); when you author your remotable components, you specify the capability to marshal by copy. Then, set up your endpoints with "Channels," at which point you can decide whether or not to expose the service with SOAP. In contrast, with GLUE (in the simplest case) you define an interface, then implement the interface with a concrete class, then tell the GLUE server you wish to publish the implementation as a service. Enterprising minds can see how both approaches can work.

The key for me is that both processes can be used with little knowledge on the caller's part. With GLUE, there's a slight registration process for the caller; it's not quite transparent. With .NET, you do much the same: acquire a handle to a remote service at runtime (including the type of connection), then call the object.

Thus, it's safe to say that there can be a direct equivalency between using a language-neutral remote service API in both Java and .NET. As such, as developers, our horizons are broadened by the existence of both technologies; a service is just a service, and we no longer really care if it's hosted on .NET or not; all we need to do is establish an endpoint, call the service, and process the result. Competition is a moot point when the technology is roughly equivalent, and interoperability is easily accomplished.

However, there are still differentiators. .NET is still provided by primarily one vendor, which means being subject to the whims of that vendor; I know of a few excellent programmers who have experience in COM, COM+, and DCOM…shifting focus everytime as Microsoft discovers a "new and better" way to accomplish late binding. Java has had late binding built into its core since its inception, and that's one of its strengths.

Note that not all Java APIs for SOAP are created equal: JAXM does not provide the same clean API that GLUE does, which is a pity; JAXM follows Apache SOAP's model of exposing the underlying transport to the programmer, which is a grand failure in my opinion. The unfortunately named SAAJ (as implemented by Apache Axis) is better than JAXM, in this regard, but still requires a lot of code compared to GLUE. Hopefully, as the JCP matures the XML services for Java, they will follow GLUE's excellent example.

The result of all this is that Java and .NET compete, but primarily in mind share, not in technology. The marketing drive for both continues to escalate, but the interoperability between the two continues to improve; that is a huge win for implementers, as we can now visualize even operating environments as commodities. The goal should not be to dominate the market to the exclusion of other solutions, but to make implementation easier than it is using the available technology. If the implementation is as easy to use as GLUE's is, then the technology will be adopted.

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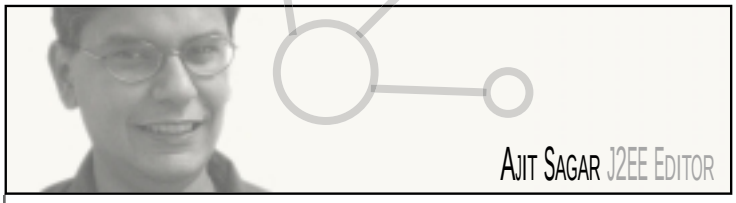
Joseph Ottinger is a consultant with Fusion Alliance (www.fusionalliance.com) and is a frequent contributor to open source projects in a number of capacities. Joe is also the acting chairman of the JDJ Editorial Advisory Board.



AJIT SAGAR J2EE EDITOR

The Proof Is in the Concept

In a large project, designing for performance often turns out to be a chicken or egg situation. In a J2EE project, this is even more evident. Typically when business and functional requirements are handed down to the technical team, the first step is to map the functional subsystems into software components, and then to hand out the design of those components to respective team leads for design and implementation. This is part of the responsibilities of the project architect. At this stage in development, the onus is on the architect to make decisions on identifying potential bottlenecks in the system and recommending alternatives based on standard architecture patterns and guidelines.

In an ideal project, the design of each module involves taking all the performance characteristics into consideration and building out the functionality. If a formal design and development cycle is followed, the team may be able, even enforced, to take care of performance issues early on in the project. However, the luxury of doing this is often not there. Typically, most projects are driven by an urgency to demonstrate the functionality of the system to the client. Although well-coordinated teams design and develop with performance criteria in mind, focusing on performance issues puts the team in danger of missing the boat.

One of the reasons such projects lead to disaster is that often a technical proof-of-concept initiative that's undertaken at the beginning of the project ends up creating the framework for the full solution. A common point of confusion between different stages of a project is the proof of concept (POC) and the prototype. A proof of concept is geared toward demonstrating functionality. A prototype should be an implementation of the full solution that tests minimal functionality. A proof of concept doesn't need to consider performance characteristics, while a prototype should tweak out performance characteristics before the full functionality is implemented.

In a J2EE project, the architecture of the full solution needs to deal with the issues of load balancing across different hardware machines: integration with legacy systems; decisions on using the best technology such as EJBs versus JDO, application server clustering, etc. On the other hand, a POC needs to primarily deal with deployment in a minimal environment to demonstrate maximum functionality.

The support provided by the J2EE platform to implement different stages and environments is quite good. Application servers allow the same code base to be deployed in different environments with well-defined migration paths. For example, you can deploy multiple applications in the same instance of the server, multiple servers on the same machine, or multiple servers on different machines. If you've designed the code base correctly, the migration from one to the other should be well defined. While a POC typically has "throwaway code," designing with migration in mind facilitates at least some degree of reuse.

My current client has opted to invest both capital and resources into a well-defined POC. I think this is a worthwhile investment. Our project team is well aware of the life cycle of the POC, and the compromises we are making in terms of performance, the different architectural configurations, and the different issues involved in migration. This becomes even more crucial when integrating new third-party tools into the architecture. In our case, this involves a J2EE-compliant business rules engine and a workflow engine.

Organizations that decide to invest in such initiatives early on in the project end up working smarter and not harder. J2EE offers the capability to achieve this from a platform perspective as well as in the form of well-documented guidelines and patterns.

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Ajit Sagar is the J2EE editor of JDJ and the founding editor of XML-Journal. He is a senior technical architect with Infosys Technologies, a leading global consulting and IT services organization, and is well-versed in Java, Web, and XML technologies.

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Interview with BEA

JDJ Asks . . . BEA

Here is your chance to get the inside track on WebLogic: Eric Stahl of BEA answered readers' tough questions about BEA products and where they're headed in the coming year. Eric has spent the last three years at BEA Systems and is currently the director of product marketing for WebLogic Server and WebLogic JRockit. Eric's team is focused on product communications, developer relations, market analysis, competitive analysis, analyst relations, benchmarking, and other product-focused activities.

<J. Michael Towry>: Will the upcoming WLS 8.1 release contain any new features from J2EE 1.4/EJB 2.1? Is there a "ballpark" ETA for a WLS version with a complete J2EE 1.4 implementation?

<Eric Stahl>: Through our ties to the JCP and the WS-I, we supported the push back of the J2EE 1.4 because we think it should incorporate the Basic Profile. But our release train has a lot of momentum, and we think we have a great new package in WebLogic 8.1, so J2EE 1.4 will be delivered in a future release.

<Tony Ciafardoni>: I've used Workshop with WLS 7.0.1. How will Workshop be extended and enhanced in WLS 8.0?

<Stahl>: Check out the new Workshop beta and hopefully you'll be impressed. We've added the ability to access all aspects of the platform, so it's a major advancement. This allows you to develop your core application from a single environment, integrate it with back-end resources, and expose it through the portal. It's a great end-to-end view.

<Sreedhar>: I'm searching for the best application server for our Web-based product. Can you briefly explain the advantage of WebLogic Server over other application servers? It will be very useful for us.

<Stahl>: We think WebLogic Server is easier to use (development, administration, and integration), and industrial strength (reliability, scale, security). I'd recommend looking into our Workshop Application Framework; our clustering architecture; our configuration, management, and security capabilities; and the extension of the application server with the WebLogic Platform, which includes WebLogic Portal and WebLogic Integration. Beyond the product, look at the ecosystem. We've seen massive consolidation in the application server space over the last few years, and BEA has been fortunate enough to come out on top. This drives the larger developer, ISV, hardware, and SI partnerships that ultimately offer more choices to our customers. Also, many best practices are established through the many books, magazines, user groups, and other WebLogic resources that are available.

<Mike Gardner>: Considering how complicated a server-side product WebLogic Server is, do you consider 2.25 years from product launch to desupport a long enough time? Please consider (especially for large shops): (1) jumping on a new product version is foolhardy; six months of settle-time is prudent... with SP1 or SP2. (2) Multiple projects, with different or possibly the same resources, have to be aligned. (3) Stress-tested burn-in time in dev, test, and QA is prudent. (4) IT departments have more to do than upgrade infrastructure.

So it's reasonable that a year has already gone by before WLS can be migrated confidently into production, leaving a little over a year before production problems are not supported.

<Stahl>: We just announced the EOL of WLS 5.1 to be February 1, 2004. It was shipped April 4, 2000, so it has a four-year window, but I understand the concern. We are taking a close look at our release mechanics and welcome as much input as we can get. Have your BEA reps direct your requirements to our product management team.

<Ganesh Venkatesasundaram>: When will WebLogic's JRockit JVM support the Unix (HP-UX) platform?

<Stahl>: Our philosophy was that neither Windows nor Linux had good, independent JVM representation, so we set out to deliver the world's fastest and most reliable JVM on those platforms. Through our alliance with Intel, we have optimized WebLogic JRockit for IA 32- and IA 64-bit platforms running Windows and Linux. We feel that HP will continue to invest in and deliver the best JVM for HP-UX.

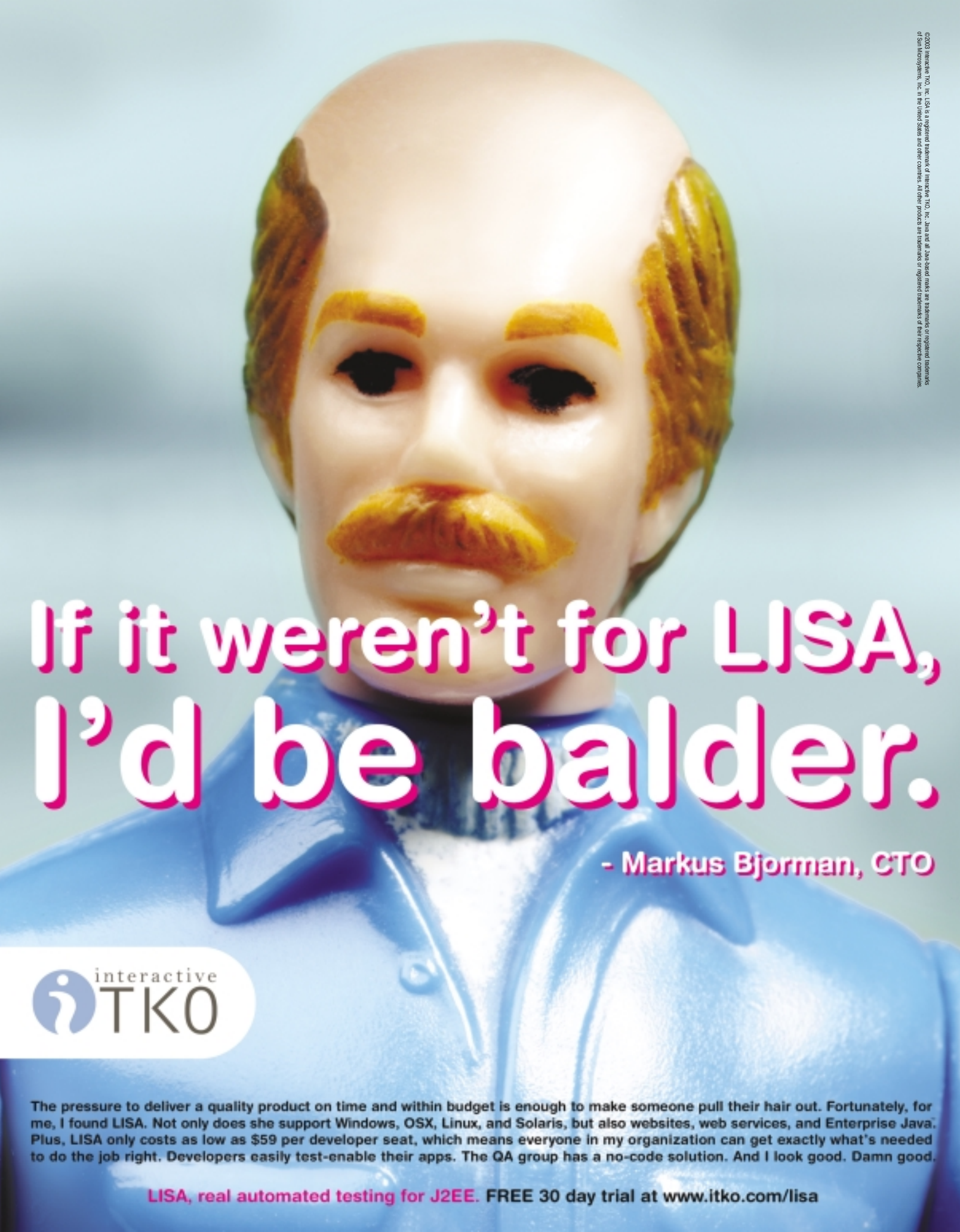
<Anas Mughal>: What advantages does WebLogic have over WebSphere?

<Stahl>: We believe that customers benefit from the intersection of easy-to-use products with industrial-strength reliability. IBM has always been able to get a system going, but at tremendous cost, due to nonintegrated products and an army of consultants. I strongly suggest that anyone interested in seeing the difference between the products put the PowerPoint slides down and run through a simple installation, configuration, and just kick the tires of both products. Also, our most recent benchmarks with WebLogic Server 8.1 are the best in the business. Combine that with our tight alliances with Intel, HP, Sun, Dell, the packaged application vendors, the system integrators, and the developer community, and we think we have a compelling story to tell.

<David Glasser>: What technical advantages does WebLogic have over JBoss that justify the sizeable investment in a per-CPU WebLogic license? To put it another way, what do I get for my five- or six-figure investment in WebLogic that I can't get for free from JBoss?

<Stahl>: Most customers I talk to want to look at the total cost of a project and do what they can to drive the cost down. That includes all the hardware, software, and human costs associated with a project. It turns out that the application server license is a very small percentage of the total project cost, yet has a huge impact on everything else. With better scalability you need less hardware, which drives out cost. With developer and administrator productivity tools, like WebLogic Workshop and our management, monitoring, and security frameworks, not only can fewer people do more in less time, the resulting application is more industrial strength.

Also, with out-of-the-box integration with all the leading system management, security, tools, LDAP, and other peripheral technologies, WebLogic can easily be integrated into an existing



architecture. Finally, with the WebLogic platform we add native BMP, adapters, and B2Bi capabilities on the back end, with personalization, content management, and the portal framework on the front end. In the end customers pay for licenses because WebLogic drives down hardware, development, integration, and administrative costs while increasing reliability.

<Emeric Vernat>: **Do you plan to invest in a partner program with an IDE's manufacturer(s)? Do you think of the possibility of buying Borland?**

<Stahl>: BEA partners with many tools partners. We also sell and support JBuilder, WebLogic Edition.

<Rory Sherman>: **When will WebLogic Server support Java 1.4.1?**

<Stahl>: WebLogic Server 8.1 supports 1.4.1.

<Keith Wilson>: **When will WebLogic's JRockit JVM implement Java 1.4 and the Java Servlet 2.4 and JSP 2.0 specifications?**

<Stahl>: WebLogic JRockit, which currently holds the world record SPECJbb benchmark numbers for four CPU systems, is based on JDK 1.4.1. Servlet and JSP support is implemented in WebLogic Server, which is compliant with J2EE 1.3.

<Tim Dawson>: **As more and more of app server "added functionality" becomes part of one spec or another, do you plan to continue to differentiate WebLogic Server in the future by adding additional proprietary tools/APIs, or by improving the administration of the server (i.e., through better deployment/maintenance/monitoring/scalability/log file management, etc.).**

<Stahl>: As an Executive Committee member of the JCP and a founder of the WS-I, BEA has always been very committed to open standards. The standards aspect of our differentiation is based on how quickly we can implement the latest standards, and the quality of those implementations, such as scalability, reliability, etc. But standards only go so far. We have always added substantial functionality around the standards and focused on two areas. First, we need to make them easy to use through our tools or value-add APIs. Second, we need to make them industrial strength, as we've done through our clustering architecture and security framework. One other important point is that we have a history of pushing many of our innovations back into the standards bodies. If a new standard ever comes out that overlaps with our own implementation, we'll go for the standards-based approach wherever possible.

<Joe Weber>: **Where do you see WebLogic Workshop going in the future? Do you feel you've gained enough market share to make it a worthwhile development?**

<Stahl>: In February we announced WebLogic Workshop 8.1, which extends the development environment and application framework well beyond Web services to include design views for Web apps, business process management, custom controls, adapters, personalization, the portal framework, and all other aspects of the WebLogic Platform. Aside from exposing all of the platform services, the framework allows non-J2EE developers to easily build applications, which is a huge win for developers. For J2EE developers we've incorporated EJBGen, making it much faster and easier to create EJBs. It's a unified development environment for all applications that we think will change the way people look at application platforms.

JavaServer Faces

A standard-based solution for Java Web applications

by Murali Kaundinya and Jamiel Sheikh

Developing interesting and effective Java Web applications requires simple, robust, and manageable frameworks and the tools that complement them. If you design and develop Java applications for a living, it could be quite a challenge to stay abreast of all the software developments and frameworks both from commercial software vendors and the vast open source community. In this article, we will survey the various Java Web development frameworks that are popular today and then take an in-depth look into the JavaServer Faces (JSF) technology.

Ever since the creation of servlets and JSPs, Web application architects and developers have contemplated on how to standardize the application development process, particularly for large enterprise projects. They often include questions such as which frameworks and design patterns to use; how to perform data validation; and how to handle exceptions, errors, and logging.

As architects, we've pursued these challenges and from time to time have adopted and used the frameworks that were in vogue and extracted their best practices. From among these many frameworks, we would predict the emergence of what could potentially become a standard for Web development only to see it slip away because it lacked some features, or it was too proprietary, and so on.

We revisited these questions recently in an enterprise portal project. It started out as a debate on what would be the critical size of a Web application to warrant using a robust framework. Once we crossed that point, the next challenge we faced was whether to advocate one from a plethora of open source frameworks or recommend our own internally developed framework. As much as Java and open source have in common, this question is an interesting one in view of enterprises that are concerned about support for the tools and frameworks used in their applications.

Once a framework is chosen, you have to justify the overheads such as the ramp-up cost and the learning curve against its return on ease-of-use, maintainability, and standardization of the developmental process. The last but not the least of those challenges is about successfully executing the project's requirements.

All of this in today's ever-challenging Web application development projects with their dynamic requirements and deadlines. Wouldn't it be desirable to have a standard-based solution that extracts the best ideas from the innumerous proprietary frameworks and frameworks from the open source communities? Could JavaServer Faces be such a standard? In this article we survey the landscape of Web development frameworks and then look under the hood of JSF and see what it has to offer.

For an Enterprise Web development framework to be successful and popular, it has to cater to two types of audiences. One type is those who are attached to the tools and IDEs whose selection may have long been made. These developers derive high productivity gains from these tools, much of which may come from familiarity and ease of development with their existing applications.

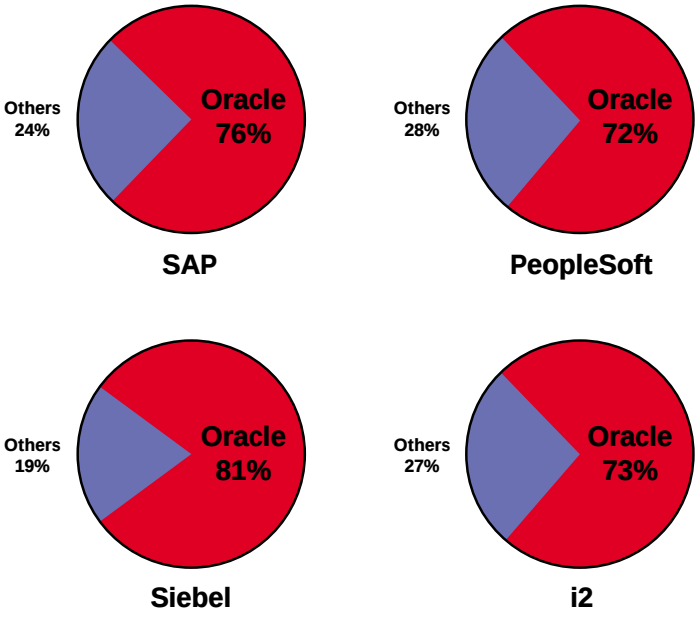
The second type is those who are not particularly locked into any tools or IDEs. These developers crave the best-of-breed solutions and often don't hesitate to create their own frameworks if that's what they think will best meet their architectural requirements. The first type has let the IDE industry thrive and prosper, although lately the IDE vendors have shrunk tremendously in number due to considerable mergers and acquisitions. The latter type has fueled the imagination and creativity of those who have made their Web development frameworks accessible to the public in varying licensing terms similar to the terms of open source software.

Survey of Open Source Web Frameworks

The open source community has contributed quite an amazing list of quality software and it's not surprising to find the same quality in some of the Web development frameworks. Some of the leading ones that come to mind are shown in Table 1.

Oracle #1

for Enterprise Applications



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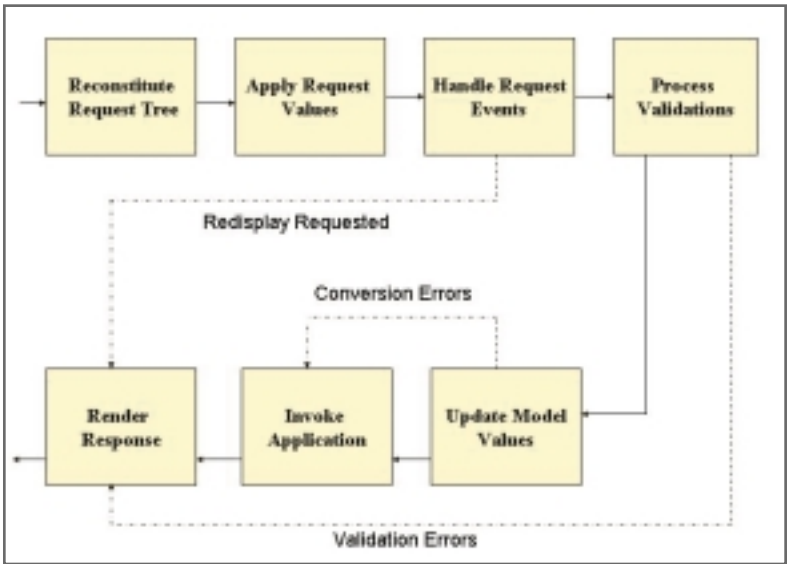

FIGURE 1 Request processing life cycle

Expresso is offered by a private company. It uses Struts as its tag library but adds capabilities of its own for security, robust object-relational mapping, background job handling and scheduling, self-tests, logging integration, automated table manipulation, and more.

