

JAVATM DEVELOPER'S JOURNAL

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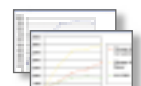
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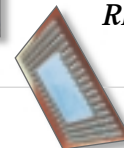
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analyze the problem

understand the customer needs

define the requirements

control the changes

deliver the right solution

start club for overachievers

be liberated

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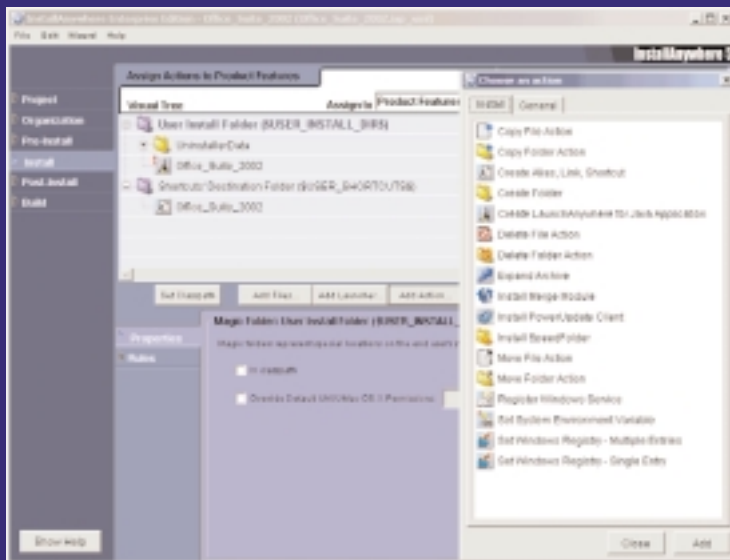
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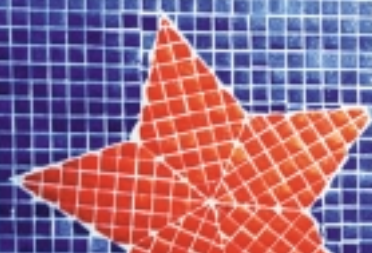
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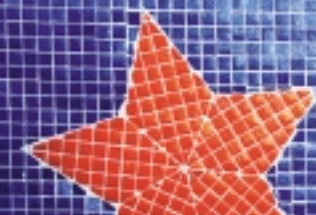
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Name:	Daiva Venckus
Application:	Ringster
Interest:	The next big thing – and being a part of it
Income:	Millions of potential customers – you do the math



Daiva Venckus is a senior product manager with Moviso LLC, a subsidiary of Vivendi Universal. She's the creator of Ringster, a cool BREW™ application that allows for the downloading of over a thousand ringtones from leading entertainment companies. "The most attractive thing about BREW is that even the smallest developers can now get their product to the carriers for download," said Venckus. "And those BREW subscribers number in the multi-millions – this is a very real revenue opportunity." Other developers agree. Commercial services are launched and BREW applications such as games, email, news, weather, stock trades, position location and ringtones are now in the market – a market of millions upon millions of customers. If you aren't developing for BREW, you aren't developing to your potential. To get started, go to www.qualcomm.com/brew/jdj.



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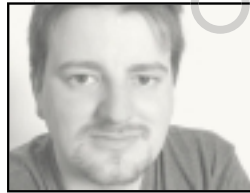
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ALAN WILLIAMSON EDITOR-IN-CHIEF

Make It Work, Then Make It Accessible

As the old saying goes, "It never rains, but it pours." Our esteemed J2ME editor, Jason Briggs, and I have been sparring for the best part of a year now on what we are looking for when it comes to mobile computing. We have differing opinions on the matter and while Jason wants something to rule the world, I'm content with something that will merely check e-mail, play some music, and even take the odd call or two! What we do agree on though is being able to load our own applications on to the beast and make it dance to our tune.

It didn't take much to persuade Metrowerks to give us the new Sony P800, which has been hailed as the next best thing since sliced bread. I won't go into too much detail about it as Jason will be doing a review of this model over the next few months, but I will say one thing: Wow! Not only does it look and feel stunning, but the APIs available to us as Java developers open up the whole phone, including getting access to the core functionality such as the address book and call features. The screen on the P800 is large and colorful, which makes some of the MIDlets I've been downloading an absolute joy to test.

I started thinking about this unit not from a developer/geek point of view, but from a mass consumer view. The phone straight out of the box is loaded with a number of applications, most of them completely and utterly useless with a number of major omissions from the suite, namely the catch-all input spreadsheet. While the video player is a nice show-off toy, it's completely impractical, especially when you consider the inbuilt camera is incapable of capturing video. Needless to say, that was instantly ripped off the unit to free up a few MB of memory.

I also replaced the inbuilt e-mail checker with something far more intuitive. The MP3 player had to be replaced with something that was designed by someone who actually knew about music on the move (this surprised me – with Sony taking an active part, you would

think the music end of things would be top notch). This is the power Java is bringing to the table: the ability to completely replace all the junk on the phone with software you will actually use and not be shoehorned into applications that just don't work the way you want.

Fortunately for the mass consumer market, loading MIDlets onto your phone (or at least the P800) is an absolute breeze and shouldn't present any major issues, which is half the battle. First you make the technology work and then you make it accessible. I have been excited about J2ME for a long time now but seeing the rich interfaces now being integrated in handhelds, I believe 2003 is going to be the year for Java on the move.

• • •

Regular readers will know that in the last few months I have been venturing into the world of blogging and unearthing some real informational gems. While munching lunch I find myself surfing around people's blogs and just clicking deeper and deeper into subjects. There are a number of jumping-off sites that I use called aggregators (www.javablogs.com) and there are many more popping up. These take a snapshot of the latest entries over a wide variety of blogs and present them in a single page. What you find are people detailing their problems with a particular piece of software or code and then others (or the original poster) writing solutions or guidance.

This is slightly different from most mailing lists, where the original posters very rarely post back the solution that worked for them. There is a greater sense of closure on a problem. I noticed one particular blogger (<http://glen.blog-city.com>) had posted an issue he was having and within four hours someone had offered up the first bit of help with more posters following. The point here is that this wasn't a mailing list or newsgroup, merely someone's personal blog site.

If you maintain your own blog, then get aggregated. Free the RSS! ☛

AUTHOR BIO

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

alan@sys-con.com

WRITTEN BY JOSEPH OTTINGER

A Long Road Ahead

Lately it's been easy to dislike Sun. Their JVM is slow; Sun ONE is certainly nowhere near the fastest J2EE application server; Forte, while capable, is far from what coders actually want to use if they want to write code in a reasonable amount of time; MS's constant marketing and technical assaults eat away at Sun's armor; Sun's stock (as of this writing) is roughly a dismal \$4.

All this adds up to a sad picture for Sun, the company that once proudly labeled itself as having put the "dot in dot-com." I've seen this reworded as "Sun put the black hole in dot-com," and that's difficult to argue with.

Since Sun has been unwilling to give up control of Java, Java is tied to Sun's apparently sinking fortunes, and Java programmers will go as Java goes. That paints a bleak picture for us in the face of so many obstacles, especially since Sun's Java products are so perceptively slow: most pundits think that since Sun doesn't write blazingly fast software, Java must be at fault. Speed is tied to many, many things, including user perception. Most users will tell you that the under-the-surface calculation is more important than screen refreshes, but if the screen doesn't refresh in 5ms, they think the program is slow. This creates a huge problem with Java's mindshare.

I agree with the bleakness on the surface. However, like a countryside covered in snow, the cold runs only so deep: underneath the dark external picture remains a core of strength that can sustain Sun for quite a while, provided that people don't lose sight of what's important in favor of what's popular.

For one thing, Sun's software and hardware all share a common characteristic: slow and sure. Rarely are Sun products known for blazing speed, but you can

almost always guarantee that they won't outright fail on you except in the case of catastrophic hardware failure. For high-end businesses that value their processes, the knowledge that data won't die on the wire is invaluable, and Sun has better products than any shy of big iron at providing this peace of mind.

For another, Sun's ineptness at marketing doesn't change the fact that they do have worthy technologies, including Java. What most people see is that Java doesn't excel in fairly vertical applications; what they don't see is that Java programs' bug counts are very low, that Java programs tend to be written more quickly than other languages' end products, and that Java programs are naturally more portable across platforms than other languages' are. All of these add up to products that are normally safer to run, and cost much less to develop than an equivalent program in, say, C++ (not to say that Java is "better than" C++). That would require a lot of definitions of what "better than" means, and I'm not touching it.)

Their hardware, where they place most of their trust in the future, follows the same path: they will not have blazing CPU speed or incredible processing capabilities, but you can trust Sun to be scalable (massively so) and spending money on Sun boxes will not give you a system that locks up at random intervals. It all goes back to what businesses want: reliability over flash.

Sun has a long road ahead of it, and the company makes it harder on itself by battling in the press and not in the technical arena. In some ways, that's because in the technical arena it's already won the war even as it loses battles. In the long run, however, I think you'll see Sun standing tall for quite some time, and Java will not have been a bad choice. ☯

AUTHOR BIO

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.

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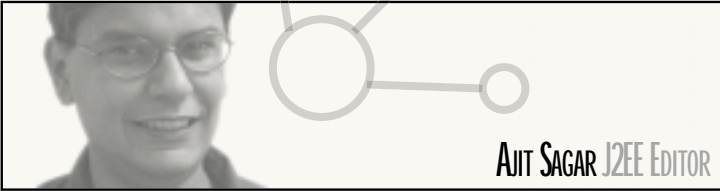
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AJIT SAGAR J2EE EDITOR

Integrate My Environment

If you wanted a home theater system, would you buy a shrink-wrapped solution – a preconfigured system from a single brand? Or are you one of those folks who would like to buy a TV from here, a receiver from there, and speaker from hither, and the amplifier from yonder? Because you can mix and match the best with the best. Of course, if you are the latter type, you have to know enough about connecting electronic components to set things up on your own, because coordinating support from multiple vendors can definitely be a headache.

If you are architecting J2EE solutions, would you rather buy your complete solution from one vendor, or would you like to shop for alternatives? Personally, I like one-stop shops, especially when the product I'm purchasing is just a means to an end – the entire solution provided by a single vendor. The reason is that integration between different products and components becomes a less formidable task. However, the catch is: What is the configuration of the products? Many times the configuration of a product suite ends up being the integration effort you were trying so hard to avoid. The reason? The J2EE vendor from whom you purchased the product actually bought it from several different vendors, marketed it under one single product suite, packaged it under one installation package, and made it available to you under one pricing scheme.

At the end of 2002, one of the large acquisitions in the software industry was that of Rational by IBM. (You may have seen SYS-CON's coverage of that.) The IBM WebSphere IDE already has some level of integration with Rational products, so the question is will this improve things for the development community? IDE integration with a CASE tool like Rose still requires you to work in two environments. You design in one, code in the other, and the integra-

tion plug-ins basically keep these two efforts in sync; however, you do have to switch between environments. Of course, Rational also offers code editing features, but would you use Rose to write Java? I wouldn't. It isn't as feature-rich as a Java IDE.

Another example is UML support from Borland's JBuilder (6.0 and up). It allows you to generate UML class diagrams within its IDE. But these are not dynamic – you can't edit them graphically. Another level of integration is through an extension that allows Rose to maintain consistency by pulling in code from JBuilder and generating the graphical representation. This is useful for reverse engineering but, then again, you still have to work in two environments.