JPublish is a powerful Web publishing system that uses the Velocity template engine in combination with a content management framework to build dynamic Web sites. JPublish was designed to ensure a clean separation of content, programming logic, and presentation logic. JPublish is loosely based on the FreeEnergy methodology, which was essentially designed to handle page development in an object-oriented fashion so that common objects could be reused.

The *JStateMachine* project is a free library designed to allow you, as an application or Web site designer, to produce and enforce a well-defined design for your application's user interface using the UML state chart notation.

SOFIA (Salmon Open Framework for Internet Applications) is a RAD tool set for J2EE. It integrates best-of-breed tools with a Java framework to provide an end-to-end solution for developing high quality database-driven Web applications.

Struts framework is a flexible control layer based on standard technologies like Java servlets, JavaBeans, ResourceBundles, and Extensible Markup Language (XML). Struts encourages application architectures based on the Model 2 approach, a variation of the classic Model-View-Controller (MVC) design paradigm. Struts provides its own controller component and integrates with other technologies to provide the model and the view. For the model, Struts can interact with any standard data access technology, including Enterprise JavaBeans, JDBC, and Object-Relational Bridge. For the view, Struts works well with JavaServer Pages, Velocity templates, XSLT, and other presentation systems.

Tapestry is a powerful, open source, all Java framework for creating leading-edge Web applications in Java. Tapestry's approach, using a component object model similar to a traditional GUI, provides a high level of reuse within and between projects, allows applications' complexity to scale well, and offers easy internationalization/localization and easy team integration.

Turbine is a servlet-based framework that allows experienced Java developers to quickly build secure Web applications. Parts of Turbine can also be used independent of the Web portion. In other words, portions of Turbine are easily available for use in other applications.

WebWork is a community project conducted using the open source process. It's aimed at providing tools and a framework for building complex Web sites that are easy to understand and easy to maintain in a short amount of time. Java is the platform and language upon which it is based, although it supports many others as the language in which systems are built, such as JavaScript and XML.

An excellent summary of their features in terms of strengths and weaknesses can be found at the Wafer project, www.waferproject.org/index.html, put together by Anthony Eden and Thomas Wheeler.

JavaServer Faces

When you develop a Web application framework, what are the pressing requirements and constraints? We start by designing a controller as in Model-View-Controller. This controller distinguishes between secure and nonsecure actions of the application. It then coordinates and routes the request to the various action classes. Almost all these action classes process the request and its associated parameters, something that begs to be generalized into some kind of base class method. The action classes then proceed to do some specialized processing on their end and then start constructing the view, all the while saving state in the session.

Ever since tag libraries became popular, it's become common practice to embed tags that eliminate code litter, particularly in the JSPs that represent the views. Both client-side and server-side validations have invariably been accomplished with JavaScript and custom code, respectively. All of the above are still valid except that we could standardize on a lot more, for example, the data validation on both the client and the server side, and minimize the code. We could formalize the description and types of pages (i.e., views), and thus minimize the custom code needed to create these pages. We could have an event model to tie visual components to their object representation so they become easy to aggregate and assemble. Those are the kinds of things that you get from the JavaServer Faces specification.

JSF Overview

JavaServer Faces (JSF) is a user interface framework for Java Web applications. It standardizes the life-cycle management and the internal component management that together constitute a Web application. It aids and promotes reuse at the UI component level and, at the same time, provides for a framework to assemble newer components in a standardized fashion. It provides an easier way to pass application data back and forth with UI components. It has a simple model to map client-generated events to server-side application logic. It also provides transparency in managing and reusing session data. Above all, JSF attempts to define and delineate the tasks of the various roles in a Web development project. All of the above enable easy integration with an IDE.

JSP Integration

Right off the bat, a quick perusal of JSF will make clear that it heavily and easily integrates with JSPs; JSF even relies on JSP-related technologies. One of the promises of JSF is to abstract the eventual format of the presentation layer, and basing it on JSP-related technologies does not contradict that. An example of this reliance is the requirement of JSTL, or custom tag libraries, to aid the JSF engine in reconstituting the request tree and helping the presentation-tier designer to easily code components. The very nature of JSF's request/

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response architecture will lend to the natural usage of JSP as the presentation technology of choice for Web applications. JSPs and JSTL can now find a home within a standardized framework instead of being a standalone technology.

Request Processing Life Cycle

All requests within JSF go through a request processing life cycle before they get their response. This life cycle is made up of seven phases (see Figure 1). The solid lines indicate the normal flow of control. The dotted lines indicate error conditions.

Reconstitute Request Tree

As the name implies, in this phase JSF acquires any state information required, either from the request or from the session, to construct a request tree that's made up of components, irrespective of whether you were involved in rendering the previous page. If this is the first request, a new component tree gets instantiated and associated with the context. Once you have the component tree, all the associated event handlers, validators, and the RenderKit are instantiated. The appropriate locale is associated with the FacesContext and then the instance of the tree is saved.

Apply Request Values

In this phase the JSF implementation walks down the components in the request tree and delegates the task of decoding the relevant information from the request to obtain their current values. At the end of this phase, all components in the request component tree will have been updated with the new values included in this request.

Handle Request Events

Request events typically indicate the need for a change in visual representation. JSF calls getRequestEventsCount() on the associated FacesContext, walks down the components in the request tree, and delegates the processing of the events to those components so they update their state. It subsequently creates a response component tree and stores the handle in the FacesContext to allow for modification of the same. It also switches the RenderKit that will be utilized during the render response phase for the current response. Once all events for all components have been processed, the JSF implementation proceeds to the process validations phase or to the render response phase, depending on the return value of the event handlers.

	IDE Support	Form Processing	Error Handling	Security	I18N	Documentation	Maintainability	Licensing
Expresso	✓	✓	✓	✓	✓	✓	✓	Apache Style
JPublish		✓	✓		✓	✓	✓	Apache Style
Jstate-Machine	✓		✓	✓	✓	✓	✓	LGPL
SOFIA	✓	✓	✓		✓	✓	✓	GPL
Struts	✓	✓	✓	✓	✓	✓	✓	Apache
Tapestry	✓	✓	✓		✓	✓	✓	LGPL
Turbine		✓	✓	✓	✓	✓	✓	Apache
WebWork	✓	✓	✓		✓	✓	✓	BSD

TABLE 1 Web development frameworks and their features

Process Validations

In this phase, the JSF implementation must walk down the components in the request tree and call the processValidators() method on each component, which in turn calls the validate() method on the component along with any registered validators associated with this component that are to be called. All the correctness checks are performed and the results, both success and failure, are enqueued on the FacesContext of the request. A new tree instance is created as a response component tree and the RenderKit gets set to render the response. The control transfers to the Render Response phase if there are any error messages, otherwise it proceeds toward the Update Model Values phase.

Update Model Values

Control transfers to this phase only if the incoming request is syntactically and semantically correct. The local values for all the components are updated and the JSF implementation must walk down the components in the Request tree and update the application's model data by calling the updateModel() on every component. If errors occur, it's handled the same way as in the Process Validations phase, wherein control transfers to the Render Response phase. Otherwise, it resets all the nonnull values to null in the request component tree.

Invoke Application

In this phase, the registered application handler is fetched and all the application events that have been queued up are dispatched to the processEvent() on the application event handler. Application event handlers can appropriately deal with the dispatched events. It can change the response component tree, add or modify components, change the RenderKit, add messages, or even delegate control to the Render Response phase.

Render Response

Just as the name suggests, the response text is created for the contents of the response component tree. Upon completion of the rendering, the completed state of the response component tree must be saved to be made accessible to a subsequent request.

User Interface Component Model

A JSF user interface is assembled with building blocks otherwise known as user interface components. Request(s) and response(s) are made out of a component tree. The base class for all user interface components is an abstract class that defines the state information and its associated behavioral contracts. Every component has a type, an identifier, local values, and some generic attributes. It has the capability to update the model and the means to associate RequestEventHandlers, Validators, and Renderers with the components so it can add, modify, and delete them as appropriate.

As components can aggregate other components and make a tree, provisions are made to construct and walk the tree as necessary. The behavior of user interface components is described by events, more specifically FacesEvents. FacesEvents inherit from java.util.EventObject and conform to the design patterns of the JavaBeans specification.

Two special kinds of events exist, a CommandEvent and a FormEvent. CommandEvent indicates an application command that should be processed by the application. FormEvent indicates a form submission. Validators are objects that can be registered with a component to perform certain validations. Every data type has well-defined syntax and semantics. It's therefore very desirable to extract the common operations

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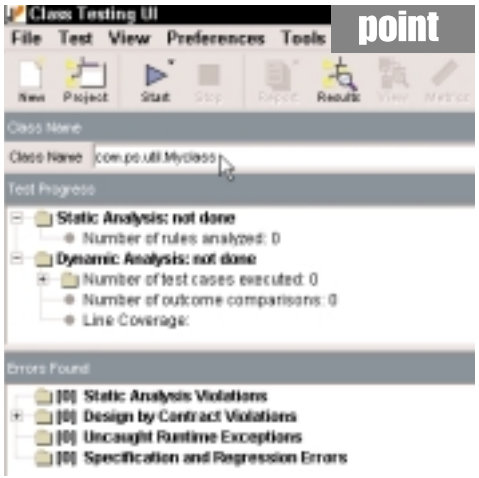

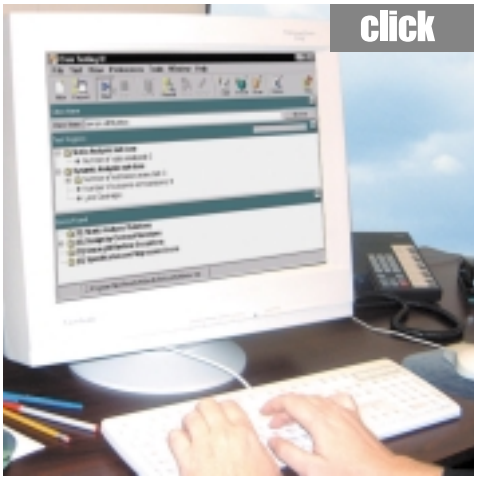

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that we perform on them, thus making these operations reusable instead of delegating these operations to the application development phase.

Some of these validation operations can also be defined in configuration files. JSF comes up with many standard validators such as DoubleRangeValidator, LengthValidator, LongRangeValidator, RequiredValidator, and StringRangeValidator. DoubleRangeValidator checks a value, optionally convertible from a string, against the minimum and maximum value specified in an attribute. LengthValidator checks the length of a string. RequiredValidator checks for a nonnull value, and StringRangeValidator checks for the range of a string object.

Standard User Interface Components

JSF provides a number of concrete user interface components that cover the most basic requirements. These components will grow in number and can be extended by component developers and vendors. The components have render-independent characteristics similar to the JavaBean properties. UICommand, UIForm, UIGraphic, UIInput, UIOutput, UISelectButton, SelectItem, UISelectItem, and UITextEntry are some of the components in the current version of the spec. UICommand class is one such UIComponent that when activated by the user triggers an application-specific command. The default behavior of these components include decode() to process and encodeBegin() and encodeEnd() to render the HTML. The other components behave similarly and abstract the common behavior of widgets seen in the UI world from the yesteryears.

Per-Request State Information

Now, let's look at two key objects in a JSF implementation. The first is javax.faces.context.FacesContext. FacesContext is defined as an abstract class that leaves room for the API to have

FIGURE 2 FacesContext

default behavior, although none exists in the reference implementation as of yet. The purpose of FacesContext is to provide server-side developers with a window into and access to the JSF implementation. More precisely, it provides in-context information for the current incoming request and eventual response. This includes the request and response UI component object graphs (Tree), servlet request, servlet response, session variables, and a host of other information (see Figure 2).

In addition, FacesContext is the repository that events are registered against. FacesEvents are generated when action is taken on the UI, such as clicking on a link or submitting a form. Descendants of FacesEvents include CommandEvent and FormEvent, where the CommandEvent handles invocation, such as URL clicks and FormEvents handle form submissions.

If you've worked with ServletContext, then FacesContext is familiar. It provides necessary information about the current request, which implies that the life of a FacesContext object is delineated by a single request/response cycle. Since FacesServlet.service() is the entry point into a JSF application, you'll find that this is where the FacesContext is created and, after pacing through all the phases, will get a release() call.

If you are a component developer or building a JSF app, you can get a reference to the FacesContext primarily via callback methods. For example, in the Invoke Application phase, your application handler will have a callback executed. This callback has a signature of processEvent (FacesContext facescontext, FacesEvent facesevent). In this method you're responsible for entertaining each event fired by the user. By the way, if you're thinking that this will lead to a branching nightmare (remember WinMain() ?) to properly delegate event handling, then you're right. We'd like to see some type of XML configuration file where events can declaratively invoke event handler classes. This is something akin to what Struts has done à la Action classes by implementing a Command pattern. However, we'll leave that for the JCP group to figure out.

Life Cycle Management

The second object worthy of mention is javax.faces.lifecycle.Lifecyle. Understanding this object will provide a stronger understanding of JSF's life-cycle management requirements and capabilities. Like FacesContext, Lifecycle is an abstract class and needs to be implemented by JSF providers. Take a quick glance at the class diagram for Lifecycle shown in Figure 3. As you'll see, static members are defined for each phase in the request processing cycle. Lifecycle's job is to act like a state machine and pace the request through the phases, and these static members work as state condition markers. As mentioned earlier, the entry point into a JSF app is FacesServlet. In addition to creating the FacesContext object (or pulling it from a pool), you'll find that in this servlet is where Lifecycle gets kicked into action. Lifecycle's execute() starts the request life-cycle process. An interesting feature that would be nice to have is the ability to add custom phases (i.e., by subclassing phase and registering it with Lifecycle).

Once Lifecycle is geared up, it adheres to its responsibility of cycling the request through the phases or short-circuiting directly to the Render Response phase. Once the request has done its time in the life-cycle process, it's time to push the response that's prepared. Lifecycle delegates the response navigation to a ViewHandler. According to the specification, the ViewHandler will be renamed, possibly as NavigationHandler. This is more descriptive of its behavior, as the ViewHandler is responsible for determining where the client should forward to. In the case of a JSP client, ViewHandler would forward to a JSP.

Rendering Model

This leads us to the question of how JSF renders the content of a page. Remember, the page may be different from the page the request was initiated from or it may be the same page. A scenario in which the same page is displayed is when a change in a UI component results in a visual change of another UI component. For example, clicking on a radio button may populate an adjacent list box. But how does JSF take a UI component and render it to something the client can display?

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"Above all, JSF attempts to define and delineate the tasks of the various roles in a Web development project"

The answer is to use RenderKits. When it comes to creating client device–specific UIs, RenderKits are to JSF what XSLT is to XML. They allow you to abstract how the UI is rendered. The reference implementation comes with a default HTML RenderKit. RenderKits can be swapped during design- or runtime and you can expect a plethora of kits to be available on the market shortly. The RenderKit will take a UI component such as UITextEntry and push a text input box to the browser. A configuration file is used to map UI components to Renderer objects. As seen in Listing 1, a UISelectBoolean is mapped to an HTMLCheckboxRenderer in a custom-created RenderKit. HTMLCheckboxRenderer has encodeBegin(), encodeChildren(), and encodeEnd() callbacks (see Listing 1) (Listings 1–3 can be downloaded from www.sys-con.com/java/sourcec.cfm.).

However, you have the option of not using a RenderKit. The responsibility of rendering a UI component then falls on the component. The encoding process is traversed across the response component tree by calling encodeBegin(), encodeChildren(), and encodeEnd(). In either case (with or without a RenderKit), an encode() will have code that creates an HTML response for an <input type=text>. Example: output. write ("<INPUT TYPE=....")

Once the HTML is rendered and the ViewHandler forwards to a JSP, JSF relinquishes control and the user can now initiate another request from the UI. The cycle has been completed.

Using JSF in Web Applications

Let's look at a simple JSF application and see how the pieces fit the puzzle. For those of you like me who hate "Hello World" applications, here's a simple weather-service application that takes input from a form with fields such as zip code, city, and state in the U.S., and looks up a weather service application and displays the weather for that location. As in most servlet applications, the WAR files contain the following files:

1. WEB-INF/web.xml
2. WEB-INF/classes/com/weather/listeners/WeatherContextListener.java
3. WEB-INF/classes/com/weather/ah/WeatherApplicationHandler.java
4. /weather.jsp
5. /weatherQuery.jsp

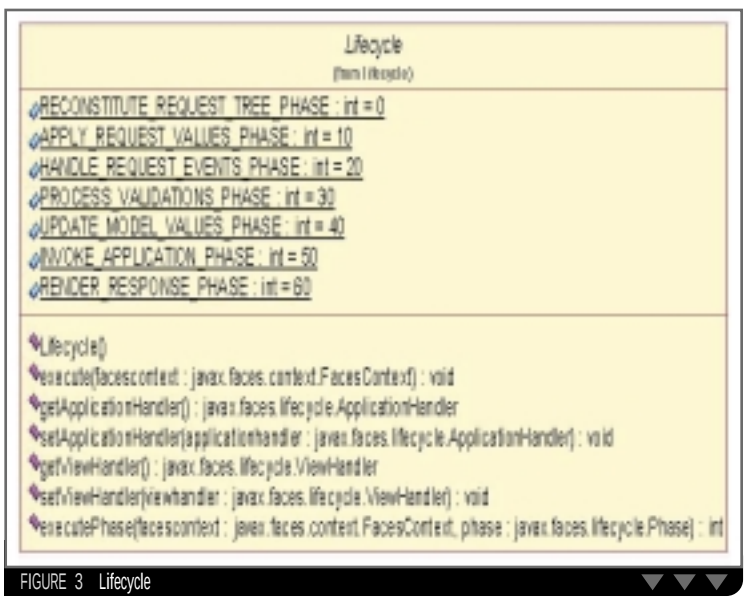

FIGURE 3 Lifecycle

The web.xml file (see Listing 2) enlists a context listener and the controller servlet. It provides a standard URL mapping and specifies a welcome file. This file is a JSP that serves a form that solicits input into three fields, namely zip code, city, and state.

The weatherQuery.jsp (see Listing 3) displays a form with three text input fields. Two of these have validation constraints, namely a zip code has to have at least five characters (although it can be any character, something that will not quite work in the U.S.). The city has no constraints but the state has to be at least two characters in size. This is not an error-proof application, but you get the idea of how to use the JSF built-in validators to enforce these constraints as opposed to writing custom code.

Conclusion

JavaServer Faces has certainly addressed the woes of many developers. It has the right representation from a diverse developer community that's part of the Java Community Process. Though a bit late to arrive compared to the several popular frameworks already in vogue, it has sufficient merit to get developers' buy-in irrespective of their development preferences. Like all things within the Java technologies, separating the interfaces from their implementation is certainly going to allow the software vendors to innovate and make it available within IDEs and other tools.

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1. *The JavaServer Faces Specification:* http://java.sun.com/j2ee/javaserverfaces/
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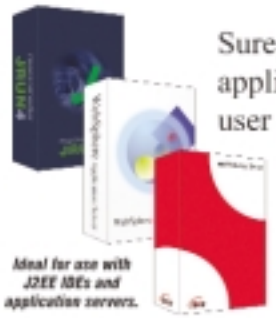

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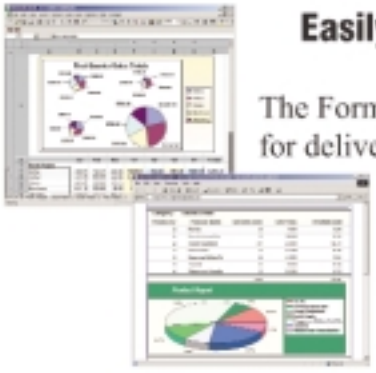

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Design Pattern: Java Value Types

Advanced examples

WRITTEN BY
NOAH HORTON

Design patterns are a familiar resource and using them is a routine matter. Here are other ways to make them work better, especially in large-scale applications.

The Java Value Types (JVTs) design pattern targets the use of "managed entities." To see just how useful this can be, let's look at some examples of JVTs and how they can be fully leveraged in today's enterprise solutions. In this role, JVTs are essentially "helper" classes; that is, they're primarily useful for representing a snapshot of an entity's state. These JVTs are very similar to value objects, but the distinction between the two is well worth noting.

Classically, objects have been categorized as both reference and value objects. One regarded authority, Martin Fowler, in his book *Refactoring* (Addison-Wesley, 2000), identifies a distinction between reference and value objects. Reference objects describe entities such as customers or accounts that represent things that would logically be single objects in the real world. In contrast, value objects are objects defined entirely in terms of their values, such as dates or numbers. Yet there is a third type of object with characteristics of both reference and value objects that becomes valuable in large-scale applications. These objects are Java Value Types.

These JVT objects are not really entities in their own right, like reference objects; they're not defined entirely by their value like value objects. They're used to transport and adapt an entity's state between components of a system or to and from other formats, such as XML. To get an idea of their usefulness, consider the following example of the Java Value Type pattern. Our example is a common J2EE design that contains a persistence layer of entity EJBs and a business logic layer of stateless session EJBs, and uses JVTs to move information between the layers.

Our example is a stock brokerage firm Web site (see Figure 1). It has three entity EJBs for persisting stocks, bonds, and customers that make up the persistence framework. We also have stateless session EJBs in the business logic framework called SecManager, StockLocator, BondLocator, and CustomerLocator. The Web application, Web service, and JMS subsystems all access the business framework to obtain JVTs that represent the state of entities in the persistence framework.

The stateless session EJBs can also perform caching of the JVTs. For example, if each SecurityJVT has a timestamp of the quote (in the SecurityJVT), then the SecManager can cache these for a configurable period of time to reduce access load on the entity EJBs in the persistence framework.

IS PERFORMANCE REALLY AN ISSUE?

Using JVTs changes the performance characteristics of your software. It replaces a series of individual get or set method calls with one larger call that, in the get case, has the overhead of object creation. In small applications that object creation overhead would probably slow the overall system down. Yet in enterprise applications, the small individual get and set calls may well be remote calls requiring socket communication. Thus in these cases you avoid significant latency by replacing these smaller method calls with one larger call.