The latest release of Oracle JDeveloper seems to have one of the most integrated offerings that provides a consolidated environment for UML design and J2EE development. This is because they have their own homegrown modeler that's a part of JDeveloper, and it may have enough features for developers to design the basic elements and go straight to code.

With IBM's acquisition of Rational and Borland's of TogetherSoft last year, it seems that acquiring and integrating these products is the trend. What would be really useful is for IBM to come up with a modeler within Studio or for Rose to have a full-fledged J2EE environment. When these products are bought separately, it is counterintuitive to shift from one environment to another.

Book Recommendation

If you're looking for a good book on Java and XML binding, check out *Java and XML Data Binding* by Brent McLaughlin (O'Reilly). It had useful insights on JAXB, Castor, and other alternatives for generating Java objects from XML. ♦

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AUTHOR BIO

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

Integrate My Environment

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by Ajit Sagar

JDJ Asks...IBM

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

Enterprise Messaging Security

JMS-based enterprise messaging has emerged as the ideal backbone for mission-critical and business-sensitive data across the extended enterprise. This article discusses different encryption technologies that are used to secure JMS and how to find the best compromise between your security and performance demands.

by Steve Trythall

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Crystal Reports 9 arrives!



Reporting software wakes up and smells the Java

SAN FRANCISCO —

Delighted Java developers flooded the streets yesterday after experiencing the powerful new Java features of Crystal Reports 9*. The industry-leading software now offers a Java SDK for creation and integration of reports into J2EE-based applications.

HIGHLIGHTS

- Component reuse with single point updating
- Support for Java®, .NET and COM
- Unlimited SQL control
- New scalable report server for web application integration
- Flexible deployment licensing for enterprise web applications

Java developers rejoice over the introduction of a Java SDK featured in the industry-leading Crystal Reports 9.

See *PORTAL & WIRELESS INTEGRATION* page A2

Why didn't someone think of this before?

Crystal Reports 9 is now available with flexible, cost-effective deployment licensing designed for enterprise web applications, people sources say.

that Crystal Reports request queuing capabilities are ideal for deployment of web applications with variable user loads.



Component reuse saves time, effort

Certified Training straight from the source

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Interview with IBM



J2ME



J2SE



J2EE



Home

JDJ Asks... IBM

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<eric rizzo>: Is IBM investigating the option of pushing SWT through the JCP? If so, what specifics can you give?

<don ferguson>: We don't have any plans to submit SWT to the JCP; Sun wouldn't allow this. Actually, we've positioned SWT as a technology to create advanced visual interfaces for the creation of compelling development tools. While we've seen SWT being used by some subscribers to the Eclipse toolkit, this was not our original intent.

<rizzo>: What is IBM's response to claims by Sun supporters (maybe Sun itself) that IBM is undermining their community effort around Forte/NetBeans?

<ferguson>: There is no serious community around Forte or NetBeans. Eclipse is focused on the requirements of tool vendors to create feature-rich and visually attractive tools that are easy to integrate. The lack of an open community and framework in this space was one of the key motivating factors for creating eclipse.org. We've seen that the massive participation in eclipse.org – two million downloads, 175 tool vendors committed to creating commercial Eclipse-based tools – demonstrates that there was a compelling need for it.

<carl luongo>: What is IBM's involvement with Java and J2EE? What is the J2EE support in WebSphere? Where do you stand with J2ME?

<ferguson>: IBM was one of the principal contributors to J2EE. For example, many concepts from Component Broker manifest themselves in EJBs. Many WebSphere MQ concepts appear in JMS, and JCA is completely based on IBM's common connector framework. IBM also participates in all major J2EE specifications.

With WebSphere, IBM was the first

major vendor to have a J2EE 1.3 certified product. We have an excellent development environment, based on Eclipse, that supports J2EE application development. The WebSphere platform routinely wins awards for being the best J2EE development environment. We won the *JDJ* Readers' Choice Award for Best J2EE IDE.

IBM supports J2ME through our application development tools. Visual-Age Micro Edition won this year's *JDJ* Readers' Choice Award for Best J2ME IDE. We are also working with several mobile device vendors that embed our J2ME runtime products.

<henry roswell>: Why was IBM one of the last major vendors to license J2EE officially?

<ferguson>: IBM has not been as aggressive in delivering products certified to the latest J2EE standards because our customers demand enterprise products built with reliability, scalability, security, and support of standards. Therefore, we have focused on deployment-ready systems. By contrast, other companies shipped early releases that complied with the standards but were not suitable for deployment. When we shipped our J2EE 1.2 and J2EE 1.3 products, we passed far more tests in the CTS than any vendor. WebSphere was also the first product to successfully run ECPeRf. The IBM brand stands for certain things and we support the brand through WebSphere.

We realize that customers want early access to standards for development purposes, followed by deployment-ready systems. So we have shifted our philosophy to first deliver development platforms and then the deployment systems. This is why WebSphere was the first major J2EE 1.3 certified product.

<kyle sanders>: What is IBM's support of EJBs?

<ferguson>: WebSphere supports EJB 2.0. WebSphere Studio Application Developer supports EJB 2.0. We have contributed significantly to the EJB specifications.

<jesse sinkowitz>: Can you elaborate on IBM's position on J2SE?

<ferguson>: IBM and Sun have both invested in creating a platform, J2SE, that Java applications such as J2EE can run on. IBM develops J2SE-compliant

Java SDKs on a range of platforms from Intel to PowerPC to our zSeries mainframes, on operating systems ranging from Windows to Linux to zOS.

All of these platforms are built to deliver enterprise deployment characteristics.