JVT's Role in Designs: Loose Coupling

JVTs are extremely useful within enterprise applications for decoupling systems or technological layers. In our brokerage example we want to create a routine that purchases stock. In the classic style, you would call the purchaseStock(String symbol) method on the Customer entity. This method would then use some hard-coded mechanism to look up the entity that corresponds to the symbol and then query it for a stock price, time of quote, exchange ID, etc. Using a JVT approach, we would create a stateless session EJB on which we call the purchaseStock(String symbol, int shares, int customerID) method. This EJB would retrieve the StockJVT and the CustomerJVT from service locators. In this case the locators would retrieve the JVTs from CMP entity EJBs, but you can see how the use of JVTs and the locator would allow you to replace the source without having to change any of the logic.

It's incredibly useful to use common base classes with JVTs. Whereas the example entity EJBs don't use inheritance, the JVTs enable the use of inheritance to process the JVTs. Subsystems using JVTs need only access objects as the most generic subclass needed to perform their processing tasks. For example, the purchaseSecurity method in our exam-

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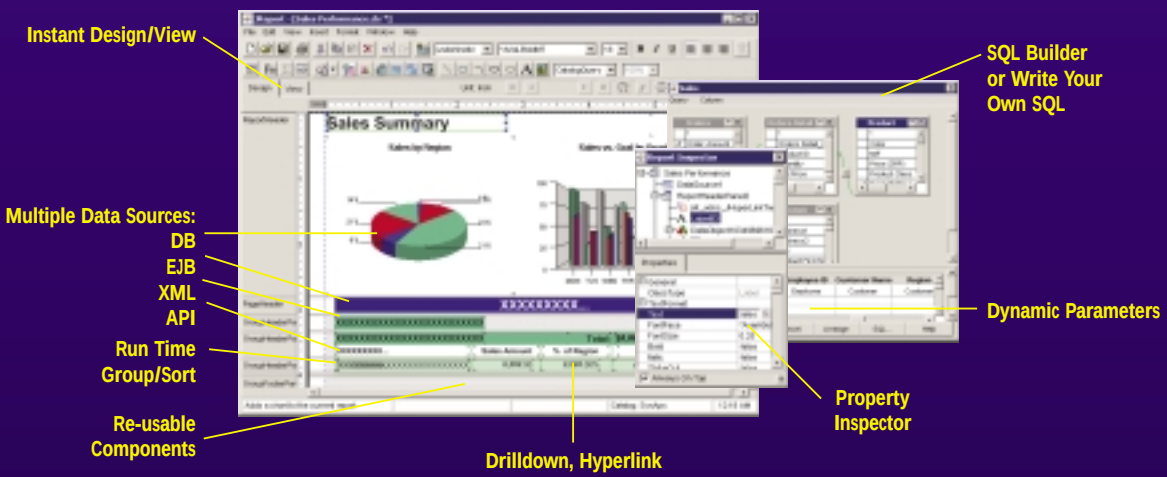

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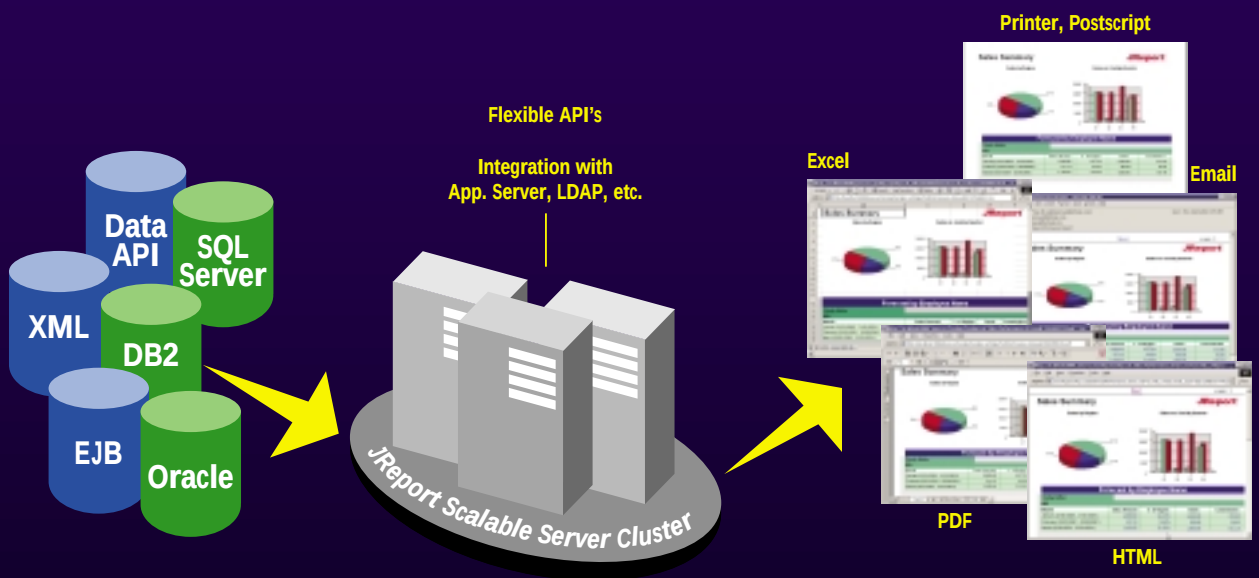

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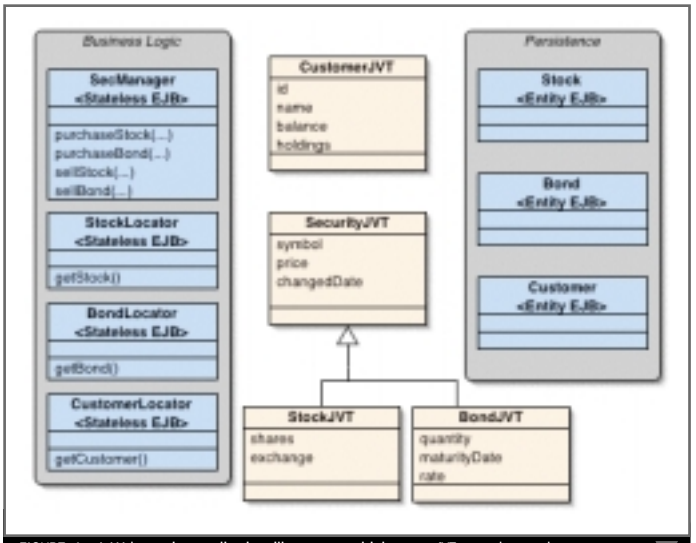


FIGURE 1 A Web service application illustrates multiple ways JVTs can be used

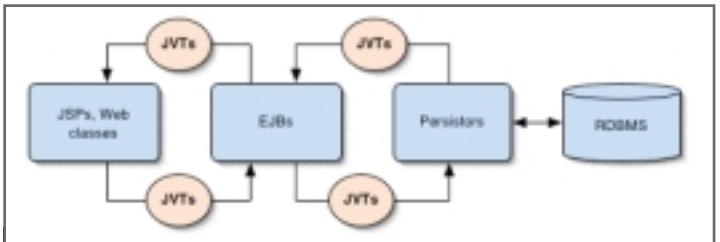


FIGURE 2 Using JVTs with Java Data Objects

ple can operate on the generic SecurityJVT level since it just needs to know the price of the security. Then the purchaseStock and purchaseBond methods can use the appropriate locator to retrieve the StockJVT or BondJVT for their invocation, and then pass that object to the purchaseSecurity method for processing.

Versioning and Transactions with JVTs

JVTs can also benefit transaction handling and state management. Adding an attribute to a JVT object to represent the object's version and altering this as the state changes provides a mechanism that can indicate if an object has changed. If this attribute is a Date, then a developer can check at any time, when comparing to another instance of the same entity, which JVT has newer or older data and take appropriate actions.

This same approach can assist in better handling transactions. For instance, if another Date attribute is added to contain a timestamp of the last entity change (usually persisted along with the entity), then the code that's processing any JVT can determine if the entity it represents has changed since the JVT's state was set. This enables identifying "dirty" JVTs before getting into a possible transaction rollback situation. Of course, JVTs also enable the grouping of state changes on an entity, just as with value objects, which results in better performing applications. Keep in mind that one of the largest performance issues with any distributed application is the number of remote accesses to entities in the model. This can impact both the network efficiency and database locking bottlenecks. JVTs can be a very useful strategy in producing efficient, large-scale distributed applications.

To enhance the performance of our application, we can obtain a JVT when an EJB in our business layer begins a transaction that involves multiple entities, then make changes to copies of those JVTs. Prior to committing the changes back to the entities, it can query those entities for new state JVTs to see if the state had changed since it first queried the entities. If not, it can go ahead and commit. If the state had changed, it can decide how to handle the changes, thus avoiding rollback situations rather than letting the transaction manager handle the rollback. This is quite a bit more work, but is one way to improve performance for transactional applications with high volume changes.

Using JVTs with XML

JVTs are useful for converting to and from XML. One excellent strategy is to push generic marshaling to and from XML up to a base class of the JVT. This can be accomplished by using reflection for the method access. If JavaBean style property syntax is followed on the JVTs, and the fully qualified classname is stored on the XML as an attribute for the JVT, then a single JVT base class is capable of both reading and writing all subclasses out to XML and reading them from XML.

Using JVTs with Persistence

It's very useful to utilize JVTs with Java Data Objects (JDO). Much of this stems from the fact that JDO is focused upon persisting value objects, or JVTs. The combination of JVTs and JDO can be powerful, resulting in rapid and robust development of persistence frameworks that manage object/relational mapping from JVTs to relational databases. Several JDO products exist from open source products to commercial products. Figure 2 shows the JVTs being used to move entity state between the layers of an application.

This approach also works effectively with CMP EJBs (see Figure 2). The main difference between using CMP EJBs and JDO persistence is that with the former, you have all the advantages of EJBs: remote access, container managed transactions and security, etc. JDOs sometimes have the edge in mapping

> "JVTs are extremely useful within enterprise applications for decoupling systems or technological layers"

Author Bio

Noah Horton, an R&D engineer for Hewlett-Packard for the last two years, has been programming in Java for five years and specializes in enterprise system design with Java. He most recently worked on an advanced service activation system for HP.

complex relational models. But that's a topic for another article.

Using JVTs Effectively with Web Services

The introduction of Web services has added yet another way of exposing enterprise systems. It adds to the existing list that includes Web interfaces and thick clients. What's most important in handling the increasing number of ways to expose your system is to have a strong design for adding multiple façades to one system, and JVTs greatly facilitate this.

Consider stock quoting in our brokerage example. If you had built the system using the JVTs and locators described earlier, the Web interface probably just queried the stock locator for a StockJVT and then used that JVT to populate a quote page. There may have been an RMI façade that accepted stock quote requests and used that same locator to fulfill the request. Now you can easily add a Web services façade that similarly exposes the desired functionality by querying the locator for StockJVTs. The locator provides a good abstraction of the source of the JVT, and the JVT provides a common interface for all these systems to use that is robust and well suited to multitiered applications. This design allows you to easily change individual parts of the system without having to modify every system, and it allows for the easy development of new consumers of the systems information.

JVTs Assist in Large Team Development Projects

Systems are increasingly comprised of multiple subsystems collaborating to provide the overall functionality. Such a development strategy helps in large projects because testing the smaller components is easier than testing one mammoth system and those subsystems can be developed in parallel by subteams.

JVTs help to improve this team development paradigm. Using them between components allows for greater decoupling in which one system can be entirely replaced without the other system noticing. During development, test JVT generators can be developed that create JVTs with mock data so that they can be used as simulated input in the development of a subsystem. Similarly, automated tests can easily be developed for a subsystem that use mock input JVTs and compare the JVT output of a system to a predefined JVT with the expected output.

Summary

We've shown the value of the Java Value Type pattern in going beyond value objects to decouple technical layers within a J2EE application. Our JVTs enable us to utilize inheritance with entity EJBs that don't support inheritance. They provide objects that utilize standard JavaBean properties on Java classes to transport and manage state throughout a distributed J2EE application. They even assist in reducing the code needed to interact with Web services and enable communication with non-Java systems.

JASON BELL J2SE EDITOR

Building the Social Network

Whether you like it or not, you're part of the Java community. Just by reading this publication you're declaring that you're a part of the Java way of life, maybe not by choice but you're still here. We have a network of developers all programming in the same language; there are many aspects to this language, but they all share a common thread. Fun, isn't it?

One of my little side projects is occasionally contributing to the FOAF community. FOAF (Friend-of-a-Friend) is RDF-based metadata regarding who you know and what you know about them. It builds into a handy RDF/XML-based file you can keep on your server, thus allowing people to read it and the FOAF files of the other users. The project is in beta at the moment, but it's used by some professionals to hold the public data they need about themselves and about others. Once you interact with several thousand other users with FOAF files, you have a content-rich social network.

This gives rise to some interesting developments – I'm looking at it from a skills-level point of view; I'm interested in my group of people having a skill set. From there, if I wanted to put a project together, on SourceForge for example, then I could query my FOAF file to find out which people had the skills I was looking for. A basic set might look like this:

```
<rdf:RDF
xmlns:rdf="http://www.w3.org/1999/02/22-
   rdf-syntax-ns#"
 xmlns:sk="http://example.com/skills"
 xmlns:foaf="http://xmlns.com/foaf/0.1/"
   >
<foaf:Person>
  <sk:Discipline
rdf:parseType="Resource">
    <sk:description>Software
   Dev</sk:description>
    <sk:skill>Java J2SE</sk:skill>
    <sk:skill>Ant</sk:skill>
    <sk:skill>Lucene</sk:skill>
    <sk:skill>Jena API</sk:skill>
  </sk:Discipline>
</foaf:Person>
</rdf:RDF>
```

Part of the fun I'm having with all this is getting to grips with query language, which is SQL-like. For Java there's the Jena API, which is designed for manipulating RDF and also has a query language (RDFQL) built in. Developing the implementation to put a team together to do software development is slow but it certainly is fun. As with many of these things, time is the deciding factor.

Another aspect I'm looking at is a catalog of code from each developer. If Fred has some open source code to iterate through IMAP folders in JavaMail, that information could be stored as metadata so I can query it and have a look at that code myself. Why go to all the bother of using Google when the metadata about the data is already close at hand? And more to the point – from someone you know, therefore there's a level of trust between developers.

However, it does require proactive developers who can grab the bull by the horns and produce some killer applications using RDF. It's an interesting challenge. Tim Berners-Lee mapped out the future of the Web as being resource based and named it the "Semantic Web." Read the RDF Primer (link below) and see what you think.

• • •

Are You an Open Source Developer?

Do you have projects that are hosted on sites such as SourceForge or freshmeat.net? If so I want to hear from you! ***JDJ*** is continuing with its **Spotlight on Open Source** column that focuses on Java open source projects. The only real requirement is that your project is on a repository so people can freely access code and, if they wish, join your development team. All I ask is that you first draft a small proposal on the *JDJ* Web site (http://grids.sys-con.com/proposal), then we'll get the ball rolling.

Resources

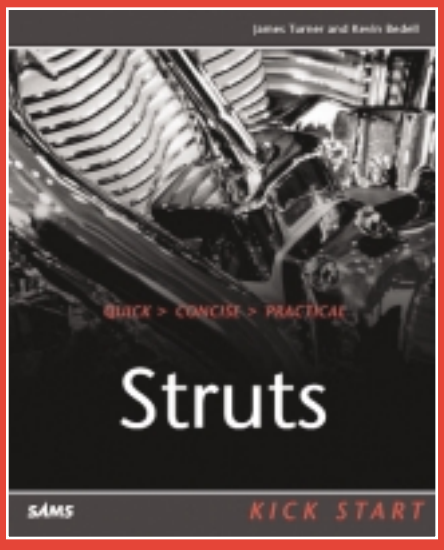
- *RDF Primer:* www.w3.org/TR/rdf-primer/
- *RDF Validator:* www.w3c.org/RDF/Validator
- *FOAF:* http://xmlns.com/foaf/0.1/
- *Jena API:* www.hpl.hp.com/semweb/jena.htm

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.

Give your code a Kick Start



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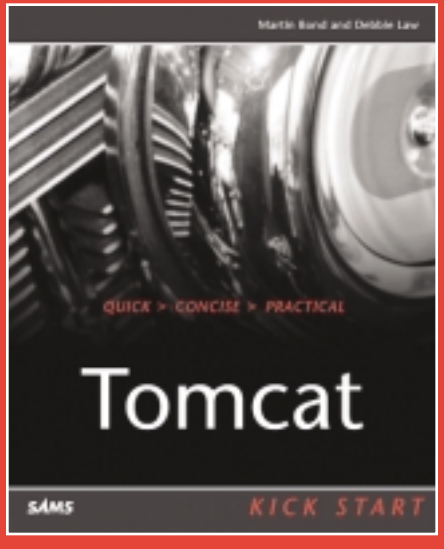

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Aoyon Chowdhury, Parag Choudhary
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JAX: Java APIs for XML Kick Start covers the JAX APIs—fundamental for development of Java-based Web service applications as well as other e-Commerce applications requiring the exchange and manipulation of data. The book includes an overview of Web service fundamentals including SOAP, UDDI, and WSDL, all of which will be built upon in later examples. The book then covers the current set of JAX APIs for data processing, for messaging, for writing data to registries and for calling remote applications.

WRITTEN BY STEVE NORTHOVER AND JOE WINCHESTER

*The first part of this article (**JDJ**, Vol. 8, issue 4) introduced the Standard Widget Toolkit (SWT), and showed how graphical user interfaces can be created using some of the basic widgets found in SWT. In addition, layout classes were described that allow widgets to be arbitrarily positioned and sized within their parent.*

In Part 2, we continue where the previous article left off, describing some of the more advanced controls and concepts, including multithreading in the user interface. We conclude with a brief discussion of SWT graphics.

Items

Many of the advanced controls in SWT make use of items. Items are widgets that represent a specific kind of child within a control. They are always used in conjunction with the parent and cannot exist without the parent. For example, a menu contains menu items and a menu item cannot exist outside of a menu. Table 1 shows some controls and their associated items.

A complete description of each of these controls is beyond the scope of this article. However, we'll briefly discuss some of the most commonly used ones – Menu, TabFolder, Tree, and Table.

Menus

SWT supports menu bars, and drop-down and pop-up menus using a single class called Menu. Style bits provided in the constructor create the appropriate kind of menu. These bits are SWT.BAR, SWT.DROP_DOWN, and SWT.POP_UP.

Each choice in a menu is MenuItem. A menu item can have a number of styles, including SWT.CHECK, SWT.CASCADE, SWT.PUSH, SWT.RADIO, and SWT.SEPARATOR to support a different appearance and behavior.

A menu bar is the root of a hierarchy of drop-down menus. Every shell can optionally display a single menu bar using the setMenuBar(Menu menuBar) method of Shell. It's possible to create many menu bars in a shell, but only one can be visible in a shell at a time. The following code creates the standard File and New menus for the shell shown in Figure 1.

```
Menu bar = new Menu(shell,SWT.BAR);
shell.setMenuBar(bar);
MenuItem fileItem =  new MenuItem(bar,SWT.CASCADE);
fileItem.setText("File");
Menu fileMenu = new Menu(shell,SWT.DROP_DOWN);
fileItem.setMenu(fileMenu);
MenuItem newItem = new MenuItem(fileMenu,SWT.PUSH);
newItem.setText("New");
```

Drop-down menus represent submenus in a hierarchy of menus. They can never be the root of a menu hierarchy and cannot be displayed without being connected to a menu bar, pop-up menu, or another drop-down menu. Drop-down menus are connected to other menus using the setMenu(Menu menu) method of MenuItem.

In Figure 1 the black lines indicate the containment hierarchy from top to bottom. The shell is the parent of the drop-down menu and the menu bar. The gray lines indicate the setMenu() relationship between the cascade menu item and the New menu. Dotted red lines show the objects that are visible in the window.

A pop-up menu is the root of a hierarchy of drop-down menus. Pop-up menus are sometimes called context menus and are normally associated with a control. In SWT, every control can optionally have a single context menu using Control.setMenu(Menu menu). The same context menu can be used in many different controls.

Some platforms show a pop-up menu when the user presses the mouse, while others show the menu when the user releases the mouse. Depending on the platform, there are also specific key sequences or mouse and key combinations that are used to request a pop-up menu. For example, on Windows, the user presses Shift+F10. On the Macintosh, the user holds down the control key and presses the mouse. In SWT, pop-ups are displayed appropriately no matter how they were requested.