<chris jensen>: Do you think Sun will ever donate Java to the open source community?

<ferguson>: I personally appreciate the leadership Sun has provided through the JCP. However, we hope that at some point Sun will submit Java to a bona fide standards body. Control by any one vendor – whether it's Sun or anyone else – creates problems.

<jay laurents>: I read that IBM will be coming out with a new version of WebSphere. What are some cool features for developers?

<ferguson>: There are a lot of cool new features. I'll briefly highlight five of them.

1. WebSphere Version 5 continues to place a major focus on Web services. We support a gateway for publishing applications into the Internet through Web services, with support for security and auditing. WebSphere Studio provides tools for encapsulating "legacy" applications through WSDL, and publishing J2EE artifacts (JavaBeans, EJBs, etc.) with Web services. We also provide JMS support for Web services, in addition to HTTP and RMI/IIOP.
2. WebSphere provides a workflow engine that choreographs business processes in which the activities map to J2EE Java calls or invocations of Web services. It also supports a business transaction model with automated compensation-based recovery.
3. We significantly improved our support for dynamic fragment caching of both data and *ML results. In the past, reverse proxy servers and in-network servers cached HTML result pages. In a world that relies on personalization and portal models, result pages are composites of "subelements" that the application server dynamically assembles based on request parameters, user profile, etc.

WebSphere's fragment-caching environment understands how to compute cache IDs for the subelements, and optimize construction of the composite result pages. This all

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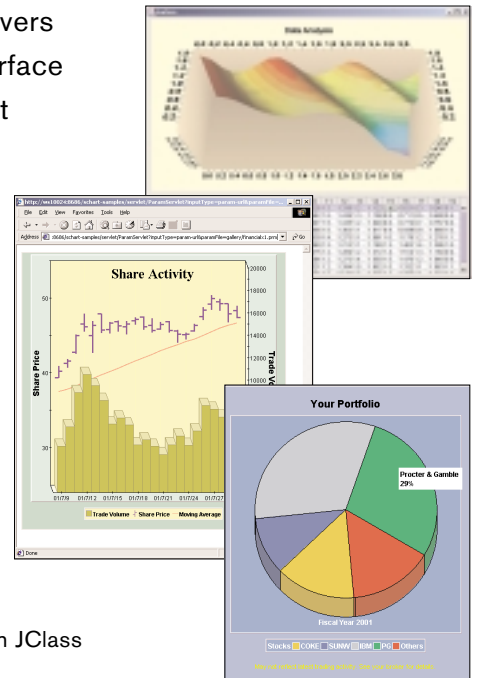
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works transparently to the application developer by having a deployment time specification of caching policies. Policies and an event mechanism implement cache coherency within a cluster and tie together our fragment caching, content distribution networks, and content management products.

4. We have shipped an improved version of our problem determination tools that correlates and consolidates multisystem WebSphere logs, and uses filters to report on root causes for problems and the proper corrective action.
5. We have built on EJB 2.0 to improve the development and performance of entity beans. This includes improved tooling for relational-object mapping, policy-driven optimization through prefetching, optimistic transactions, and caching. We also ship an enterprise extension that supports dynamic, SQL-based query in addition to EJB finders and select methods.

<alan brown>: I hear a lot about how the Java and CORBA specs are merging. How close are we to having a single specification for both Java and CORBA? What do you see as the benefits/drawbacks for current CORBA customers who wish to adopt or move to a J2EE architecture, or should they even be thinking of moving at all?

<ferguson>: CORBA and J2EE are already somewhat merged. The CORBA specifications define J2EE interoperability for transactions, security, and EJB remote method calls. There's also IDL bindings for EJBs to enable non-Java applications and JNDI support for CosNaming. IBM pushes hard for this convergence; for example, JSR 95 drives an Activity Service that provides Java support for the evolved CORBA OTS specifications.

Much of J2EE defines Web aspects, such as JSPs, servlets, and HTTP Session. These are not covered by CORBA. The EJB specification defines a component model between application server containers and deployed business components. There is some overlap between EJBs and CORBA components, but there seems to be little progress on convergence.

I believe that CORBA customers should move to J2EE for the "server model" for CORBA. J2EE and EJBs define an excellent endpoint/container/server model for hosting CORBA objects.

WebSphere has put several features in place to ensure interoperability between our J2EE hosting environment

for EJBs and "legacy" CORBA environments.

The main disadvantage of J2EE is the exclusive focus on the Java implementation of the server business objects. I expect that application vendors will gradually and incrementally add support for non-Java languages over time.

<chester arnold>: What is IBM's stance on the Java Data Objects specification for persisting data? It seems like a useful spec that's much easier to use than the alternatives, e.g., entity beans, JDBC, etc., but no major player has adopted it other than Sun.

<ferguson>: We have no plans to support JDOs. For J2EE, we recommend EJB 2.0 support for CMP entity beans, which we believe is simpler and better. Application development tool support for JDBC also provides a better model than JDOs.

<jun kong>: Why is IBM always so slow in new J2EE technology such as EJB 2.0, etc.?

<ferguson>: Please see the response to Henry Roswell's question.

<kong>: WAS 5.0 looks like WebLogic. The significant point in WAS 5.0 is that there is no standalone console. Instead, there is a Web-based console just like WebLogic. Why?

<ferguson>: We have found that basic concepts from portals, frameworks like Struts, and JSP tag libraries provide sufficient richness for most management scenarios. This was not the case in the past.

While the console approach may be similar, the functional capabilities of WebSphere administration far surpass those of WebLogic.

<jani kavcic>: I have been looking for the JDK 1.4 (JRE 1.4) from IBM for some time, but I still didn't find it anywhere on the Web. Is it already available? If so, where?