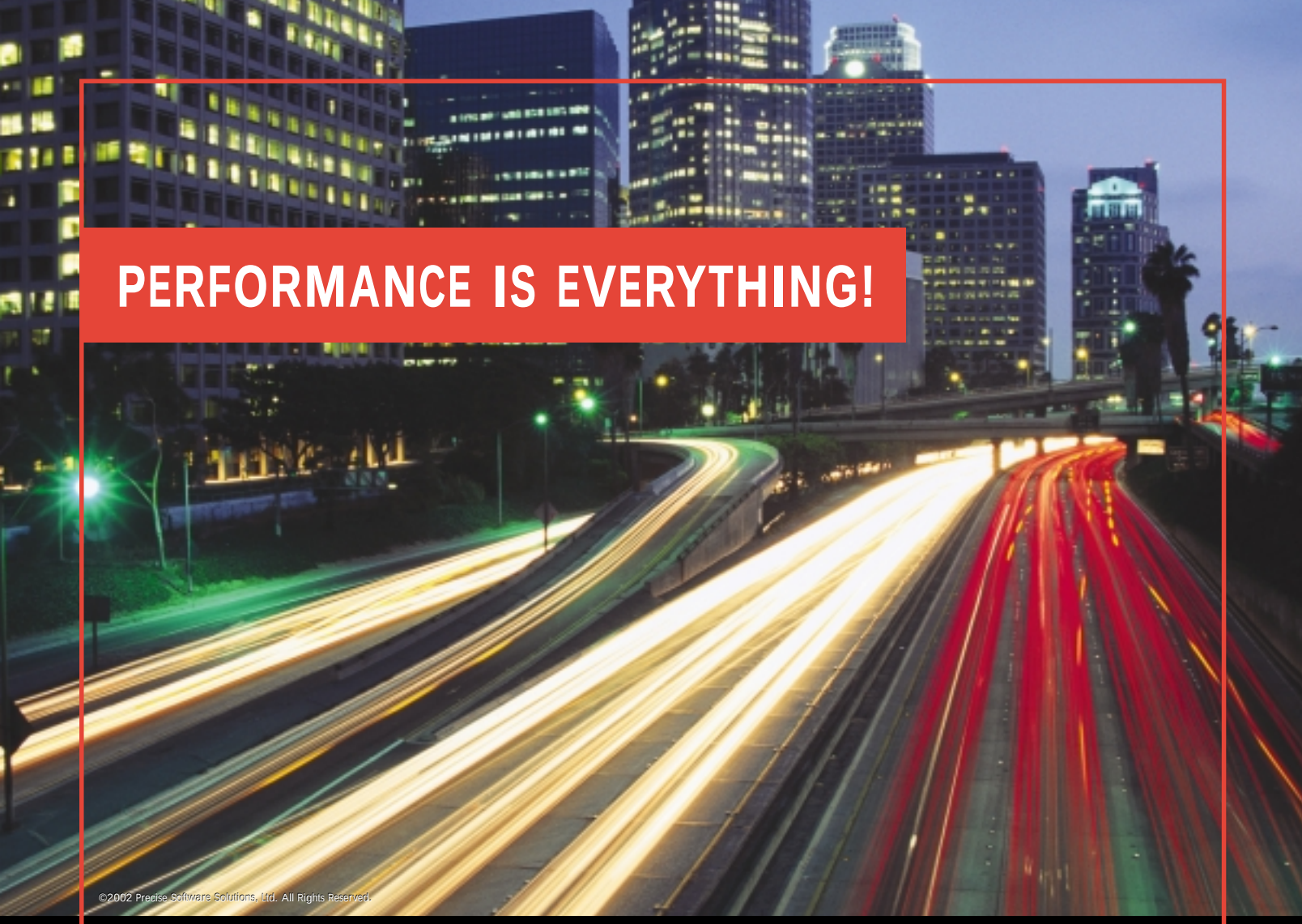
Figure 2 shows a List with a pop-up menu that contains two menu items, one of which is a cascade item containing a drop-down menu. This menu has a single item that can be checked and unchecked by the user.

```
Menu popUpMenu = new Menu(shell,SWT.POP_UP);
```

ERRATA

In Part 1 of the article (Vol. 8, issue 4) there was an error in the section "Obtaining the SWT". The Java command should be:

```
java -classpath "helloworld.jar";C:\ECLIPSE\
   eclipse\plugins\org.eclipse.swt.win32_2.0.1\
   ws\win32\swt.jar
-Djava.library.path=C:\ECLIPSE\eclipse\plugins\
   org.eclipse.swt.win32_2.0.1\os\win32\x86
HelloWorld
```



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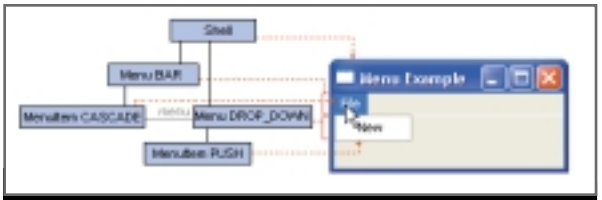

FIGURE 1 Shell with MenuBar and Menu

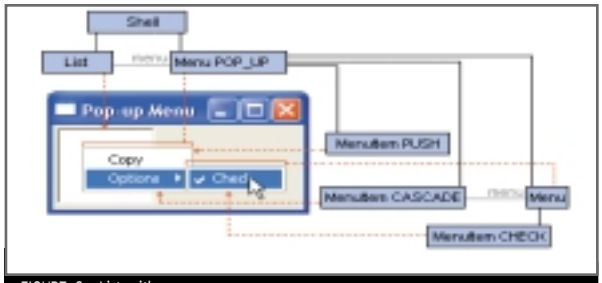

FIGURE 2 List with pop-up menu

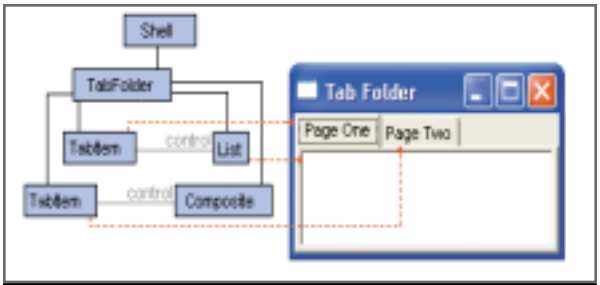

FIGURE 3 TabFolder with TabItem pages

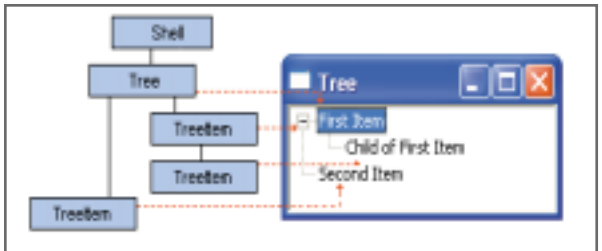

FIGURE 4 Tree with children

FIGURE 5 Check box tree with text, images, and colors

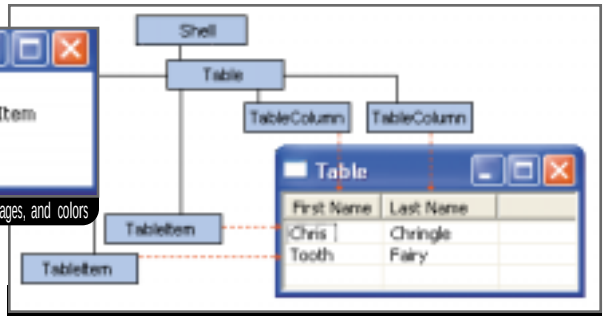

FIGURE 6 Table with columns

```
list.setMenu(popUpMenu);
MenuItem copyItem = new MenuItem(popUpMenu,SWT.PUSH);
copyItem.setText("Copy");
MenuItem optionsItem = new MenuItem(popUpMenu,SWT.CAS-
CADE);
optionsItem.setText("Options");
Menu optionsMenu = new Menu(popUpMenu);
optionsItem.setMenu(optionsMenu);
MenuItem check = new MenuItem(optionsMenu,SWT.CHECK);
check.setText("Check");
```

TabFolder

A TabFolder represents a notebook with pages and tabs. Each tab in the tab folder is a TabItem. Tab items can display strings and images. Tab folders support automatic page selection as well as more sophisticated control over paging.

Controls are included in automatic page selection using TabItem.setControl(). When the user clicks on a tab, the previous control is hidden and the new control is resized to fill the client area of the tab folder. There is no special control that represents a tab folder page. Any control can fill the client area, as long as it's a child of the tab folder. In Figure 3, the tab folder is using automatic page selection and was created using the following code.

```
TabFolder folder = new TabFolder(shell,SWT.NONE);
TabItem tab1 = new TabItem(folder,SWT.NONE);
tab1.setText("Page One");
List list  = new List(folder,SWT.BORDER);
tab1.setControl(list);
TabItem tab2 = new TabItem(folder,SWT.NONE);
tab2.setText("Page Two");
Composite comp = new Composite(folder,SWT.NONE);
tab2.setControl(comp);
```

The implementation of TabFolder is flexible. It allows complete control of the client area of the folder and doesn't dictate when and how pages are created. To avoid automatic page selection and to implement your own page selection strategy, don't call setControl(Control). This allows you to hide and show pages yourself by listening for selection events on the tab folder. TabFolder supports the SWT.Selection event and listeners can be added using addListener() or addSelectionListener(). You can even create pages lazily, destroy or hide them, or keep some of the same controls around from a previous page when the page changes. Of course, this requires more effort on the part of the programmer.

Tree

A Tree represents a hierarchy of tree items. Each node in the tree is represented by the class TreeItem. Tree items can display strings and images, and can be collapsed and expanded by the user or by the programmer using TreeItem.setExpanded(boolean expand).

TreeItems are created using the constructors TreeItem(Tree tree, int style) and TreeItem(TreeItem tree, int style). These constructors allow a new item to be a child of another item or a child of the tree. In addition, the constructors TreeItem(TreeItem tree, int style, int index) and TreeItem(Tree tree, int style, int index) allow an item to be inserted at an arbitrary position with respect to a sibling in the tree.

```
Tree tree = new Tree(shell, SWT.BORDER);
TreeItem firstItem = new TreeItem(tree,SWT.NONE);
firstItem.setText("First Item");
TreeItem secondItem = new TreeItem(tree,SWT.NONE);
secondItem.setText("Second Item");
TreeItem childOfFirstItem = new
TreeItem(firstItem,SWT.NONE);
childOfFirstItem.setText("Child of First Item");
```

Figure 4 shows a tree with three items where two are children of the tree and one is a child of another item.

A tree can allow more than one item to be selected when created with the style bit SWT.MULTI. Selected items are returned by getSelection(), which returns an array of the cur-

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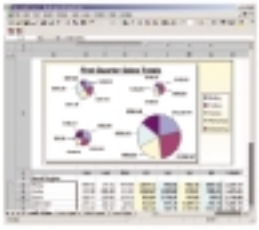

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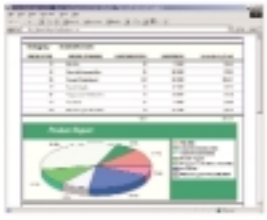

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rently selected items. To know when the selection has changed, trees support the SWT.Selection event.

In addition to text, a tree item can have an image associated with it using setImage(Image image). Individual colors for each item can be changed with setForeground(Color color) and setBackground(Color color).

The Tree style bit SWT.CHECK can be used to allow each item to have a check-box appearance, as shown in Figure 5. When a TreeItem has been checked or unchecked, a selection listener is called with the detail field of the event set to SWT.CHECK. This allows the programmer to determine whether the item or the check box was selected.

Table

Tables are used to display a list of strings and images, optionally in columns. Each row in the table is represented by a TableItem. When no columns are added by the programmer, the table behaves like a List widget, showing a single list of items with no headers or grid lines.

To add a column, TableColumn(Table parent, int style) is used to create the new column. After a column is created, in order for it to be visible to the user, it must be resized. The TableColumn methods setSize(int width) and pack() are used to resize a column. The pack() method makes the column large enough to display the column header or widest string and image in the column. It's typically called after all the items have been added to the table.

For column headings and grid lines to be shown, the Table methods setHeaderVisible(boolean) and setLinesVisible-(boolean) are used. Headers and grid lines are not shown by default.

```
Table table = new Table(shell, SWT.BORDER);
table.setHeaderVisible(true);
table.setLinesVisible(true);
TableColumn columnOne = new TableColumn(table,SWT.NONE);
columnOne.setText("First Name");
TableColumn columnTwo = new TableColumn(table,SWT.NONE);
columnTwo.setText("Last Name");
```

Figure 6 shows the table. (*Note:* On Windows the last column does not extend to fill up the available space.) Each row in the table is a TableItem created using TableItem(Table parent, int style). To set the contents of particular cell, use the methods setText(int index,Sting text) or setText(String[] strings).

```
TableItem firstTableItem = new TableItem(table,SWT.NONE);
firstTableItem.setText(new String[] {"Chris","Chringle"});
TableItem secondTableItem = new TableItem(table,SWT.NONE);
secondTableItem.setText(0,"Tooth");
secondTableItem.setText(1,"Fairy");
```

As well as showing text, a table item cell can display an image. Like the tree control, the style bit SWT.CHECK is used to add check boxes to the control (see Figure 7).

In Figures 5 and 7, you'll notice that the examples contain images and text. Where did these images come from and how were they created?

Graphics: A Brief Introduction

SWT includes the package org.eclipse.swt.graphics that provides general-purpose graphics capability. Table 2 shows the basic set of SWT graphics objects.

Both widgets and graphics share the same coordinate system, with (0, 0) in the top left corner. Most of the time, it's possible to use graphics objects and have the widgets do all the drawing for you. Graphics objects often appear as arguments in the widget API. For example, you can set an image into a button, causing the button to draw the image.

Fonts, Images, and Colors

A Font is created with a font-face name, a point size, and style bits. The style bits are a bitmask of SWT.NORMAL, SWT.BOLD, and SWT.ITALIC.

```
Font font1 = new Font(display,"Courier",18,SWT.BOLD);
Font font2 =
    new Font(display,"Arial",10,SWT.ITALIC | SWT.BOLD);
```

Images can be created from an absolute path or loaded from an input stream.

```
Image image1 = new Image(display,"c:/temp/eclipse32.gif");
InputStream stream =
getClass().getResourceAsStream
 ("icons/image.gif");
Image image2 = new Image(display,stream);
```

Colors are created from red, green, and blue components. These are integer values from 0 to 255. Commonly used colors can be retrieved directly from the display using the method getSystemColor(int id).

```
Color cyan = new Color(display,0,255,255);
Color red = display.getSystemColor(SWT.COLOR_RED);
```

The same font, image, or color can be shared by many different controls, reducing the number of operating system resources that are allocated. The results are shown in Figure 8.

Most graphics objects, like fonts and images, use operating

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Testing platform	J2EE reference implementation 1.3	Tomcat 4.03
Max throughput	6 pages per second (520,000 hits a day)	30 pages per second (2,600,000 hits a day)
Lines of code	22,221 lines in 250 files	3,563 lines in 50 files

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system resources in the same manner as controls, and must be disposed when they are no longer required (see www.eclipse.org/articles/swt-design-2/swt-design-2.html).

WIDGET	ITEM	DESCRIPTION
CoolBar	CoolItem	Items can be rearranged by the user
Menu	MenuItem	Items are the choices on the menu
TabFolder	TabItem	Items are the tabs in a tab folder (notebook)
Table	TableItem, TableColumn	Items are rows and columns in a table
ToolBar	ToolItem	Items are the buttons on the tool bar
Tree	TreeItem	Items are the nodes in a tree

TABLE 1: Controls with items

GC: The Only Way to Draw

GC, which is short for graphics context, is one of the most important graphics classes in SWT. All drawing and measuring operations are defined in this class. For those readers who are familiar with Windows GDI, a GC is equivalent to an HDC. On X Windows, a GC is a thin layer on top of an X Windows GC.

GCs are created on different kinds of objects, usually an image or a control, allowing drawing and measuring operations to occur in these objects.

Drawing Lines and Shapes

GC has a number of API methods that allow the drawing of images, shapes, and text. As well as drawing a simple line between two points, there are a number of methods that draw pre-defined shapes. Arbitrary polygons can be drawn by defining the points that make up the polygon. Lines and shapes are drawn in the foreground color of the GC. Different line widths and styles can be specified. Figure 9 shows the results of running the following code.

```
gc.drawRectangle(10,10,30,40);
gc.setLineStyle(SWT.LINE_DOT);
gc.drawOval(50,10,30,40);
gc.setLineWidth(3);
gc.setLineStyle(SWT.LINE_SOLID);
gc.drawPolygon(new int[]
  {90,10,90,50,120,30});
gc.drawArc(130,10,30,40,90,270);
```

The first shape that is drawn is a rectangle whose top left corner is (10,10) with width 30, height 40. The next shape is an oval. Ovals are drawn by specifying the bounding rectangle for the oval. In the example code, this is a rectangle with a top left corner at (50, 10) with width 30, height 40. Next, a triangle is drawn as a polygon whose corners are (90, 10), (90, 50) and (120, 30). Arcs are drawn by specifying the bounding rectangle along with the start and end angle. A start angle of 0 points due east. In the previous code, the start angle 90 means the arc begins from the top of the bounding rectangle. The end angle is the number of degrees the arc is drawn in a counter-clockwise direction, 270 degrees in the code.

FIGURE 7 Check box table with no table columns

FIGURE 8 SWT Controls using graphic resources

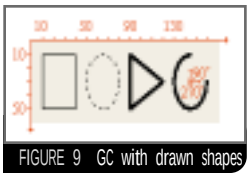
FIGURE 9 GC with drawn shapes

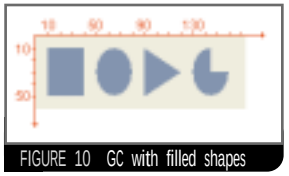
FIGURE 10 GC with filled shapes

For each method that draws a shape there is a corresponding method that fills the shape. Shapes are filled using the background color of the GC. The following code fills a number of shapes in green as shown in Figure 10.

```
gc.setBackground
(display.getSystemColor
(SWT.COLOR_GREEN));
gc.fillRectangle(10,10,30,40);
gc.fillOval(50,10,30,40);
gc.fillPolygon(new int[]
{90,10,90,50,120,30});
gc.fillArc(130,10,30,40,90,270);
```

Drawing Text and Images

Text is drawn using the method GC.drawText(String text, int x, int y, int flags). The *x* and *y* arguments specify the location of the drawing operation. The flags are a bitmask of the constants SWT.DRAW_TRANSPARENT, SWT.DRAW_MNEMONIC, SWT.DRAW_TAB, and SWT.DRAW_DELIMITER. The last three bit flags determine whether "&", "\t", and "\n" should be processed as mnemonic, tab, or new line directives or drawn in the text instead. Text is measured using GC.textExtent(String text, int flags). This method returns a point that is the bounding box of the string. The following code draws an image on GC and then some text; the result is shown in Figure 11.

```
gc.drawImage(image,0,0);
gc.setForeground(display.getSystemColor(SWT.COLOR_MAGEN
  TA));
gc.drawText("The\tStandard",10,10);
gc.drawText("Widget/n&Toolkit",10,30,true);
gc.drawText("and &Eclipse",10,70,SWT.DRAW_MNEMONIC);
```

Text is normally drawn with the background filled using the background color of the GC. For transparent text use the convenience method GC.drawText(String text, int x, int y, boolean transparent) or the SWT.DRAW_TRANSPARENT bit flag.

Images are drawn in their original size or cropped and stretched. The following code draws the Eclipse image three times as shown in Figure 12. The image is drawn once at (10,10) at the original size, then drawn again at (10,50), this time drawing only the bottom left quarter. Finally the image is stretched to twice its size vertically, four times its size horizontally, and drawn at (50,10).

```
gc.drawImage(image,10,10);
gc.drawImage
(image,0,16,16,16,10,50,32,32);
gc.drawImage
(image,0,0,32,32,50,10,128,64);
```

Drawing in an Image

As well as loading images from files and input streams, it's also possible to create an image and draw into it or draw on an image that was loaded. The following code uses a GC to draw a white line from (0, 0), the top left corner to (30, 30), the bottom right corner in an image. The resulting image is set into a label. Figure 13 shows that label in a shell.

```
Image image = new
  Image(display,"C:/eclipse32.gif");
GC gc = new GC(image);
gc.setForeground
(display.getSystemColor
```

```
  (SWT.COLOR_WHITE));
gc.drawLine(0,0,30,30);
gc.dispose();
Label label = new Label(shell,SWT.NONE);
label.setImage(image);
```

OBJECT	DESCRIPTION
Point	a two dimensional point with fields x and y
Rectangle	a two dimensional rectangle with fields x, y, width, height
GC	a graphics context, used for drawing and measuring operations
Font	an allocated font, ready to be set into a control or GC
FontData	an unallocated font, the data needed to create a font
FontMetrics	the data that describes the details of an instantiated font
Image	an allocated image, ready to be set into a control or GC
ImageData	an unallocated image, the data needed to create an image
Region	a clipping region, composed of rectangles, ready to be set into a GC
Color	an allocated color, ready to be set into a control or GC
RGB	an unallocated color, the data needed to create a color
Cursor	a graphic to indicate the position of the mouse pointer

TABLE 2: Basic SWT graphics objects

Drawing in a Control

We've seen how to use a GC to draw into an image and how images can be drawn by a GC or a control. It's also possible to draw directly into a control. The following code fragment draws a line from (0, 0) to (30, 30) in a Canvas (a class that is specifically designed for drawing operations):

```
GC gc = new GC(canvas);
gc.drawLine(0,0,30,30);
gc.dispose();
```

In a multiwindowed windowed environment where the desktop is shared by many different processes, each with multiple overlapped windows, what happens to the line when the user clicks on another window and then clicks back on the canvas? Since most operating systems don't retain graphics operations or save the window contents automatically, the canvas is redrawn without the line. How can we ensure that the line will always be drawn when the canvas is drawn? The answer is to use a paint listener.

Paint Listeners

The code fragment, shown in Figure 14, draws a line from (0, 0) to (30, 30) on a canvas in an SWT.Paint listener, ensuring that the line will always be drawn every time the canvas is drawn:

FIGURE 11 Text styles drawn on a GC

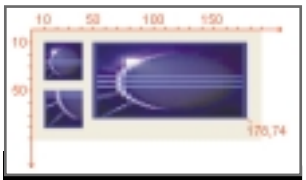

FIGURE 12 Cropped and stretched

FIGURE 13 Line on an image

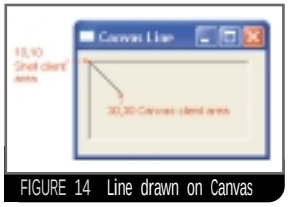

FIGURE 14 Line drawn on Canvas

```
Canvas canvas = new
Canvas(shell,SWT.BORDER);
canvas.setBounds(10,10,160,80);
Listener listener = new Listener() {
  public void handleEvent(Event
   event) {
    event.gc.drawLine(0,0,30,30);
  }
};
canvas.addListener(SWT.Paint,listen
 er);
```

Notice that we did not create a GC but used one from the paint event. On most operating systems, when a control is drawn, the window system provides a native graphics context that is clipped so that only the area that was exposed will be painted. SWT takes advantage of this feature and provides a GC that maps directly to the native graphics context. The coordinate system of the GC is the client area of the control, so in Figure 14 the line begins at (0,0) within the Canvas and continues to (30,30).

To determine how much of the canvas needs to be painted, the paint event contains the damaged area. This is the *x*, *y*, width, and height of the area that needs to be drawn. In most situations, paint listeners just draw the entire client area of the control, ignoring the damage. However, it's possible to use the damaged area to draw less. In the example, if the damaged area did not intersect the line from (0, 0) to (30, 30), then the paint listener could choose not to draw the line.

When do paint events occur? As previously discussed, they can occur when the user resizes or exposes a window on the desktop. It is also possible for the programmer to cause a paint event to occur using the method Control.redraw(). Why would we want to do this? For one thing, drawing outside of a paint event means that the drawing operations will get lost when the window is resized or exposed. This means that a control always needs to be able to draw its contents in a paint event, so why draw outside of paint? In addition, drawing in paint can reduce flicker. Most operating systems collapse individual paints and merge the damaged area into a single paint event, reducing the number of redraws.