<ferguson>: We have been delivering our SDK 1.4 and JRE 1.4 on our supported platforms since the end of the second quarter. As you know, IBM delivers JVMs on many platforms so we are actively rolling out all platforms now. By the end of the fourth quarter, we expect to have rolled out our JVMs on all our key platforms including Linux on IA-32.

Here are a few URLs detailing both GA and beta deliveries:

- Linux on zSeries: <https://www6.software.ibm.com/dl/lxdk/lxdk-p>
- z/OS: www-1.ibm.com/servers/eserv/er/zseries/software/java/aboutj14.html
- AIX: www.alphaworks.ibm.com/tech/aixsdk

<swaroop>: How do you characterize the next-generation middleware from IBM with the WebSphere Application Server and MQSeries addressing new trends in application development for Web services, computing on demand, grids computing, etc.?

<ferguson>: For Web services, there are two fundamental concepts: the "container" and the "bus". The container is the environment in which the service actually executes, and we have put a large amount of work into WebSphere to make it the Web services container. This is also the environment that provides support for current and evolving Web services standards like BPML4WS, WS-Coordination/WS-Transactions, etc.

We are evolving our message middleware products so that they implement a "bus" for communication between Web services. This includes support for multiple protocols and formats, interoperability, and value-added services for Web services. Examples of value-added services include support for dynamic binding, interface/format matching and transformation, pub/sub, etc.

IBM has been working to bring together the Grid, Web services, and J2EE. You can see this from our leadership on the OGSA specification, which is an extension of Web services/WSDL, and on the Globus Toolkit's move to J2EE.

IBM has spoken about projects we are working on to support "provisioning" on-demand. These products will support policy-based configuration of system images to physical systems and mapping application images to configured systems. This dynamic configuration technology together with a WSDL interface model for applications and the well-defined packaging model of J2EE form the pillars of on-demand computing.

<dan novik>: What is IBM's support for custom JSP tags in WebSphere? Are you going to provide your own taglibs like Oracle or BEA?

<ferguson>: We provide and will continue to enhance our library of JSP tags. We also support Struts in WebSphere Version 5, which comes with tag libraries. Our development tools, WebSphere Studio Application Developer, support the production of new tag libraries and the use of other tag libraries.

<andrew craig>: WAS 4.0's support of JMS is flaky at best, and WAS 5.0 seems to be pushed back more and more each time I look into it. Is there any plan to move proper MDB support into WAS 4.0 (AE) ahead of the WAS 5 release? I have used many of the workarounds, but they are only good



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<ferguson>: WebSphere 5 has direct support for JMS and MDBs through J2EE 1.3.

<charles simon>: **What's the story on supporting Java on VM? How can I use VM as a Web services server platform? Will Java ever be supported under CMS?**

<ferguson>: z/OS and Linux are the key strategic platforms for executing Java components and Web services on the zSeries server. There is some degree of support for Java on VM: the IBM Java Port for VM/ESA, Developer Release 1.1.6 is a port of Sun Microsystems' Java Development Kit (JDK) to the S/390 platform and will run on all z/VM releases and VM/ESA version 2 releases 3 and 4. You can find more information at www.vm.ibm.com/java. There are no current plans to provide a WebSphere Application Server on VM. However, VM does play a key role in this space by providing hosting services to multiple zSeries Linux guests. Running WebSphere in zSeries Linux guests under VM is a highly recommended way to consolidate workloads and leverage VM's systems management strengths against these workloads.

<bisi>: **What is your advice for developers and software engineers who want to specialize in distributed component-based software development?**

<ferguson>: WSDL will form the basis for the industry's distributed component model. We are working to ensure that this occurs and that OGSA comes together with WSDL. There will be multiple approaches to "implement" the WSDL components. Some components will be legacy applications encapsulated in WSDL through development tools like WebSphere Studio Integration Edition. EJBs and J2EE provide one ideal environment for implementing new components from their WSDL interface definitions.

Component assembly will become the main approach to new components. We will build new WSDL components from existing ones using languages like BP4WS. I also expect to see an approach to component customization that relies on components making out-calls to a policy service to tailor their behavior. We are moving our Business Rules Beans support in WebSphere in this direction in the longer term.

Brokering will also become increasingly important. Finding components will become easier, but the routing and transformation necessary to dynamically

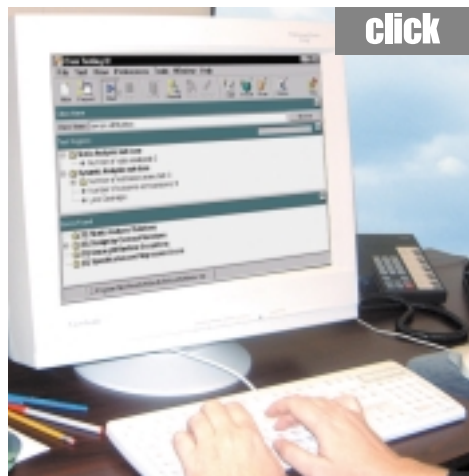
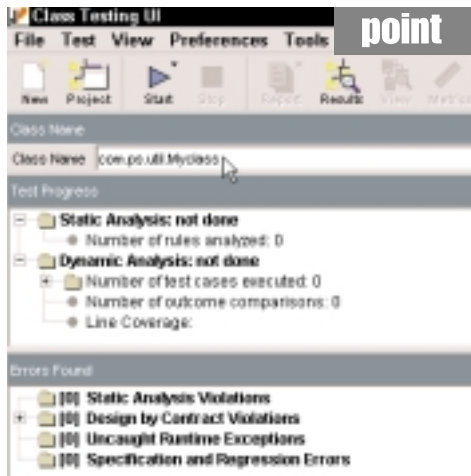
integrate components will be critical to Web services and component success. So technology like XSLT and pub/sub are areas that will grow.