To damage a specific area and cause it to be redrawn, use Control.redraw(int x, int y, int width, int height, boolean all). The integer arguments specify the damage rectangle while the boolean argument determines whether the rectangle should also be damaged in the children of the control.

Occasionally, it makes sense to flush all outstanding paint events for a control, causing it to draw right away. This is sometimes necessary when a program takes some time getting back to the event loop and needs to give feedback to the user right away. For example, imagine a control that displays a line of text (like a Label) and only draws this text inside the paint event. When the text is changed, the control issues a redraw() to cause a paint and eventually draw the new text when the next paint occurs from the event loop. If the text is changed to many different strings, redraw() will be called for each string but only one merged paint will occur. This means that the control will only draw the last string. Normally this is not a problem but if the control is being used as a counter in a tight loop to give feedback to the user, the user will only see the last value of the counter when the tight loop has finished and the program goes back to the event loop.

To flush all outstanding paint events, the Control.update() method is used. Generally, it's a bad idea to flush outstanding paints because this defeats the paint event and the damaged area merging mechanism of the operating system.

Multithreaded Programming

In SWT, by definition the thread that creates the Display is a UI thread. This thread is responsible for reading and dispatching events from the operating system event queue, and invoking listeners in response to these events. Listener code is executed in the UI thread. This makes an SWT application

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generally quite responsive, behaving like most other operating system programs. However, any long operation, when executed by a listener, will run in the UI thread and prevent it from reading and dispatching events, thus temporarily hanging the application.

If a listener has a large amount of work to perform, instead of performing that work in the UI thread, it can fork a separate thread so the UI thread can continue dispatching events. If the other thread needs to execute code that accesses an SWT object, such as changing the string in a label, there's a concurrency issue. Some kind of synchronization mechanism is necessary to prevent the operating system or SWT from crashing, hanging, or behaving unpredictably.

SWT implements a single-threaded UI model often called apartment threading. In this model, only the UI thread can invoke UI operations. SWT strictly enforces this rule. If you try to access an SWT object from outside the UI thread, you get the exception "org.eclipse.swt.SWTException: Invalid thread access". Different operating systems have different rules governing threads, UI components, and synchronization. Some use a single-threaded UI model like SWT. Others allow only one thread at a time in the window system library, controlling access through a global lock. This type of multithreaded UI model is often called free threading. To be simple, efficient, and portable, SWT is apartment threaded.

To allow background threads to perform operations on objects belonging to the UI thread, the methods syncExec(Runnable runnable) and asyncExec(Runnable runnable) of Display are used. These are the only methods in SWT that can be called from any thread. They allow a runnable to be executed by the UI thread, either synchronously, causing the background thread to wait for the runnable to finish, or asynchronously, allowing the background thread to continue execution without waiting for the result. A runnable that is executed using syncExec() most closely matches the equivalent direct call to the UI operation because a Java method call always waits for the result before proceeding, just like syncExec().

The following code sets the text of a label from a background thread and waits for the operation to complete:

```
display.syncExec(
    new Runnable() {
        public void run(){
            label.setText(text);
        }
    }
);
```

Conclusion

One of the design goals of SWT was to create a rich set of user interface controls so that developers could build applications with a high level of integration on the desktop. SWT includes an advanced set of user interface controls such as Tree, Table, TabFolder, and Menu. These controls display images as well as strings. The package org.eclipse.swt.graphics provides a general purpose graphics capability, including support for images, fonts, and colors.

In SWT, events are dispatched from the thread that is running the event loop. Widgets can only be accessed programmatically from that thread. To allow background threads to update the user interface, the Display class provides both a synchronous and asynchronous mechanism.

Acknowledgment

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Author Bios

Steve Northover is the principle architect of SWT. He is the SWT team lead for the Eclipse project and works at the IBM OTI Lab in Ottawa.

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GLEN CORDREY J2ME EDITOR

Convenience Apps

What is a killer app for J2ME? Well, if I had a specific answer to that question I'd be slaving away over it during all my free time, dreaming of the riches and life of ease ahead of me.

If you scan various MIDlet sites, you'll find a preponderance of games, numerous business applications, and a scattering of "other." The appeal and value of business applications has been widely discussed, so I won't rehash old ground. It's also easy to see the appeal of developing games, as the portability of handheld devices makes them an obvious target for entertainment applications. However, I've never heard of anyone making it big by developing J2ME games, so I'm afraid any J2ME developers counting on game royalties to pay the food and rent, let alone fund the purchase of that private island, may be in for a disappointment.

What I haven't seen are any significant personal applications developed in J2ME. There are toys such as dog-age calculators and biorhythm calculators, and I once developed a J2ME mortgage loan calculator under contract. But how valuable is a dog-age calculator, and are you really going to use your cellphone mortgage calculator to calculate your pay-off schedule that often? Are there J2ME applications, potential or existing, with functionality that's of real value to the average person?

I believe there are, and encourage you not to overlook their potential. Such applications may not have the pizzazz of games or the obvious economic benefits of business applications, but the payoff could be far greater. Imagine an application that appeals not just to a particular business segment or to gamers, but to every household. Such applications are already present both in the PC world (e-mail and Web browsers) and on wireless devices (text messaging).

I'll proffer an example of such an application for wireless devices – in the heady '90s I might have even been able to get venture capital on a thread as thin as this, but alas, those days are past.

I want my cellphone to have my always up-to-date grocery list, so I don't end up at the store having forgotten my list and inevitably making a second trip to pick up something I couldn't remember was on the list. Briefly considering the server side, which is functionally my kitchen, I'd eventually like to be able to speak to my house computer whenever I need to add to the grocery list, but for now assume text entry on my home PC. Whenever I'm home I want my (future) Bluetooth-enabled handset to get the current grocery list from my house computer. To ensure that I have any updates made by my (hypothetical, for those who know me) spouse while I'm away from the house but she isn't, I also want to be able to either pull or push (MIDP 2.0!) the current list to the handset. I want the app to remember the order in which I check off items as I go down the aisles, so the next time I shop it can organize the item list so I don't have to keep going back two aisles to get something I forgot was in that aisle. And finally, since my grocery shopping is done in one of two stores, I want my J2ME shopping list app to present me with the list organized correctly for the store I'm in, as determined by the app using onboard GPS.

Even without Bluetooth and GPS capability, the core of this functionality can be provided using existing J2ME platforms. The pool of potential users is huge, and since a small slice of a huge pie can be much larger than a huge slice of a small pie, the payoff could be greater than for business apps or games. Granted, few people are likely to buy a J2ME-enabled device simply so they can use this intelligent grocery list, but having a number of such convenience apps could constitute a critical mass that lets J2ME gain entry to the world of ordinary people and everyday life. So when you're brainstorming ideas for J2ME applications, don't forget to consider such convenience apps.

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AUTHOR BIO

Glen Cordrey is a software architect working in the Washington, DC, area. He's been using Java for five years, developing both J2EE and J2ME applications for commercial customers.

J2ME INDEX

Name:	Daiva Venckus
Application:	Ringster
Interest:	The next big thing – and being a part of it
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MIDP 2.0:

The Game API

by Mikko Kontio

An API for basic 2D gaming operations

The Mobile Information Device Profile (MIDP) 1.0 was designed to make it easier to design software for mobile devices (the applications are called MIDlets). The idea was great but Java's mantra, "Write Once, Run Everywhere," didn't quite come true since MIDP 1.0 was very restricted. Manufacturers wanted to offer more interfaces and features to developers and include proprietary interfaces such as messaging and graphics.

The new version of the profile, MIDP 2.0, has added many new and exciting features. One of the most interesting new features is the Game API, but there are others as well. The Media API allows playing tones (tone sequences or single tones) or WAV files. An enhanced user interface allows a better layout and self-made custom items. The Communication API has new interfaces for new protocols (such as serial ports, sockets, and HTTPS), and it also enables inbound connections. Inbound connections mean that server applications can push information to MIDlets.

In MIDP 1.0 there was only a recommended specification for OTA provisioning (over-the-air loading of applications to the device). Now the OTA provisioning is a part of the specification and has been changed slightly by the removal of the cookie support requirement.

Why is the Game API one of the most important new features? Because it offers small companies and even individuals the opportunity to succeed if they make a good MIDlet. Imagine writing a program, for example, a game that half of the mobile phone users in the world would pay you $1 for. If you look at www.midletcentral.com, there are at least 188 applications and 338 games listed (at the time of writing). So games are obviously one of the most tempting areas for developers as well.

The possibility of making a financially successful game is not the only reason the Game API is important. Developing games was not a particularly easy job in MIDP 1.0 since there were only a few classes for graphics and there was no floating point support. For example, rotating an object was not easy to do.

MIDP 2.0 doesn't automatically solve the floating point issue, since floats were not supported in CLDC 1.0 (the configuration that MIDP was built on). However, there's a new version of CLDC on the way (CLDC 1.1) that supports floats.

For graphics manipulation, MIDP 2.0 offers a great deal. The whole API is based on the concept of layers and how to manage them. A typical game consists of several layers, such as the background, roads, walls, buildings, and the characters (if any). The game area can also be larger than the screen, and scrolling the game area and managing all the game activities in the code in MIDP 1.0 was a tough job. Not only that, it also increased the size of the JAR file. The size of the JAR file is important for several reasons: some devices might have limitations for loading and running the application, and the user can store more applications if they're smaller. By moving most of the basic gaming functions to the MIDP core or even to the underlying platform, the size of the JAR file gets a lot smaller and the code gets simpler. MIDP 2.0 does all this by offering a simple API for most of the basic 2D gaming operations.

The Game API

The Game API has five classes (see Figure 1). Four of the classes (Layer, LayerManager, Sprite, and TiledLayer) are directly related to layers or manage them. The fifth class, GameCanvas, is a subclass of Canvas. Along with everything inherited from the Canvas, GameCanvas has two major features: built-in double-buffering and the ability to get the states of the device's keys.

Double-buffering is an old practice used in game programming to avoid flickering while updating the screen. The idea is to use a temporary image to construct everything off the screen and then flush the temporary image to the screen. With Canvas (in MIDP 1.0), drawing to the screen was done by implementing the paint(Graphics) method. With GameCanvas, you don't have to implement the paint(Graphics) method at all. Instead, obtain the Graphics object with the getGraphics() method, do your drawing, and call one of the

> "If you don't want to wait for **MIDP 2.0** and want to start **developing games** on a similar basis right away, implement a subset of the **API**"

flushGraphics() methods.

Key states are for obtaining information about which keys are pressed. The getKeyStates() method returns an integer that holds the states bit coded. Each bit in the integer represents a certain key in the device. The keys are up, down, right, left, fire, and four game keys (game a, b, c, d), which might not be supported by the device. The following code shows how to read the states of the left and right keys from the integer.

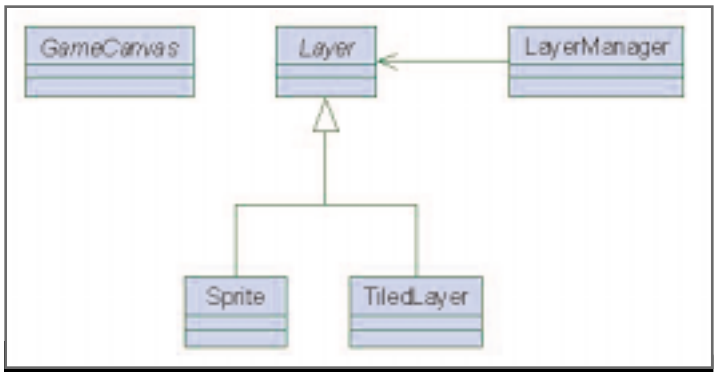

FIGURE 1 Class diagram of the Game API

```
protected void keyPressed(int keyCode) {
  int keyState = getKeyStates();

  if ((keyState & LEFT_PRESSED) != 0) {
      // move the ship left
  }

  if ((keyState & RIGHT_PRESSED) != 0) {
    // move the ship right
  }

  if ((keyState & FIRE_PRESSED) != 0) {
    // fire the arms
  }
}
```

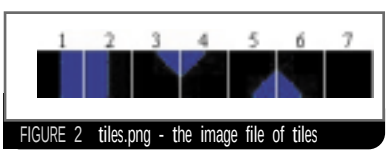

FIGURE 2 tiles.png - the image file of tiles

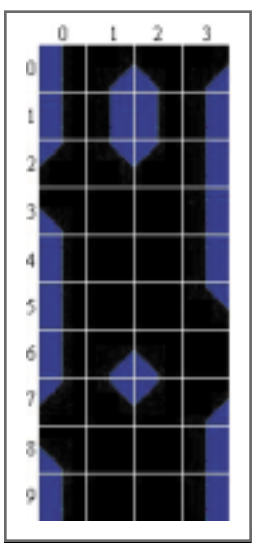

FIGURE 3 Game background with white lines indicating the grid

Setting the Background — Using Layers

The remaining classes – LayerManager, Layer, TiledLayer, and Sprite – are all related to managing layers. As can be seen in Figure 1, TiledLayer and Sprite are subclasses of Layer, which is an abstract class that represents a visual element of the game. LayerManager is responsible for managing instances of TiledLayer and Sprite. This might sound a bit confusing at first but a simple example will show how easy it is.

Let's think about a simple space game in which a spaceship flies smoothly over a future city. The city with its streets and buildings is obviously the background and it can be done with an instance of a TiledLayer. The background consists of small building elements laid out in a grid. The image file in Figure 2 holds all the tiles (small images) used to construct the background. (The white lines and index numbers indicating the different tiles are not part of the image but are shown for clarity for the following discussion.)

The background is constructed with these small tiles by placing them in a grid. The grid (with white lines indicating the "invisible" grid) can be seen in Figure 3. The background is one layer and the spaceship another. The ship can be done as an instance of Sprite. Now, all we need in the game are the enemies (or at least some sort of challenge).

Constructing layers is easy. There are two methods in TiledLayer for that: setCell() that sets the content of a cell with a tile from the image and fillCells() that fills a region of cells. Listing 1 shows how a TiledLayer is created and how it's filled. The TiledLayer needs an image that has all the visual elements for building the background (or any other layer).

After the layer is ready, it needs to be added to an instance of LayerManager. LayerManager manages layers, and layers can be added to or removed from it. LayerManager also draws the contents of the layers, and scrolls the layers if the area is bigger than the screen. Adding new layers to LayerManager can be done with two methods: append() and insert(). Figure 4 demonstrates how LayerManager handles layers. When a new layer is added to the manager with the append() method, the layer is placed the furthest from the viewer. With the insert() method you can tell exactly where to place the layer. If all layers are the same size, only the closest will be drawn to the screen. If the layers are different sizes, the manager will render the graphics accordingly.

LayerManager also has a simple solution for handling game areas larger than the screen. With the setViewWindow() method you can set a so-called view window that represents a certain section of the game area. The size of the view window could be the size of the device's screen or you might want to set it a bit smaller to fit other info, like score. Figure 5 demonstrates the relationship between the game area and the view. The view can be scrolled as the user moves on the game area or the scrolling can be done automatically, for example, to create the effect of flying with a spaceship at a constant speed.

The Characters — Using Sprites

Sprites are visual elements on the screen, so a sprite could be a spaceship, a cloud, a bee, etc. There are two kinds of sprites, animated and nonanimated. A sprite can consist of one or several images. Setting the images to a certain sequence creates the frame sequence. The sequence is created with the setFrame() method and the animation is created by calling the nextFrame() method. With nonanimated sprites, the images can be used in different situations, for example, to demonstrate an explosion or a movement.

Developers often need different images, for example, for a sprite to move to the left or to the right. With the setTransform() method you can transform one image by rotating it or by taking a reflection of the image. This way a Pacman clone is easy to do with just two images – one with mouth open and one mouth closed – by transforming the images.

Figure 6 shows an image that contains four frames. You could use the frames to make the man walk in either direction and wave his hands.

Detecting collisions manually is also a tough job, but fortu-

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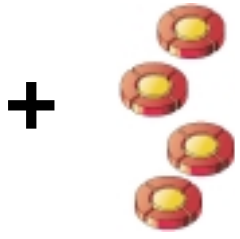

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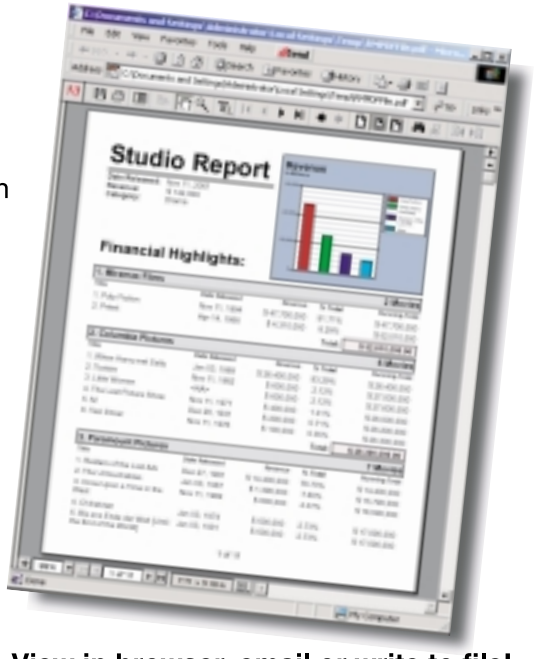

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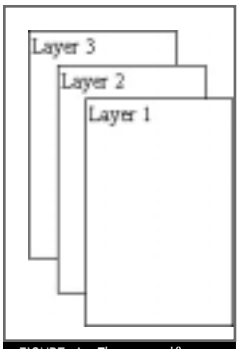

FIGURE 4 The append() method

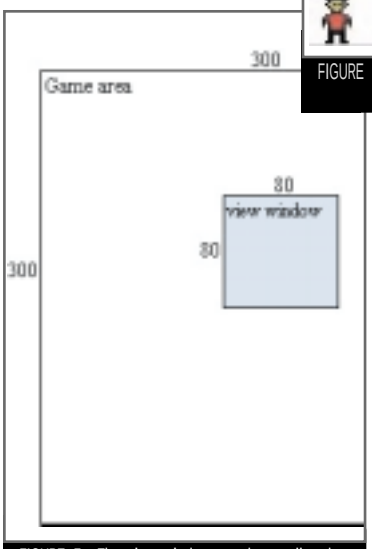

FIGURE 5 The view window can be smaller than the game area.

FIGURE 6 The frames used to make the man move

nately Sprite also offers methods for it. Collisions can be detected between the sprite and another sprite, an instance of TiledLayer, or an image. The collision can be detected on a pixel-by-pixel basis or by using simple bounds checking.

Conclusion

After going through all these features, it's time for some big questions: Is the API any good, and do we have to wait for the MIDP 2.0 or couldn't we just implement the API on MIDP 1.0? The answers are: yes it is good, and yes we could implement at least some of the features on MIDP 1.0. However, there are some features that can't be done easily or at all with MIDP 1.0. One of these is the collision detection in Sprite, which examines the collisions by reading the pixels of the images. The speed of the implementation and the size of the JAR file are also things that you can't change in MIDP 1.0. So the Game API is a welcome feature.

However, if you don't want to wait for MIDP 2.0 and want to start developing games on a similar basis right away, implement a subset of the API. If you make your own API similar to the Game API, your applications will port easily to MIDP 2.0 and can take full advantage of its new features.

Resources

- Kontio, M. (2002). *Professional Mobile Java with J2ME*. IT Press.
- http://wireless.java.sun.com
- www.microjava.com
- www.billday.com/j2me

Author Bio

Mikko Kontio is a technology manager for KPY eSolutions, a leading-edge software company in Finland. He holds an MSc in computer science and is the author and coauthor of several books, including Professional Mobile Java with J2ME *(IT Press).*

mikko.kontio@absblue.com

Listing 1

```
try {
  tilesImage  = Image.createImage("/tiles.png");
} catch (IOException e) {}

// 4 columns wide with 10 rows, each tile 30x30 pixels
tiles  = new TiledLayer(4,  10, tilesImage,
                        30,  30);
// TILE_EMPTY is the last (7th) tile in the image file
tiles.fillCells(0, 0, 4, 10, TILE_EMPTY);
// TILE_LEFT is the last (2nd) tile in the image file
tiles.setCell(0, 0, TILE_LEFT);
```

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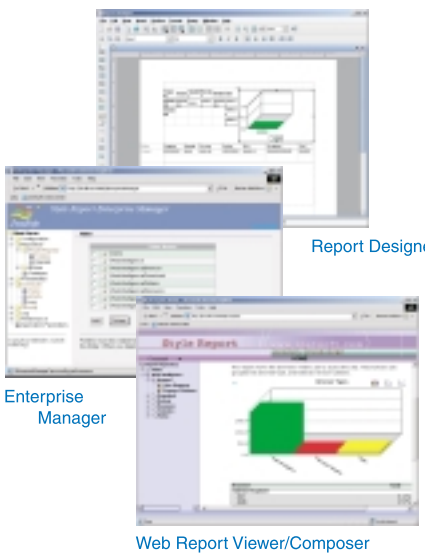

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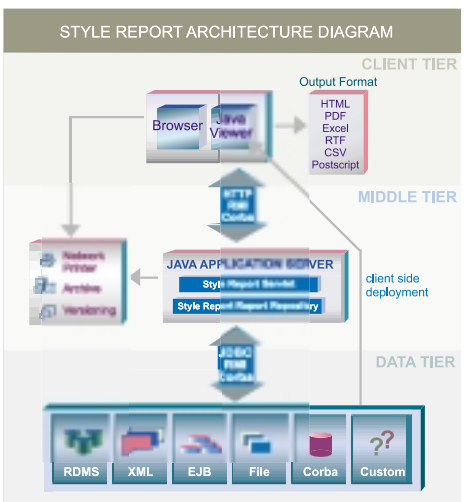

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InstallAnywhere 5 Enterprise Edition

by Zero G Software, Inc.

REVIEWED BY JASON EDWARD BROWN jasedbrown@yahoo.com

Zero G Software, Inc.
514 Bryant Street
San Francisco, CA 94107
Phone: 415.512.7771
Web: www.zerog.com
E-mail: info@zerog.co

Specifications
Platforms: Designer – any platform that supports Java 1.3.x (1.3.0 or greater)
Installer: Java 1.1 or greater, must be installed on the target system or bundled with the installer
Pricing: Licensing – initial cost $2,995; premium support/year $1,495, maintenance and upgrades/year included with support

Test Platform
Dell Inspiron 4150, 1.7GHz Pentium 4-M Processor, 256MB RAM, Windows XP

Creating cross-platform applications has always been a challenge. Java can insulate us from much of the hassle during application development, but often the particulars of each platform become painfully acute when distributing the application to a host of varied platforms. Most commercial installer programs support only one platform, which leads developers to support multiple installers on multiple platforms (using multiple products from multiple vendors). Fortunately, several Java installer applications exist in the market and are robust enough to deal with many of the particulars of platform-specific functionality within a unified code base.

Product Description

InstallAnywhere from Zero G is a Java-based install product that allows you to create and customize cross-platform installers for any type of application (Java, C++, Perl). You can make installers for Windows, Macintosh (OS 9 and Mac OS X), Linux, and any OS that supports Java 1.1 or higher. Installers can be designed for Web or CD-ROM distribution, GUI or console interface, and a Java app plus native wrapper or pure Java executable. InstallAnywhere is available in several versions; this review focuses on the Enterprise Edition.

Installation and Setup

The design environment of InstallAnywhere runs on any OS that supports Java 1.3 or higher. A fully functional trial with an unlimited evaluation period can be downloaded from Zero G's Web site – be prepared, though, the download is 50MB. The InstallAnywhere environment requires about 80MB of hard disk space. Installation is quite simple and takes only a few minutes. The evaluation product gives you a good idea of what an InstallAnywhere installer looks like and how it functions (see Figure 1).

Creating Installers

If you're new to installers or InstallAnywhere, read through the Introduction and Concepts sections of the User Guide. In general the documentation is good, but at times it doesn't seem as if it's been updated to match the current version of the product (5.0). This inconsistency is a bit disappointing as I often refer to the documentation as I develop.

InstallAnywhere uses two different schemes for installer creation: Wizard and Advanced Designer. The Wizard scheme is good for straightforward applications that don't need to customize the end user's environment (i.e., set environment variables, change registry settings, etc.). As shown in Figure 2, the Wizard offers a simple interface in which you can set the name of the application and installer, set classpaths (if you're installing a Java application), and choose which platforms you want to build installers for. Thus, you can create a multiplatform installer in under 10 minutes, assuming your installer needs are relatively uncomplicated.

InstallAnywhere's Advanced Designer, on the other hand, is more complex yet more powerful than the Wizard. As shown in Figure 3, the Advanced Designer allows you to create custom panels, execute scripts, set environment variables, and even call your own custom Java code. It is through the Advanced Designer that you can begin to tackle those tricky and arduous cross-platform issues, especially if you're attempting to achieve a unified code base for your installers.

For instance, the Advanced Designer has an action to set an environment variable on the end user's platform (in InstallAnywhere parlance, "actions" are functions that the installer can perform). All you need to do is provide a name and value for the environment variable and InstallAnywhere takes care of the platform-specific details of actually setting it. Similarly, the "Create Alias, Link, Shortcut" action can create a link in a platform-independent location ("Desktop"), or it can be created in a platform-dependent location (Mac OS X Dock, Windows Start menu). In addition, the Advanced Designer handles several Windows-specific actions such as reading and writing to the registry and starting and stopping services.

When you find that your requirements call for functionality is beyond what is avail-

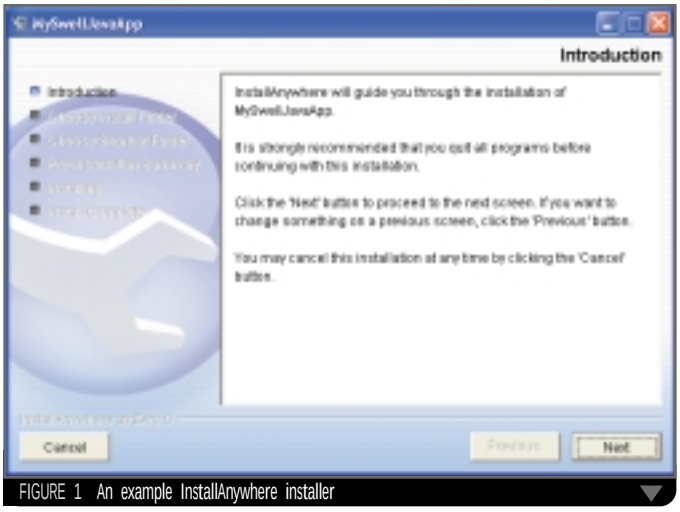

FIGURE 1 An example InstallAnywhere installer

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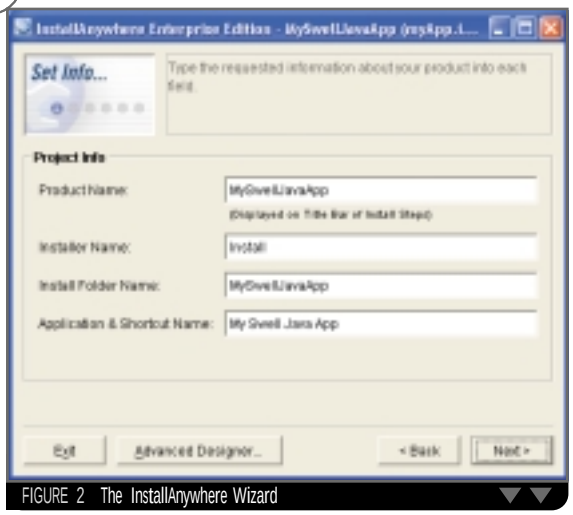

FIGURE 2 The InstallAnywhere Wizard

Product Snapshot

Target Audience: Build/release engineers, Java developers

Level: Beginner to advanced

Pros

- Cross-platform installer
- Extend installers through custom code
- VM management on end user's machine
- Community Forums

Cons

- Documentation spotty in sections
- Price may be steep for some organizations

able through InstallAnywhere's standard actions, you have the option of incorporating "custom code" into your installer. Custom code consists of classes that you write in Java that extend InstallAnywhere's functionality and can be run at install or uninstall time. Also, custom code runs in the same VM space as the installer, and thus allows you to get and set runtime InstallAnywhere variables. You can create custom actions, panels, or console actions to extend your installer.

In the course of developing an installer, you'll occasionally run into an issue that's a real noggin-scratcher. Zero G's technical support is quite helpful and willing to offer suggestions for difficult problems. For example, I inquired about creating a two-CD installer that runs on Windows and Macintosh, and they recommended several sound, real-world solutions (one of which I implemented in my client's application). Potentially more helpful, though, is the Community Forums section of the Zero G Web site. This is a typical message board where users post questions and (hopefully) get responses from other InstallAnywhere users or from Zero G themselves. I have found the Community Forums invaluable as I develop InstallAnywhere installers. The forums are free, but you need to register (also free) to post questions or replies.

Summary

Overall, InstallAnywhere is a very solid product. As with any installer environment, you need to learn the idiosyncrasies of the tool and then tailor it to meet your requirements. The advantages of using InstallAnywhere to package and distribute a Java application are clear, but the benefits may not be as obvious for a C++ program. The mechanisms InstallAnywhere provides for platform-specific functionality within a single installer code base are certainly worth investigating though, and the ability to extend the installer through platform-independent Java makes supporting multiple platforms a significantly easier task.

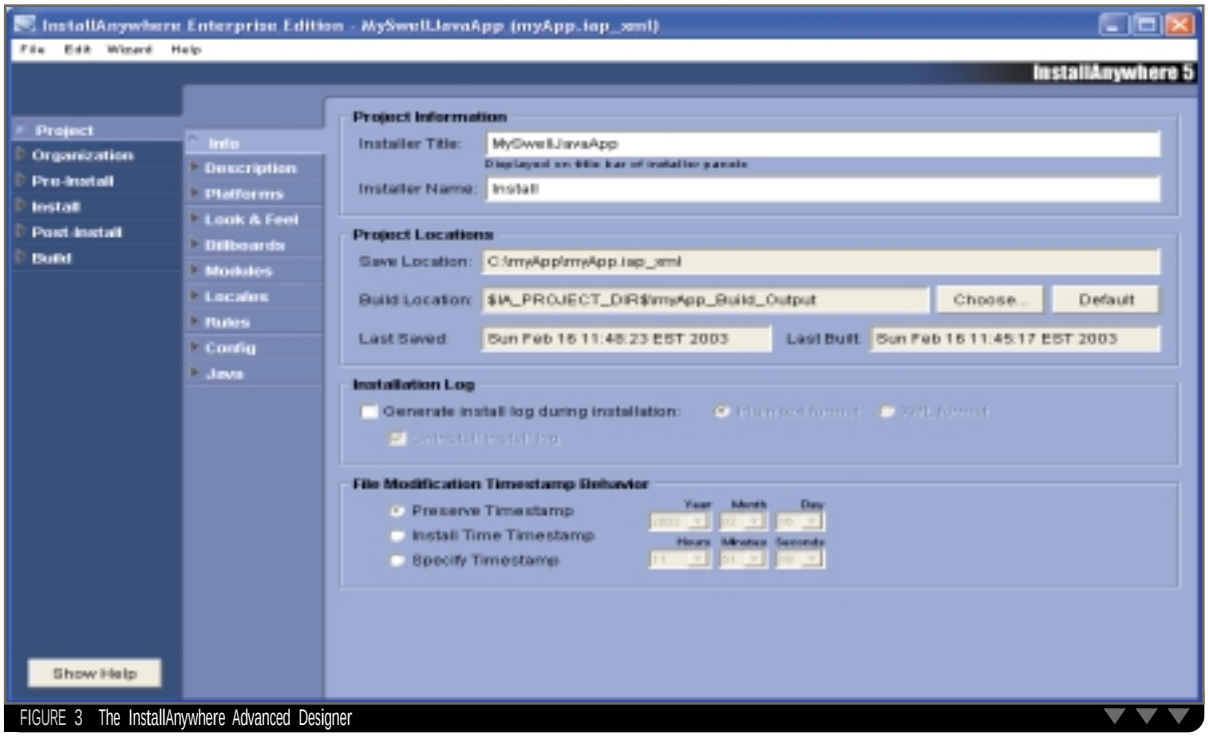

FIGURE 3 The InstallAnywhere Advanced Designer

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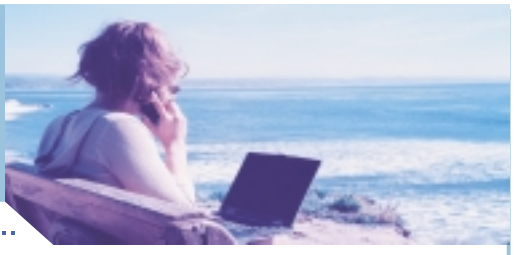

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e-Commerce		✓	✓	✓
Tier 1 Center	✓	✓	✓	✓
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Bandwidth/Month	3GB	10GB	15GB	35GB
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Email Aliases	2	20	100	Unlimited
Servlet Contexts	1	1	10	Unlimited
Control Panel	✓	✓	✓	✓
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Telnet/SSH	0	1	5	Unlimited
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JBoss	2.4.1	2.4.1	-3.x	-3.x
Cocoon	1.8.x	2.x	2.x	2.x
Backup	✓	✓	✓	✓

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Memory: 256MB
OS: 10.1 and 10.2

Pop quiz: you're writing a standalone cross-platform application that needs to handle a large number of data files. The data may be disparate in type but it has some qualities in common. You want the user to be able to browse or search the data and, of course, you want your application to be responsive.

What are some possible ways to handle the data? The most rudimentary would be to allow the user to specify the location of the data files and have the application search those files each time the user needs data, much like a file finder may search for text in a file.

A slightly more elegant and faster method would be to create a file containing information about the data files; this metadata could then be searched to locate the correct data file. This is reasonably easy to implement, but complex queries are difficult to perform and adding support for future data types or additional parameters requires careful coding. The most powerful solution would be to store the metadata in a relational database.

A well-designed database offers flexibility, speed, and easy data manipulation through JDBC support. This database must be 100% Java to maintain the cross-platform compatibility as well as be easy to use so the average Java programmer can integrate it with little difficulty. FirstSQL provides such a database in FirstSQL/J Professional.

FirstSQL/J Professional v2.0

FirstSQL/J Professional is an object-relational database management system (ORDBMS) written in 100% Java. It conforms to the intermediate-level SQL92 standard and supports objects in the database. This is a powerful feature that allows Java objects to be used as the type for table columns, and static functions to be called either as a function in SQL or as a stored procedure. In addition to the database support classes, FirstSQL/J also ships with utilities that execute SQL commands and browsing tables (see Figure 1) and for database maintenance, such as backing up, restoring, creating, and building new databases (see Figure 2). There is an Enterprise Server version available, but this review focuses on the Professional version.

The recently released version 2 adds support for an in-memory mode of operation that keeps tables in memory for faster access, writing them to disk at the end of a database run. FirstSQL/J Professional also optimizes complex queries and efficiently handles deeply nested queries.

Installing and Using FirstSQL/J Professional

Installation is straightforward and requires no modification to the system environment. The installer is distributed as an executable JAR file and, after selecting a target directory, the necessary files are copied into place. In addition to a comprehensive user's guide and the API, a series of 10 tutorials is also included.

Adding FirstSQL/J Professional to an application is as easy as including a JAR file in the application's classpath and pointing to a database. FirstSQL/J Professional doesn't support runtime creation of databases, so a new database must be created using the included utility or the empty database installed with the product must be copied. From there it's just a matter of manipulating the database with SQL statements or FirstSQL extensions.

Real-World Use

My experience with FirstSQL/J Professional comes from being a project lead of a team developing a commercial weather satellite imagery visualization application. We

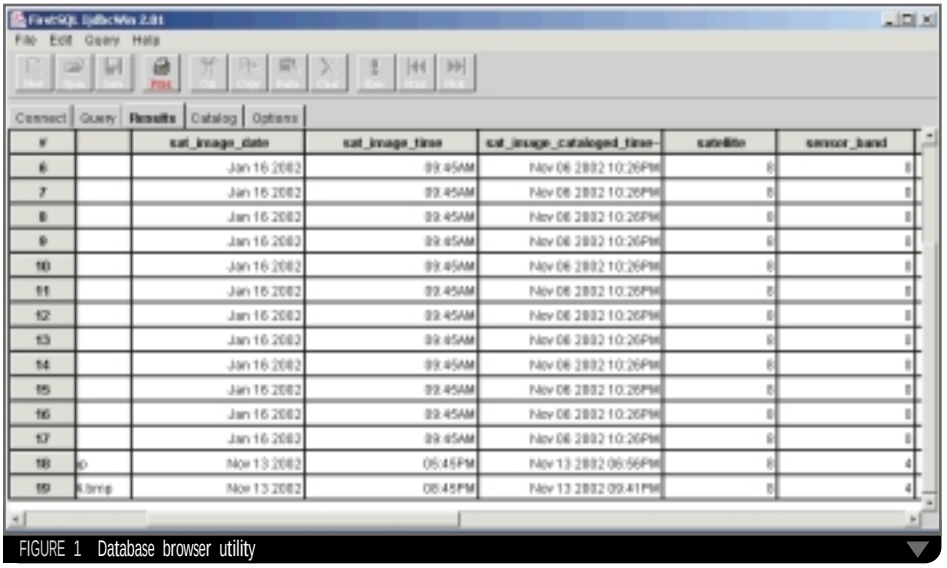
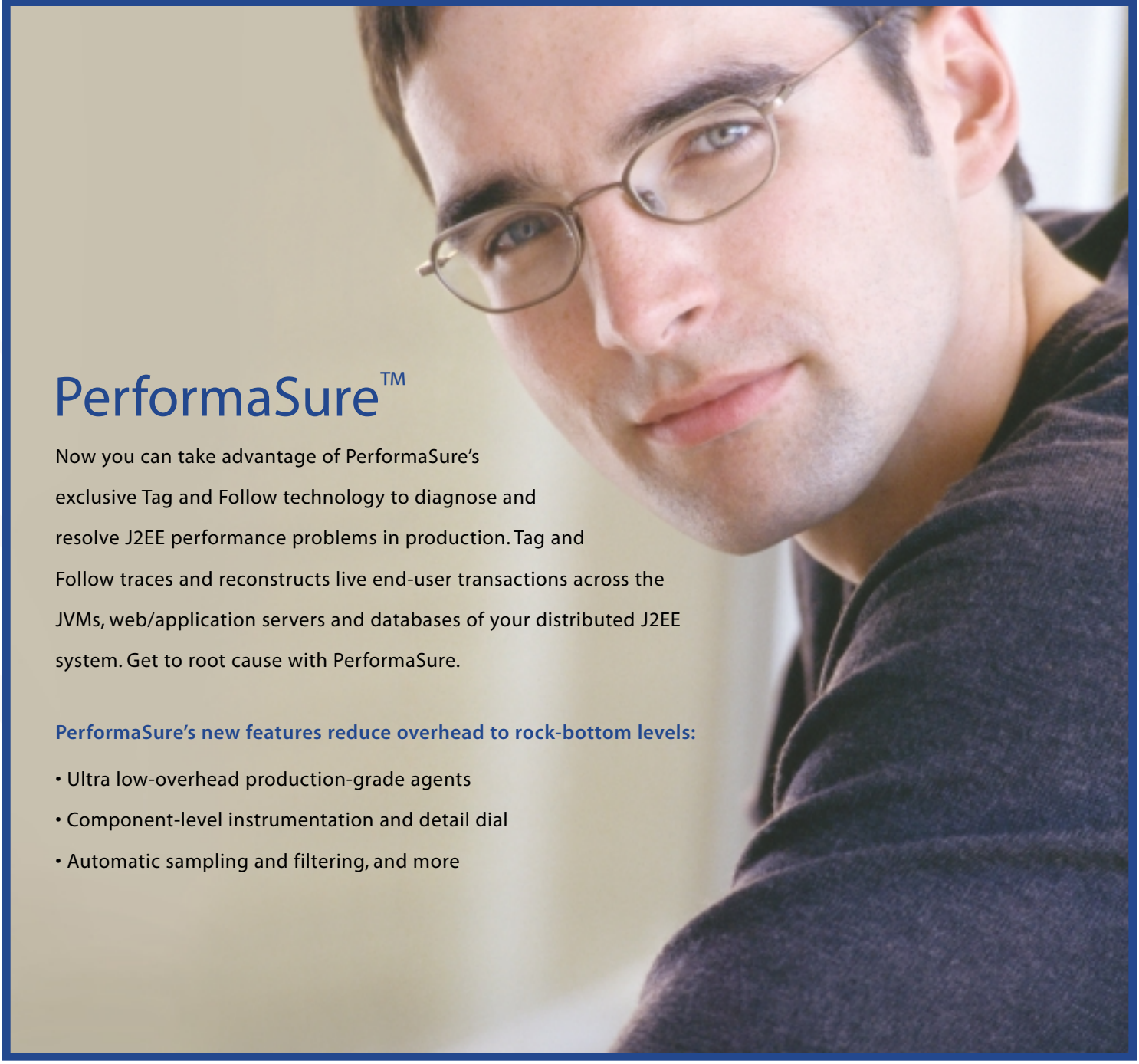


FIGURE 1 Database browser utility

Diagnose and resolve J2EE performance problems
...now in production



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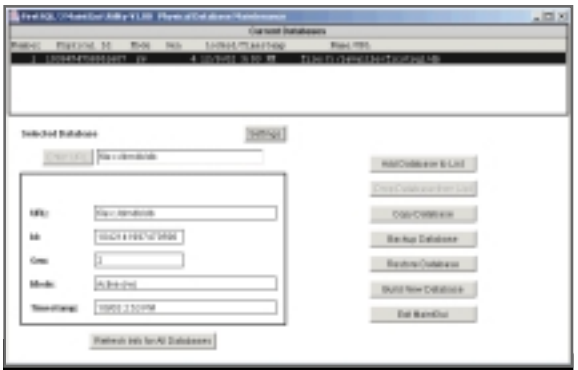

FIGURE 2 Database maintenance tool

decided to use an ORDBMS to make it possible to deliver a better experience to the user and to allow for future expansion of the application. It was envisioned that the program would be expanded to include other types of meteorological data such as surface observations or output from weather models. The amount of data available for display would quickly accumulate and it would become difficult for programmers to devise a scalable, flexible method to allow the user to easily find desired data.

While an RDBMS (one that does not support objects in the database) would suffice, we felt embedding objects directly in the database would add considerable power and flexibility. For example, consider a spatial query. The user wants to show all the available satellite imagery containing a specific latitude and longitude point (see Figure 3). Without objects, the bounds of each image have to be stored as four columns in a table, one column for each corner point. A very complex query or iteration over the whole dataset would be necessary to determine if the desired point fell within the bounds of the image. Our solution was to create a bounds object consisting of the corner points and comparison methods such as a point within the bounds, an area contained within the bounds, and an area intersecting the bounds. The following snippet of SQL illustrates how the object was used.

FIGURE 3 An ORDBMS makes it easy for the user to find the desired data

```
WHERE(img.sat_image_bounds).containsPoint
(CAST (-75.2 AS DOUBLE),CAST (40.5 AS
DOUBLE)) <> 0
```

The method returns an integer because a method in a SQL must have arguments and a return type that are convertible to a SQL data type or be a user-defined class, and BOOLEAN is not a supported data type.

To define a class for use by the database is equally simple. Here's the entire SQL statement to register a class for use by the database:

```
CREATE CLASS geobounds FROM 'com.direct-
met.geo.GeoBounds'
```

This ease of use fulfilled one of the requirements I had in selecting a database: easy to implement. I have a working familiarity with SQL and relational database design though I'm not an expert by any means.

Another requirement was speed. While FirstSQL provides benchmark code, huge numbers of INSERTs and SELECTs alone are not representative of the type of query our database would most often see. I anticipated spatial queries against objects in the database would be the most common and potentially the most time-consuming. I wrote a short program to fill a table with an object representing geographic bounds and containing methods to compare against those bounds, then ran queries against the table calling the methods in the stored objects. Performance was good enough so that the database would not be the source of delays affecting the user's experience. Using the in-memory mode improved performance several fold.

FirstSQL/J Professional held up well through development and testing under both Windows and OS X. Through many crashed applications no data was ever lost, even when the problem occurred in code related to the database, nor was the database ever left in an invalid state. FirstSQL provides a short block of code to recover after an abnormal program termination, so all that's required to maintain a healthy database is to run the recovery code if the program did not exit gracefully.