Finally, I expect to see significant progress in support for XML in databases to provide a better query and persistence mechanism for components.

<martin hromek>: **Is there a meaningful approach to comparing WebSphere (J2EE?) to .NET?**

<ferguson>: You mean, outside the fact that we're vastly superior? Seriously, I think the functional overlap between .NET and J2EE is about 80-90%. They learn from what we do and vice versa. At the same time, we also feel that WebSphere is much further ahead and much more mature in terms of the implementation of those common functions. .NET will always be limited to a homogeneous Windows environment, while J2EE will be cross-platform and cross-vendor. As for the much touted (at least by MSFT) capability of .NET to support multiple development languages, other languages will begin to appear in "J2EE" as well. We already support JavaScript in WebSphere. I think the approach in the CLR is not workable and overly complex, and simpler models to multilanguage are more appropriate. ☛

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A SLEDGEHAMMER TO CRACK A NUT?

ENTERPRISE MESSAGING SECURITY

JMS-based enterprise messaging has emerged as the ideal backbone for mission-critical and business-sensitive data across the extended enterprise.

As the need for more robust security measures arises, SSL is frequently used to secure messaging communications. But is this using a sledgehammer to crack a nut? System architects have choices when considering techniques that strike the right balance between performance and security. One of the main concerns of any middleware security solution is encryption. This article discusses different encryption technologies that are used to secure JMS and how to find the best compromise between your security and performance demands.

Introduction

The Java Message Service (JMS) has been enormously successful as a messaging technology – well beyond the expectations of its original devisors. Today, if you make a telephone call, conduct a banking transaction, purchase goods from a supermarket, or trade in shares, there's a good chance that JMS has been involved somewhere in the process. For most of these applications, security is a key consideration. Although the JMS specification writers chose to remain silent on the topic of security, the vendors have found it to be a fertile ground for innovation and for differentiating themselves.

As JMS is increasingly employed to exchange mission-critical and business-sensitive data between business partners, security is a paramount concern when extending business communication across the Internet, which is viewed as a hostile environment.

There are three linchpins in any middleware security solution: authentication, authorization, and encryption.

Authentication

Authentication is the process by which the identity of a principal (i.e., user) is established. Most commonly this is accomplished through a user name and password, but it could be via a digital certification or more esoteric mechanisms such as thumbprints or an iris scan. Java Authentication and Authorization Service (JAAS) has provided a standard mechanism to allow pluggable authentication, allowing organiza-

tions to select their authentication method and technology of choice.

Authorization

Authorization is about granting or denying rights to principals. Typically, JMS destinations are organized into hierarchies and principals into groups. Groups are then granted or denied rights to some part of a destination hierarchy, such as send, receive, or administer.

Encryption

The final member of the security triumvirate is encryption. As illustrated in the opening paragraph, JMS is frequently used as a conduit of mission-critical and business-sensitive data. In such scenarios it's vital that the transported data is not revealed to unauthorized third parties. Encryption is used in JMS to secure the content of messages.

A More Efficient Sledgehammer – Making SSL Go Faster

In the minds of many architects and developers, middleware encryption and SSL are synonymous. Later in the article I'll argue for other approaches, but first let's explore SSL. Secure Sockets Layer (SSL) was first defined in late 1996 by Netscape; its principal goal was to secure the communication between a Web browser and a server. However, it has since broadened out to become the de facto means of securing client/server communications.

The original Internet Draft entitled "The SSL Protocol Version 3.0" specifies:

A security protocol that provides communications privacy over the Internet. The protocol allows client/server applications to communicate in a way that is designed to prevent eavesdropping, tampering, or message forgery.

It has since spawned an Internet Engineering Task Force (IETF) working group to create a de jure standard Transport Layer Security, or TLS. Many middleware products now support SSL 3.0 and TLS 1.0. Support for SSL 2.0 is now rare due to its well-known security flaws. The TLS now maintains the definition of the elements of transport layer security including HTTPS and variations in ciphersuites.

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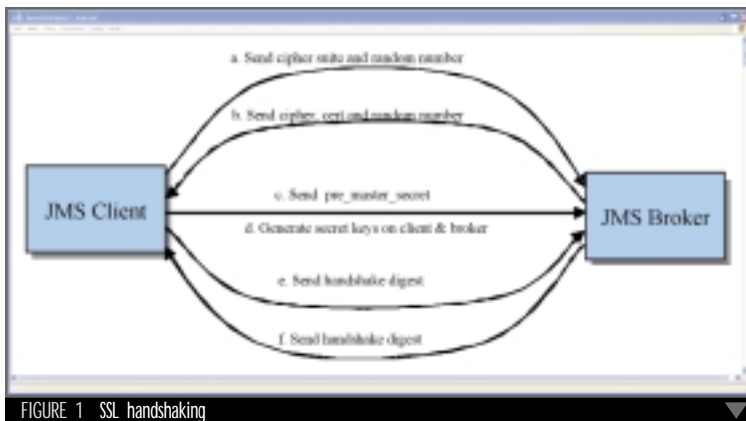
SSL has three basic properties:

1. **The connection is private:** Encryption is used after an initial handshake to define a secret key. Symmetric cryptography is used for data encryption as this is dramatically cheaper to compute than the public-key asymmetric alternative.
2. **Identity can be authenticated by asymmetric or public key cryptography:** This is typically done using a digital certificate.
3. **The connection is reliable:** Message transport includes a message integrity check using a keyed message authentication code (MAC). This authentication code acts as a digest of the SSL data and confirms that the data has not been modified in transit.