Deployment

FirstSQL/J Professional has a relatively light footprint, requiring only the inclusion of a 635KB JAR file. If the embedding application is packaged in a JAR file, the class files for any objects included in the database have to be outside it. Another minor annoyance is the need to install an empty database with the application as FirstSQL/J Professional doesn't allow the creation of a database programmatically.

Support

During the past year I've contacted FirstSQL a number of times with questions or to report bugs. I've always received a prompt response and any bugs have been taken care of in subsequent releases. Naturally I'm satisfied with the support I've received, but this personal type of support won't scale well as the product gathers more users. Online support could use some work: the Web site is a little difficult to navigate and the layout can be confusing.

Summary

FirstSQL/J's ease of use and deployment and zero administration requirement mean programmers with basic knowledge of relational databases and familiarity with SQL can be productive in no time. Included tutorials and a comprehensive manual provide not only basic information but a good treatment of more advanced topics.

Product Snapshot

Target Audience: Java programmers developing for the desktop

Level: Intermediate

Pros:

- Easy to integrate and deploy
- Good documentation
- Good performance

Cons:

- Cannot create a database via code
- Support on Web site needs improvement

THESERVERSIDE SYMPOSIUM

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"No Fluff, Just Stuff" Conference

You're Invited...

TheServerSide.com cordially invites you to come join us at **TheServerSide Symposium** – a special technical conference on **Enterprise Java (J2EE)** technologies. If you currently building Enterprise Java applications or plan to continue doing so in the next few years, this is not a show to be missed!

At this conference, you will learn about:

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- Web services

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The show is unique because it is the only show in the Java industry that promises you will learn an **unbelievable** amount of new, useful information about J2EE programming. We have an all-star lineup of speakers who are making a difference in the enterprise java development community, as well an extremely technical and advanced set of technical sessions of a nature that are not found at less specialized or more commercial shows.

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TheServerSide Symposium has assembled an incredible team of people who have been contributing to the enterprise java space and whose work has undoubtedly influenced the way we develop today or might be developing enterprise applications tomorrow. Among the speakers are:

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- **Major open source project committers/founders**. Apache Cactus founder and Struts committer **Vincent Massol**, OpenSympony Group founder/core-developer **Mike Cannon-Brooks**, JBoss 4 lead architect **Bill Burke**, and others.
- **Authors of important enterprise development books**. More than 12 book authors including Agile/OO writer **Scott Ambler**, Core J2EE Patterns author **John Crupi**, Mastering EJB author **Ed Roman**, **Mark Grand**, and others.
- **Independent Evangelists and influential research analysts**. TheServerSide.com creator **Floyd Marinescu**, Java Lobby founder **Rick Ross**, patterns guy **Kyle Brown**, Giga Information Group VP of Research **Randy Heffner**, web services strategist **Anne Thomas Manes**, and others.

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NEWS FROM JDJEDGE EAST CONFERENCE & EXPO

EAI Consortium Partners with Gartner, Giga, DCI, SYS-CON, and BrainStorm

(Calgary, Alberta, Canada) – The EAI Industry Consortium, global voice for the industry leaders in enterprise application integration, announced its alliance with BrainStorm Group Inc., DCI, Gartner Inc., Giga, and SYS-CON Media in a drive to showcase its member companies' competitive edge in the industry. The partnership with the leading trade show service companies seeks to introduce business process integration within and between organizations using Internet-standard protocols and formats and to inform the marketplace of emerging integration technologies. www.eai-industry.com

Sun Microsystems Launches Sun Developer Network

(Boston) – Sun Microsystems, Inc., has announced the launch of the Sun Developer Network, a new program focused on providing software developers with the content, training, support, and technology access they require to innovate and deliver applications and system solutions faster. The expanded program and portal located at java.sun.com integrates community dialog, content, access to technologies, and advanced learning that will enable Sun and individual developers to more quickly and efficiently implement applications that span multiple technologies, standards, and operating environments. http://sun.com

Sun Announces Fully Integrated Web Services Platform, Proposes JCP Specification

(Boston) – Sun Microsystems, Inc., has announced the availability of the Sun ONE Web Services Platform Developer Edition, the industry's first complete and fully integrated platform for Java-based Web services and application development. The Sun Open Net Environment (Sun ONE) Web Services Platform delivers a complete platform offered at a single price and contains all the elements necessary to develop network-based enterprise applications in a single install.

Sun also announced that it has submitted a proposal to the Java Community Process that would expand the way Java developers build integration solutions by providing a standardized container for business integration components as part of the Java platform. With this new architecture, Sun anticipates that business integration will quickly converge with Web services, helping to accelerate their adoption and reduce integration costs. http://sun.com

Digital Evolution Unveils Complete Web Services Management Platform

(Santa Monica, CA) – Digital Evolution, Inc., a provider of Web service management products, has announced its new DE Management Server 2.0. Designed to help businesses conduct secure computing in an open-standards environment, the new server offers a comprehensive management platform that takes the complexity out of managing and using Web services.

The DE Management Server 2.0 comes preintegrated with existing enterprise security packages and systems, allowing organizations to leverage existing security infrastructure for the SOA rollout. www.digev.com

IONA Leads Standards Discussion at Web Services Edge East

(Waltham, MA) – IONA's chief technology officer, Eric Newcomer, led a panel of software industry experts at the Web Services Edge East Conference in Boston. The panel, entitled, "Web Services Architecture: The Next Big Spec, From the Mouths of the W3C Authors" was part of the conference's Web Services track. The panel discussed how the W3C will shape the future of Web services with a successful architecture specification. With Mr. Newcomer on the panel were Heather Kreger, Web services lead architect for emerging technologies at IBM; Michael Champion, lead research and development specialist at Software AG; and David Booth, senior research architect at W3C. www.iona.com

Sybase Delivers Technical Session on Achieving Information Liquidity

(Boston) – Robert Breton, senior director of product strategy for the e-Business Division of Sybase, delivered a presentation at the Web Services Edge 2003 East conference, entitled "Achieving Information Liquidity through

Web Services." Sybase defines "Information Liquidity" as the efficiency with which a company transforms data into economic value. Attendees learned how this concept is guiding businesses to gain maximum value from their IT investments through Web services. www.sybase.com

World's First SOAP/MIME File Transfer Web Service Released

(Boston) – FileUp Enterprise Edition (FileUpEE), the world's first SOAP/MIME file transfer Web service, was released by SoftArtisans at the Web Services Edge 2003 East – International Web Services Conference & Expo. SoftArtisans also announced the release date for WordWriter for .NET, their newest product for creating Microsoft Word documents on the Web.

With FileUpEE, multigigabyte files, even those in excess of 100GB, are securely transferable within a Web farm environment. FileUpEE scales to the most demanding Web sites, consisting of numerous server farms and multiple levels of security. Content is secured at both the Web server and file server level, ensuring high availability and redundancy. FileUpEE File Servers can be isolated and protected far beyond any other method available today. www.softartisans.com

Parasoft Provides Enhanced Automated Error Prevention Tool

(Monrovia, CA) – Parasoft has announced a preview of SOAPtest 2.0, its automated testing tool for Web services. The new version, due out in May, was previewed at the Web Services Edge East show in Boston.

SOAPtest's automated technologies help development teams prevent errors by performing server functional testing, load testing, and client testing with just the click of a button. In addition, developers can also use SOAPtest as a proxy server to view and verify messages between a client and a Web service. www.parasoft.com/soaptest

Altova and DataPower Team to Deliver XML Web Services Security

(Beverly, MA, and Cambridge, MA) – DataPower Technology, Inc., provider of intelligent XML-aware network infrastructure, and Altova, Inc., provider of XML software tools solutions, have announced the availability of XMLSPY 5 integrated with the Datapower XS40 XML Security Gateway. The unified solution addresses the need for centralized XML Web services security without forcing application developers to alter preexisting design and deployment practices in any way. www.altova.com, www.datapower.com

Actional Unveils Web Services Management Server and Console

(Mountain View, CA) – Actional Corporation has unveiled the Actional Looking Glass Web services management server and console. The new offering enables organizations to reduce the time and cost of managing the impact of change inherent in dynamic Web service networks.

Actional Looking Glass provides a centralized control console combined with a powerful management server that enables users to quickly visualize, understand, monitor, and manage complex Web service networks. www.actional.com

Actional Introduces Web Services Initiative, Partners with Microsoft

(Mountain View, CA) – Actional Corporation has announced a detailed initiative to deliver solutions that allow organizations to minimize the impact of constant change inherent in dynamic enterprise Web services environments. As part of this initiative, Actional is announcing a series of new products, strategic partnerships, and customers, demonstrating its market momentum and ongoing commitment to helping organizations realize the full potential of their Web services deployments.

To help deliver on its commitment to helping customers maximize the value of their Web services deployments, Actional is announcing a strategic technology, consulting, marketing, and sales agreement with Microsoft Corporation. The two companies will jointly market and sell their solutions promoting their combined strengths. In addition, James Phillips, senior vice president of marketing and product management at Actional Corporation, has been selected to participate as a member of Microsoft's Infrastructure Advisory Council. www.actional.com, www.microsoft.com

Altova's AUTHENTIC 5 Has 200,000 New Users in Two Weeks

(Beverly, MA) – Altova Inc., producer of XMLSPY, has announced the widespread adoption and success of their recently released free XML document editor, AUTHENTIC 5. When AUTHENTIC 5 became publicly available under a free license in February, Altova generated approximately 200,000 new users worldwide in two weeks.

AUTHENTIC 5 is available immediately for free download at www.altova.com/download_authentic.html and is now offered under a free software license. www.altova.com

Among their users are Agile.Net, CarsDirect.com, the Pocumtuck Valley Memorial Association/Memorial Hall Museum in Old Deerfield, Massachusetts, the University of Regensburg's MedicMed Project, Oxford Analytica, and UC Irvine.

SYS-CON Events Would Like to Thank Our Sponsors and Exhibitors for Making Web Services Edge 2003 East a Success

Actional Corporation
www.actional.com

Actional solutions help organizations avoid the cost and complexity of unmanaged Web services deployments. Actional's Web services management platform provides unmatched visibility, flexibility, and active control across the entire Web service network – ensuring uptime while dramatically reducing the costs of ongoing Web services management.

Altio, Inc.
www.altio.com

Altio offers an XML presentation layer that allows you to bring a live, desktop-style interface to Web applications. Using AltioLive, businesses can integrate their Web applications, legacy applications, and Web services into one unified interface with drag-and-drop capabilities and real-time data feeds.

Altova
www.altova.com

Altova produces and markets XMLSPY 5 Suite, the ultimate Web services development tools suite, featuring a SOAP Debugger and Tester, and many other tools for developing XML Schema, WSDL and UDDI files, and much more.

asp.netPRO
www.aspnetpro.com

This publication targets professional developers who use Microsoft's ASP.NET (Active Server Pages.NET) technology to build Web-enabled applications and business solutions.

ASPstreet.com
www.aspstreet.com

ASPstreet.com is a collaborative portal and marketplace for application service providers (ASPs) and the Web services industry. In the rapidly expanding Web and .NET world, ASPstreet.com is the one-stop hub for all players interested in this emerging marketplace.

Attachmate Corporation
www.attachmate.com

Founded in 1982, Attachmate Corporation, a Microsoft Gold Certified Partner, is a privately held worldwide supplier of mission-critical host access solutions for Fortune 500 and Global 2000 enterprises. Attachmate provides direct, real-time access to back-office systems, Web- and desktop-to-host solutions, plus flexible enterprise application integration and Web services offerings.

Computer Associates
www.ca.com

Computer Associates International, Inc. (CA), delivers software that manages a company's infrastructure by addressing today's most critical business processes, information and technology management challenges. More than two decades of innovation, commitment and quality make CA the technology partner of choice.

Compuware Corporation
www.compuware.com

Compuware Corporation provides business value through software and professional services that optimize productivity and reduce cost across the application life cycle. Pattern-based, model-driven development with Compuware's OptimalJ provides one of the best means to tackle the challenges development organizations face today.

Conquer-IT! (Trans-World Resources, LLC)
www.twresources.com

Think all J2EE training is similar? Trans-World Resources has provided exceptional J2EE training on behalf of BEA, according to Bill Lawson, senior manager, BEA.

DataPower
www.datapower.com

DataPower provides enterprises with an intelligent, XML-aware network infrastructure to ensure unparalleled performance and security of next-generation XML Web services applications. DataPower's patent-pending XG3 technology powers the industry's first XML-aware networking devices to provide immediate return on technology investments while streamlining application deployments.

Digital Evolution
www.digev.com

Tested in the Fortune 500, the DE Management Server 2.0 is the only Web services management application that delivers enterprise-level security, UDDI, multitransport protocols, routing, and performance monitoring for a complex enterprise. Digital Evolution's products and solutions give organizations the power to manage their business processes within a standards-based, vendor-neutral framework.

EAI Industry Consortium
www.eaiindustry.org

The EAI Industry Consortium is a nonprofit global advocacy group developed to promote enterprise application integration through sponsored research, the establishment of standards and guidelines, best practices, and articulation of strategic and measurable benefits. The member-driven consortium, designed as an EAI information hub, encompasses marketplace education, resource tools, and EAI trends, providing members with a venue to develop, create, and debate.

Ektron Inc.
www.ektron.com

Ektron is the vendor of choice for flexible, scalable, and affordable solutions designed to achieve Web content success – today, tomorrow, and beyond. Worldwide, more than 7,000 organizations trust Ektron to help solve their real-world Web content management problems. What's your Web problem?

Forum Systems
www.forumsys.com

To maintain trust with business partners, companies cannot afford to leave entrusted information susceptible to tampering or theft. While most companies focus on XML security in transit, the network is most vulnerable. Forum Systems offers a complete answer, enabling companies to extend their Web services without extending risk. The FS Sentry 2500 ensures integrity through digital signatures, document structure validation, and document translation. It also provides security, rendering encrypted information useless to violators on the network or in transit.

Hewlett-Packard
www.hp.com

HP showcased Web application and services management tools and solutions that enable software developers to easily design and develop for manageability. HP OpenView and Eclipse development tools and new technologies for voice interactive services streamline the development process.

HSPstreet.com
www.hspstreet.com

HSPstreet.com is a collaborative portal enabling buyers to find the appropriate Web hosting plan and partners. In the rapidly expanding Web hosting world, HSPstreet.com is a one-stop hub for all players interested in the HSP marketplace.

IONA
www.iona.com

IONA is the leading provider of Rapid Integration software, with more than 4,500 customers worldwide. IONA's rapid integration software products are built on service-oriented architectures that increase reuse of software assets to deliver lasting results, standards-based software that enables vendor independence, and incremental deployment capabilities that lower the customer's risk.

Itellix Software Solutions
www.itellix.com

Itellix, a software products and services company, focuses on the use of contemporary technologies to realize technology-driven business initiatives. Its flagship product, Wisiba, is a platform-independent, standards-compliant Web services management suite that facilitates organizations to derive commercial value from their Web services initiatives. The Wisiba product suite is composed of Wisiba – Nucleus, Commerce, Optimizer, Intelligence, and Orchestra.

iTKO, Inc.
www.itko.com

iTKO develops some of today's most complex CRM, Web, and back-office applications. iTKO's latest innovation, LISA, made its debut at the Web Services Edge East Conference & Expo and has everyone talking. LISA is a no-code unit, functional, regression, and load-testing product that will change the way you feel about automated testing forever.

Java Developer's Journal
www.sys-con.com/java

Java Developer's Journal is the premier independent, vendor-neutral magazine serving the information needs of the entire community of developers in the Java programming language and Java platform.

JavaWorld
www.javaworld.com

For an audience that demands comprehensive, hands-on information about the news and trends in Java technology, no other information source can match *JavaWorld*'s content. *JavaWorld* is assembled by an award-winning editorial team and authored by seasoned Java developers and industry experts.

Jinfonet Software
www.jinfonet.com

Jinfonet Software is the developer of JReport, a 100% Java reporting tool, written to run on any platform, access any data source, and create any report. JReport Designer is a visual report design interface; JReport Enterprise Server is a high-performance, J2EE-compliant server for deploying reports over the Web.

McCabe & Associates
www.mccabe.com

McCabe & Associates enables IT to deliver better applications by providing products and process that implement a relevant, repeatable, and measurable approach to managing software changes and their effects on the testing and quality of applications. McCabe products include McCabe QA, McCabe Test, and McCabe TRUEchange.

Melissa Data
www.melissadata.com

Melissa Data, founded in 1985, is the leading provider of data-quality solutions to help you achieve the highest level of quality contact information. You'll find our versatile line of software, components, database, and services are easy to use and cost-effective. You'll save money, boost response rates, and increase your bottom line.

Merant
www.merant.com

Merant's PVCS products help you organize, manage, and protect software development assets and improve development efficiency. Leverage the common-use interface of Visual Studio .NET with PVCS to gain greater productivity and control with version/build management, issue and change management, and life-cycle development.

Microsoft Corporation
www.microsoft.com

Introducing Visual Studio .NET – visionary yet practical, the single comprehensive development tool for creat-

ing the next generation of applications has arrived. Developers can use Visual Studio .NET to build the next-generation Internet, create powerful applications fast and effectively, and span any platform or device. Visual Studio .NET is the only development environment built from the ground up for XML Web services. By allowing applications to share data over the Internet, XML Web services enable developers to assemble applications from new and existing code, regardless of platform, programming language, or object model.

Mindreef, LLC

www.mindreef.com

Mindreef SOAPscope is an easy-to-use, toolkit-independent diagnostic aid for developers, testers, and application support technicians who must isolate Web services problems. SOAPscope has a powerful logger/viewer that shows the SOAP communication flow, making it easy to view, isolate, and debug Web services problems.

MySQL

www.mysql.com

MySQL develops, markets and supports the MySQL database server, the world's most popular open-source database. With an estimated 4 million installations and over 27,000 downloads per day, MySQL is becoming the core of many high-volume, business-critical applications for companies like Yahoo! and Cisco.

.NET Developer's Journal

www.sys-con.com/dotnet

.NET Developer's Journal covers everything of interest to developers working with Microsoft .NET technologies – all from a completely independent and nonbiased perspective.

OASIS

www.oasis-open.org

OASIS is the nonprofit, international consortium that has been providing open solutions for electronic data interchange since 1993. Dedicated from its inception to the technology now known as XML, OASIS is the world's largest independent, vendor-neutral organization for the standardization of XML applications in electronic commerce. The primary mission of OASIS and its members is to identify and resolve interoperability issues that exist between XML applications and technologies.

Oracle Corporation

www.oracle.com

Oracle Corporation is the world's largest enterprise software company, providing enterprise software to the world's largest and most successful businesses. With annual revenues of more than $9.4 billion, the company offers its database, tools, and application products, along with related consulting, education, and support services.

Parasoft Corporation

www.parasoft.com

Parasoft is a leading provider of error-prevention tools that help companies improve their software development processes. These tools assist teams working on C/C++, Java, Web, and enterprise applications to significantly reduce costs by shortening development cycles, improving overall quality, and reducing time to market.

PerfectXML

www.perfectxml.com

The main focus of PerfectXML is XML, Web services, and related technologies for business people and technologists – from both a practitioner and learner perspective. The PerfectXML team works hard to provide best collection of well-organized links, developer-oriented articles and other content, up-to-date news, code samples, and an exhaustive listing of software and tools available.

Rational Software

www.rational.com

Rational Software provides a software development platform that improves the speed, quality, and predictability of software projects. This integrated, full life–cycle solution combines software engineering best practices, market-leading tools, and professional services. Ninety-six of the Fortune 100 rely on Rational tools and services to build better software, faster.

Sams Publishing–Pearson Tech Group

www.samspublishing.com/index.asp

Sams Publishing has more than 500 titles in print, and is one of the most successful computer book publishers in the world. From introductory tutorials to comprehensive reference books, Sams Publishing focuses on teaching tomorrow's programmers, developers, and system administrators the skills they need to build and manage emerging technologies.

SD Times

www.sdtimes.com

SD Times is the newspaper of record for the software development industry. It provides news, news analysis, specialized features, and comprehensive analyses on new products, alliances, and emerging market trends for software and application development managers, IT managers, and ISVs, who manage development projects. Subscriptions are free.

SlickEdit, Inc.

www.slickedit.com

SlickEdit Inc., provides software developers with the most comprehensive and flexible code editor available. Visual SlickEdit, proven across a wide range of programming languages and on Windows, Linux, Unix, and zSeries mainframe platforms, enables even the most accomplished developers to code faster and meet increasingly aggressive deadlines.

SoftArtisans, Inc.

www.softartisans.com

With enterprise-class products like ExcelWriter and FileUp, SoftArtisans assists clients on any development platform to build robust reporting, file transfer, and Web-based solutions. Over 16,000 customers in more than 70 countries benefit from SoftArtisans products and technical services.

Software AG

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Software AG, Inc., is a pioneer in XML solutions and a leading global provider of system software and services enabling enterprise data integration and management. Our products and solutions focus on standards-based XML integration such as Web services and enterprise content management.

SpiritSoft

www.spiritsoft.com

SpiritSoft, the leading provider of integration software using JMS and JCache technologies, enables developers to align IT resources on a unified foundation built on open standards, which lowers the cost of an existing IT infrastructure and boosts performance and return on investment. SpiritWave Message Server, the leading Java Message Service (JMS) implementation, provides reliable, flexible, and secure messaging to enable flexible integration between new and existing enterprise applications. SpiritWave Open JMS Framework also allows developers to integrate proprietary middleware and offers a range of interface/language bindings for legacy enterprise applications.

Sun Microsystems

www.sun.com

Sun was founded with one driving vision. A vision of computers that talk to each other no matter who built them. A vision in which technology works for you, not the other way around. While others protected proprietary, stand-alone architectures, we focused on taking companies into the network age, providing systems and software with the scalability and reliability needed for the electronic marketplace.

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www.sybase.com

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Founded in 1996, Teamstudio develops and markets award-winning, agile software tools that enhance developer productivity and improve application quality. Product lines include solutions for Lotus Notes, Domino, and Java developers, and Web-to-host integration.

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www.triloggroup.com

Trilog Group is the only software company that provides a fully integrated platform for J2EE RAD, BPM, and Web services integration. Fortune 500 companies have used FlowBuilder Visual XSP Studio to drastically reduce development and integration costs by capitalizing on its ultra-rapid, highly visual, XML-centric method to manufacture and assemble enterprise application components and Web services.

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XML-Journal

www.sys-con.com/xml

XML-Journal is the world's leading print and online resource for Internet technology professionals involved with the worldwide development and implementation of XML. Each issue contains the latest news concerning enterprise application integration and Web services, XML standards, new developments in e-commerce, product reviews, tutorials, case studies, and interviews with *i*-technology leaders.

Xtremesoft, Inc.

www.xtremesoft.com

Xtremesoft is the leading provider of software solutions that maximize the availability of applications on the Microsoft platform. These solutions enable businesses to transform and process data derived from their applications into business intelligence upon which decisions can be made.

SWT vs Swing

It amazes me that this debate is still alive ("Wanted: Java Application with Native OS Look and Performance" by Bernie Spang and Dave Thomson [Vol. 8, issue 3]). If it weren't for the relative immaturity of SWT, we wouldn't even be having this exchange. SWT is technically superior to Swing in every way that's important. If you've invested a lot of time into using Swing, that doesn't mean you should stay invested. The stock market thud seems like a good analogy.

Chuck Jang
via e-mail

Swing *could* do it, if Sun implemented a natively accelerated interface, or allowed someone else to do so the way they did with Apple's implementation of Swing acceleration on OS X. If you haven't seen it, Swing is much faster under OS X, mainly because it has a good underlying implementation. Because of the lack of such an implementation on Windows, I've been heavily researching using SWT in my next desktop project.

Robert Sanders
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Java API Docs

I agree with Jason Bell in his editorial "Can the API Docs Be Improved?" (Vol. 8, issue 3). I was one of the first users of the JDK 1.0 when it was launched in mid-1996. Writing a simple Java applet also used to be cumbersome back then, mainly due to the lack of proper, easy-to-access documentation of all the classes and methods. We spent alot of time searching for useful code snippets on the Internet, and then developing meaningful code.

Books were the only source for sample programs, for AWT, networking, and other APIs in Java. We were used to sample code snippets and sample API code in Microsoft Visual C++ 4.0, and moving from that to Java was a real pain for some people. People like me, who have patience to explore, used to enjoy writing code in Java, and mostly in text editors like "vi" and "Notepad."

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Sun really should pick up the ball and have a parallel API document showing usage. I've seen several aborted attempts of users creating an archive of examples cross-referenced by the APIs they use (most recently at Javalobby last year). The sticky issues are who decides what goes in, what stays out? Is the code example copyrighted, licenses, GNU, etc.

JDJ is one of the few organizations that could pull together enough of its own example code to create this cross-referenced API examples document. Otherwise, maybe we could go to SourceForge and set up a project using *Java Almanac* as our inspiration, and hope that we can come up with enough good open-source code examples to fill it in.

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Business Requirement Is Essential Too

"Rebel Without a Clause" by Craig Dewalt and Max Tardiveau (Vol. 8, issue 3) is an excellent article on the potential places where a developer could miss or make mistakes in exception handling.

As it says in the last paragraph, "Nothing in this article should be taken as gospel." I think attention should be paid to those anti-patterns, but how it's done in practice should be driven by requirements. For example, if it's required to do the same thing no matter what kind of errors have happened, I would argue that it's okay to catch just the exception, instead of each of the specific ones. The same can be applied to how big the try/catch block should be.

As matter of fact, I doubt that many experienced programmers can identify all six anti-patterns, due to lack of enough requirements for the example.

David Chen
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Not a Silver Bullet

In the article "Java Data Object" (Vol. 8, issue 3), Teresa Lau states that JDBC provides persistence only for relational databases. This isn't true. JDBC can handle most of the data sources listed. In fact, many JDO implementations utilize JDBC "under the covers." Second, JDO claims to be able to support these other data sources, but I don't see many implementations. JDO provides a slick abstraction for relational databases, but it's not the silver bullet that it's hyped to be.

Donald Bales
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Object Methods Are Procedural

Many objects that are programmed in Java (or any other OOP) will have complex methods beyond sets and gets ("Confessions of a Procedural Programmer" by Blair Wyman [Vol. 8, issue 3]). Anytime these methods get beyond a few lines of code, I (and other programmers I've worked with) do some type of flowcharting to establish the logic to be used, and at times to explain what's going on to our peers, managers, and/or customers. These flowcharts tend to complement both the state and sequence diagrams of UML and serve a critical need in many cases. The real difference between OOP and the old procedural languages in top-down programming seems to be that with OOP you start with objects (class diagrams, etc.) and their properties/interactions. With procedural languages, you start with the flowchart of what you want to accomplish with the program.

Mark Pardue
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Forte Software

Sun is lousy at software…sorry ("A Long Road Ahead" by Joseph Ottinger [Vol. 8, issue 2]). For example, they bought several software companies, including Forte, with better software than they had and just killed them. They wasted their money and destroyed good products. Forte had a great application server and IDE ready to go. Sun bought them and cobbled some of the application server code into iPlanet. They should have taken the Forte stuff and run with it. They then took the IDE, which was better than anything they had, and killed it. They wanted an IDE written in Java so they started over when they had the Forte IDE, which would have been one of the best.

via e-mail

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IBM

From Within the Java Community Process Program

WRITTEN BY
ONNO KLUYT

Welcome to this first installment of the JCP column! Here you can read about the Java Community Process program: newly submitted JSRs, new draft specs, Java APIs that were finalized, and other news from the JCP program.

Like any self-respecting IT industry effort, the JCP program proudly features its own collection of acronyms. To help you out, and because this is the first installment, there's a little cheat sheet at the end of this column.

J2ME Platform Swings On

Vodafone has submitted JSR 209 titled "Advanced Graphics and User Interface Optional Package for the Java 2 Micro Edition (J2ME) Platform" – AGUI for short. This JSR plans to bring a number of Java 2 Standard Edition (J2SE) APIs to devices, such as Swing, Java 2D graphics and imaging, image I/O, and the input method framework. Not only does this allow for very rich applications to be written for this environment, but accessible applications as well. However, more is happening in the J2ME environment – Sun has submitted the JSR 211 Content Handler API for managing multimedia and Web content on phones and other devices; and Nokia is enhancing the JSR 135 Mobile Media API for J2ME via a maintenance review.

> "Several new JSRs and a few older ones are directly aimed at increasing the ease of development for the Java environment"

Ease of Development

This is a topic dear to the hearts of the JCP Executive Committee members, and also many, many developers I'm sure. Several new JSRs and a few older ones are directly aimed at increasing the ease of development for the Java environment. JSR 175 will allow for code annotations or metadata that can be processed by development and deployment tools. JSR 201 defines a set of several small Java programming language changes. JSR 181's goal is to provide a simplified model for Web services development by using metadata and building on the efforts of JSR 175. Many of these JSRs have a special focus on development tools so the technologies can be easily used by IDEs to ease development. Oracle's JSR 198 is another example as it defines a standard extension API for developing IDE add-in modules.

Workflow, Web Services, and Quality Management

New directions are also being taken in the Java 2 Enterprise Edition (J2EE) environment. BEA is leading JSR 207, Process Definition for Java, while Sun is leading JSR 208, Java Business Integration. JSR 207 will define metadata, interfaces, and a runtime model, enabling business processes to be implemented and deployed in J2EE containers. This foundation can be used to build implementations of business process initiatives like BPEL4WS, WSCI, and W3C Choreography. JSR 208 will define SPIs to enable the creation of a back-end integration environment for these business process initiatives and to support developer-focused technologies such as BEA's JSR 207.

Finally, Watchmark Corporation is leading JSR 210, OSS Service Quality Management API, which is a new JSR for the OSS/J initiative. OSS/J is an example of one of the vertical subcommunities within the JCP – in this case the telco industry is coming together to develop common Java APIs for IP, billing, provisioning, and so forth. OSS/J is a collection of about 10 JSRs.

What Are Those 900 Numbers About?

JSRs with a number higher than 900 are maintenance reviews on APIs that predate the JCP. In addition, sometimes a maintenance review is done on a JSR that's not final yet. To minimize confusion and to better distinguish between the JSR and the intermediate maintenance review, the Program Management Office assigns a 900 number. An example of this scenario was JSR 109 and JSR 921.

Acronym Cheat Sheet

- ***JCP:*** Java Community Process
- ***JSR:*** Java Specification Request
- ***JSPA:*** Java Specification Participation Agreement
- ***PMO:*** Program Management Office
- ***EC:*** Executive Committee
- ***OSS/J:*** Operations Systems Support for Java

That's it for this month. I'm very interested in your feedback. Please e-mail me with your comments and questions.

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Fiorano Accelerates Enterprise Real Time Enablement

(*Los Gatos, CA*) – Fiorano Software, Inc., has announced the release of Tifosi 2002 ESB (TESB), Enterprise Service Bus, a standards-based solution for event-based distributed computing. Fiorano is already shipping Tifosi 2002 Enterprise Integrator (TEI), an enterprise class, comprehensive integration broker suite.

Built on a fully distributed, event-driven architecture, Tifosi sets a new paradigm in interoperability, scalability, performance, and ROI. Tifosi also provides comprehensive security and is designed to integrate with a company's security models and extend flexible support for all major application platforms. Tifosi supports J2EE, .NET, Web services, and legacy technologies. Download a free evaluation copy of Tifosi at www.fiorano.com/downloads.

ICS Announces BX for Java

(*Cambridge, MA*) – Integrated Computer Solutions, Inc., has announced the general availability of BX for Java. It's a complete platform that allows developers to prototype, build, test, debug, and deploy any pure AWT or Swing application. Its completely visual interface allows developers to simply drag-and-drop any Java component (including any JavaBean) into a layout of their application, customize its operation and appearance, and dynamically observe the operation of the application – without compiling.

Fully functional evaluation versions of BX for Java can be downloaded for free at www.ics.com/getbxjava.

Altova Enhances XMLSPY 5 Release 4

(*Beverly, MA*) – Altova, Inc., producer of XMLSPY, has announced the availability of XMLSPY 5 Release 4. Altova has enhanced numerous key features in its XML development environment, XMLSPY 5, that are commonly required when creating customized XML content and data editing applications.

XMLSPY 5 is the ultimate tool for rapid development of customized XML content and data editing applications that use Altova's free XML document editor AUTHENTIC 5. The new version of XMLSPY is available immediately for a free trial download.
www.altova.com

Reactor 5.1.1 Maintenance Release Available

(*Calabasas, CA*) – Oak Grove Systems has announced the availability of Reactor 5.1.1, a maintenance release for their J2EE-based, XML-driven process engine. Reactor 5.1.1 adds a variety of features and updates to the Reactor Server and Reactor Studio components, including an enhanced LDAP directory module, new annotation capabilities, and an improved graphical interface.
http://oakgrovesystems.com

Compuware Delivers Java and WebSphere Support in STROBE

(*Farmington Hills, MI*) – Compuware Corporation has announced the general availability of STROBE 3.0 and iSTROBE 1.1. STROBE blends performance measurement with performance analysis to pinpoint precise sources of application resource demands. STROBE also provides information that enables users to improve transaction response times and shorten batch windows during any lifecycle phase.

Java JVM support is new in STROBE 3.0. This allows organizations to better understand and improve the performance of their Java applications that are running under CICS, batch, and WebSphere and that may call DB2 during development and production.
www.compuware.com

Wily Delivers Management Solution for IBM WebSphere Application Server 5.0

(*New Orleans*) – Wily Technology, a provider of Enterprise Java Application Management, has announced Introscope PowerPack for IBM WebSphere version 5.0 for Distributed Systems, the newest addition to its family of products for maintaining the health and availability of WebSphere applications, including Introscope PowerPacks for WebSphere MQ and CICS Transaction Gateway. Wily's Introscope PowerPack for IBM WebSphere 5.0 combines Introscope's ability to monitor the performance of production J2EE components such as EJBs, JSPs, and servlets with measurements specific to WebSphere 5.0. It's preconfigured to offer instant component-level monitoring of WebSphere resources including JDBC connection pools, HTTP sessions, and thread pools.
www.wilytech.com
www.ibmcom

SONIC SOFTWARE RELEASES SONIC ESB 5.0

(*Bedford, MA*) – Sonic Software has announced the availability of Sonic ESB 5.0 (formerly SonicXQ), the foundation of Sonic's enterprise integration product line: the Sonic Business Integration Suite. Sonic ESB provides a distributed, standards-based, easily managed infrastructure that integrates applications and orchestrates business processes across the extended enterprise using Web services and the J2EE Connector Architecture.
www.sonicsoftware.com

ICICI Bank Signs Enterprise License Agreement with Pramati Technologies

(*San Jose, CA*) – Pramati Technologies, a global provider of application development tools and middleware infrastructure, has entered into an enterprise license deal with ICICI Bank, India's largest private sector bank. The agreement is for three years, during which ICICI Bank can deploy Pramati Server software as its preferred application infrastructure across multiple hardware and software platforms. Pramati will also provide its world-class enterprise support and consulting services to maintain and enhance applications deployed by ICICI Bank on Pramati Server.
www.icicibank.com
www.pramati.com

CocoBase Enterprise O/R 4.5 SR 2 Integrates Oracle9iAS and Sun ONE 7

(*San Francisco*) – THOUGHT Inc. has released CocoBase Enterprise O/R version 4.5 Service Release 2, the object to relational mapping tool. Integrations for the latest versions of the Oracle9*i* and Sun ONE 7 application servers are now available. New features include major enhancements to CocoBase's Dynamic Transparent Persistence.
www.thoughtinc.com

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Jinfonet Software	www.jinfonet.com/j5.htm	301-838-5560	29
Kenetiks, Inc	www.kenetiks.com	888-KENETIKS	43
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Northwoods Software Corp.	www.nwoods.com/go	800-434-9820	38
Oak Grove Systems	www.oakgrovesystems.com/jdj	818-880-8769	25
Oracle	oracle.com/enterprise	800-633-1062	17
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QUALCOMM Incorporated	www.qualcomm.com/brew/jdj		47
Quest Software, Inc.	http://java.quest.com/jprobe/jdj		13
Quest Software, Inc.	http://java.quest.com/performasure/jdj		59
Quest Software, Inc.	http://java.quest.com/jclass/jdj		Cover IV
Rational User Conference	www.rational.com/ruc		69
ReportingEngines	www.reportingengines.com/download/jdj3/jsp	888-884-8665	26-27
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What's in the next issue of *JDJ*?

A BRIEF HISTORY OF TAGS

Custom tags in JavaServer Pages have come a long way since their inception. Sun has now provided some standards for them in the form of JSTL (and the up-and-coming JavaServer Faces) and promised additional support for these standards in JSP 2.0. This article looks at how we got to this point in tag history, and where we're heading.

CONVERTING JAVA OBJECTS TO XML DOCUMENTS

Java serialization was initially used to support remote method invocation (RMI), allowing argument objects to be passed between two virtual machines. To tackle Java serialization problems a Java Specification Request (JSR 57) was created, titled "Long-Term Persistence for JavaBeans." This article describes the mechanism by which the JSR solved the problems of long-term persistence, and how you can take control of the way that the XMLEncoder generates archives to represent the data in your application.

J2ME CLIENTS WITH JINI SERVICES

Jini provides simple and reliable access to services over any network independent platform, protocol, or application technology. Enterprises can use Jini to develop a resilient service-oriented architecture that can be accessed from a broad range of clients. J2ME enables developers to build portable rich-client solutions that can operate in either connected or disconnected modes. This article provides an overview of the technologies and illustrates how to overcome the limitations of J2ME to develop an effective mobile architecture based on J2ME and Jini.

OBJECTASSEMBLER 2.5 ENTERPRISE EDITION BY OBJECTVENTURE

ObjectVenture promotes ObjectAssembler 2.5 as being a "smart" development tool that simplifies and accelerates J2EE development. As this is a popular claim among Java tools, it was put to the test. ObjectVenture offers two versions of their tool: Professional and Enterprise. This is a review of the full-featured Enterprise edition to get the best feel for what the product has to offer.

Sun Stroke in Santa Clara

Sun has asked for feedback in a "J2SE Client developer survey," http://java.sun.com/webapps/survey/display?survey_id=1064.

Scott Violet himself went onto javalobby.org asking for input and my initial thoughts were, "Fantastic – finally Sun is taking Java seriously on the client." I got myself a fresh latte coffee and sat down to complete the survey.

Unfortunately, the survey questions were a tad different than what I was hoping for. After a lot of questions about what desktops I used and what I was planning to use, I felt like I was filling in a *Computer Weekly* subscription form. Finally, up came the burning issues that Sun wants to get our input on: two questions about JFileChooser.

Here's my answer folks: I don't care diddly squat about the file chooser, nor do my users. I build applications that are concerned with viewing, displaying, and editing database entries. The software has to integrate with multiple back-end technologies, make use of different messaging protocols, and interface with call-center telephony and voice response systems. My users' programs have to calculate claim amounts based on catastrophe reinsurance spirals, and they do this by interfacing to spreadsheets and news services. This is the bread and butter of application development for anyone who is involved in serious business software.

This is what I want to see done to J2SE client development.

Ditch emulated widgets. It's yesterday's problem, and users want their applications to look and behave like other desktop programs. Most companies standardize on a desktop, and instead of Sun spending time writing lots of fancy Java code that pretends to be a native widget, just use the native widget. Infragistics JSuite and Quest JClass already provide good native extended AWT controls, and I'm tired of hearing that it can't be done because of different cross-platform focus processing. If SWT and others get it to work, so can you. Antialiased fonts and mitred line corners in Java 2D can be used by people who need them, but for most business apps that are concerned with data display and entry, just give us the extra native controls we need. And, on Windows give us better ActiveX integration. One user told me, "It's not even a case of Swing programs playing second fiddle to Visual Basic on Windows; the best it can do is stand in the back row of percussion and occasionally burp."

Rethink what layout managers are all about. If they're designed to allow multilingual GUIs, they're the wrong solution. I've worked for international companies that deploy apps in different branches across the world, and more often than not they standardize on a single language. If the program does need translating, then J2SE needs something similar to the .nib files of InterfaceBuilder, where the entire GUI is serialized as a separate file that's hand customized for each locale. The XMLEncoder sort of provides the beginnings of this, but this needs to go further and be formalized into a standard GUI architecture that allows true separation of business from display logic.

Segueing into my final point, rethink how listeners work. J2SE client development tends to encourage almost reckless use of inner classes for event handling logic, and inner classes are expensive to load and require flashy VM trickery to work. Someone needs to go back to square one and look at how other languages such as Python and Smalltalk deal with this, and maybe introduce some way of soft typing event callbacks.

I looked for the bit at the end of the survey that lets me type in comments that I want the Swing team to read; however, there was only a tiny text box available. Next time make the box bigger, please guys.

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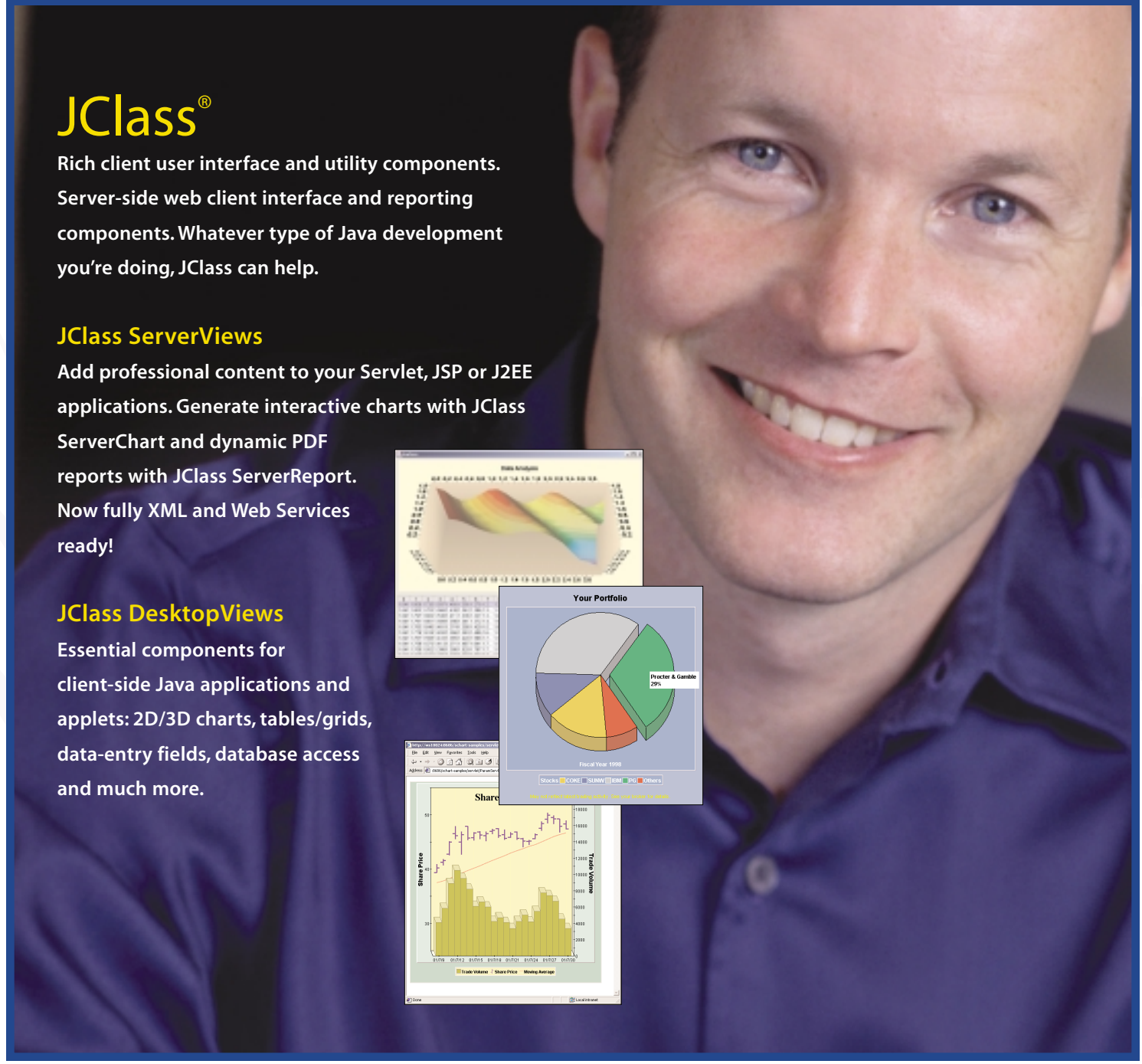

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