Inside the Sledgehammer Handshake

One of the reasons that SSL is so expensive is the cost of establishing a connection. In situations where your applications establish a small number of long-lasting connections, this may be irrelevant. However, the impact will be significant where your messaging requires many ephemeral connections. The SSL connection process works like this (see Figure 1):

- a. The JMS client sends the broker the ciphersuite that it is able to support and a random number that's used to start the key-generation algorithm.
- b. The broker will compare the JMS client's ciphersuite with its own and select one cipher that will be used for the connection. It also generates another random number as stage two of the key generation algorithm. The broker then sends to the client its certificate, a random number, and the chosen cipher.
- c. The JMS client checks the broker's certificate against its CA certificate and extracts the public key. It generates a random string called the pre_master_secret and encrypts it using the broker's public key and transmits it to the broker.
- d. Both the client and the server compute the secret keys required for the encryption and message digest algorithms. The inputs to this algorithm are the pre_master_secret and the two random numbers generated by the broker and client.



- e. The JMS client sends a digest of all the handshake messages to the broker.
- f. The broker sends a digest of all the handshake messages to the JMS client.

For some of you this is more detail about the SSL connection mechanism than you ever wanted to know! The real take-away message from all this is that establishing SSL connections is expensive. It involves five messages between the client and broker and two very costly asymmetric cryptographic operations. In fact, this whole operation is so costly that hardware accelerator companies have built a healthy business just boosting the connection time for Web sites.

There are two routes open for reducing this cost:

1. **Fewer connections:** Designing your JMS applications so that you open connections less frequently is obviously desirable. One design pattern for achieving this is the use of connection pooling in which connections are recycled for other users rather than closing and opening a fresh connection.
2. **Message-level security:** One route for overcoming the connection cost is to use message-level security over a regular TCP connection. This is described later in the article.

Cipher

The choice of cipher can have a large impact on messaging performance. It's not uncommon for JMS users to ignore the ciphersuite parameter on their JMS product, leaving the message broker to select which cipher to use. Typically the broker will choose the strongest cipher available to it, which is often triple DES (3DES). This will seriously impact performance and may be considerably stronger security than the user had ever intended.

Figure 2 shows the message rate aggregated across all the subscribers when both the publishers and subscribers are using SSL. This shows that triple DES is consistently double the cost of using 56-bit DES.

Although DES and 3DES are commonly used, they rarely make the best choice in a cipher. If performance is a concern, an RC4-based cipher is a considerably better choice. If cipher strength is of paramount importance, then a 128- or 256-bit AES is a better choice when it's supported by the JMS vendor. AES is the new NIST standard for encryption and is designed to replace DES. This block cipher algorithm is faster and more secure than DES and therefore makes an excellent choice.

Native Code Implementations

Almost all JMS implementations use a central broker, which runs on a JVM. The use of Java brings many benefits, and JIT (Just in Time) compilers have made the performance penalty almost negligible in many situations. However, encryption/decryption operations are very computationally expensive and will tax even the most efficient JVM. One route to claw back some of this SSL-induced performance degradation is to use an SSL implementation that provides a native code encryption/decryption option. Typically this uses a C cryptography library that is integrated via JNI with the JVM to carry out the crypto operations.

A More Efficient Nutcracker

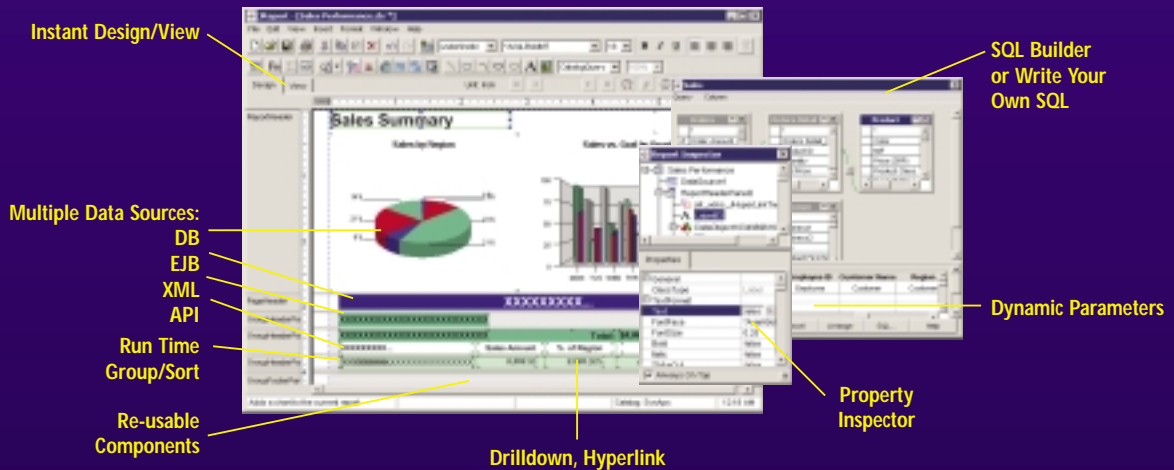
As the title of this article suggests, SSL is a very heavy-weight solution to what in many situations is a relatively simple problem. SSL includes an expensive connection handshake, the use of digital certificates, and subsequent encryption and digesting of the entire traffic between the JMS client and broker. This traffic will contain much more than just the message contents as well as:

1. The JMS message header fields
2. The JMS message properties
3. The protocol wrappers around the JMS messages
4. Additional client/broker communications such as acknowledgments

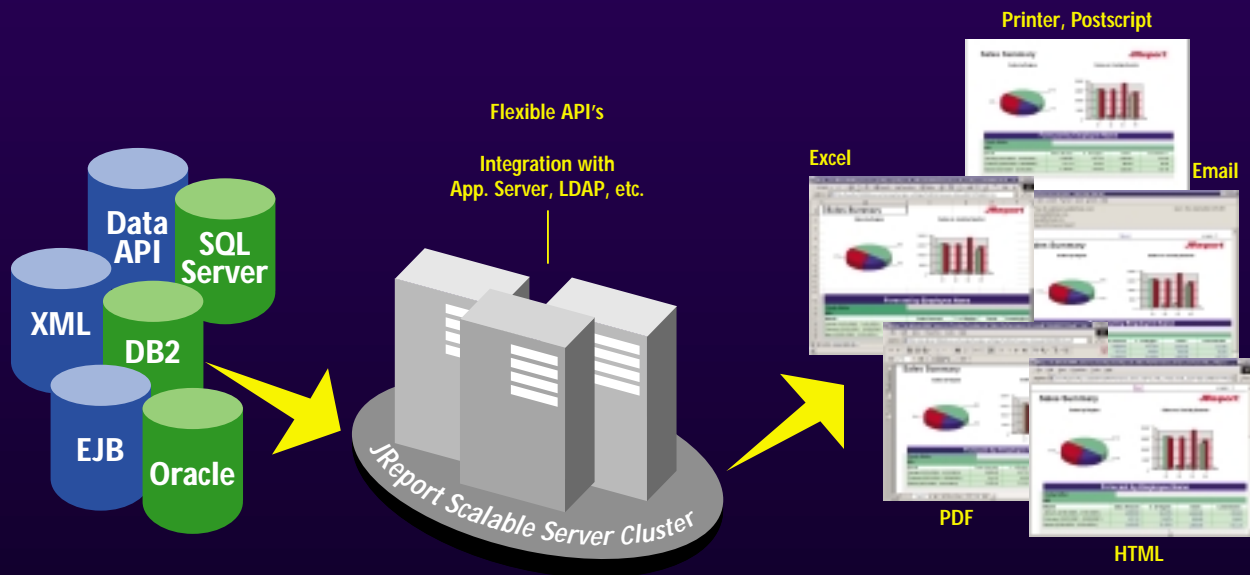
If your only concern is to ensure that your business-critical data in the message body is secured, encrypting and digesting the rest of the protocol data is wasteful. An alternative approach is to focus your precious CPU cycles on encrypting and/or digesting the message bodies.

Figure 3 shows the effects of moving to a message-level encryption and digesting scheme. Typically this is switched on and off by administrators at a JMS destination level and is transparent to the application developer. This allows applications to be written in a JMS vendor-neutral manner while still enjoying the benefits of this facility.

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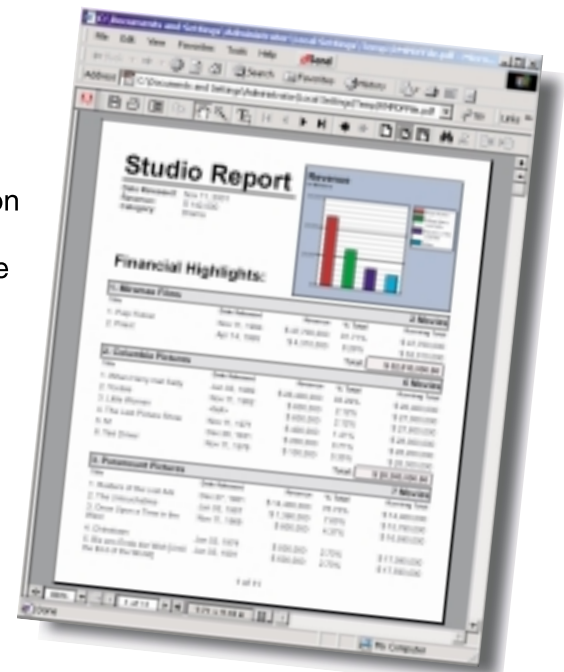
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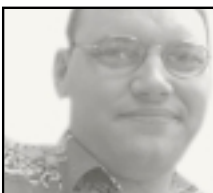
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JASON BELL J2SE EDITOR

Who Needs Resolutions

Since last month's *JDJ* was the Linux focus issue, I didn't get a chance to inflict my goals for the year. I call them goals, as I hate the term *New Year's resolutions* as resolutions are always broken by the end of the first week of the new year. In fact, I think it's more of a custom in the UK to purposely break New Year's resolutions so people can get back to normal as soon as possible.

1. Read Thinking in Java cover-to-cover:

Now in its third edition, *Thinking in Java* by Bruce Eckel (Prentice Hall) continues to fill my head with all things new. It's a good reminder of how Java programs should be constructed and how programmers should approach programming problems in general. It touches on design patterns and how they're used and also things like integrating Ant and JUnit.

2. Create a Java Weblog

Weblogs are online diaries, so you can share your programming thoughts, hints, and general musings to a world that either does or doesn't care.

There are plenty of Web sites about for creating blogs. Blogger and Blog City let you create a blog and host it on their system. If you're feeling more adventurous, you can download software, such as Roller Weblogger, MiniBlog, or Moveable Type, so you can maintain your own.

The real power of blogging comes when you syndicate large amounts of blogged data, then you have a powerful tool to reference when you need information or opinions. Java.blogs is a Web site of (amazingly enough) Java-related blogs. As long as you can generate a rich site summary (RSS) feed, then you can add it to the site.

Our illustrious leader got the idea that we all should have a blog to document what's going on in our heads. So Alan, Ajit, and myself have blogs that are updated

whenever. There is a time and place for going public on information so I tend not to say too much, but for handy announcements on Java-related stuff, it's a winner.

3. Get involved in at least one SourceForge project.

There are thousands of open-source projects that you could get involved in or you could create your own. Funnily enough, I was working on a small API to create RSS feeds. There are plenty of libraries for reading RSS feeds but none for writing them (not without really messing about with XML APIs). So I set to work on an API. Then, while I was talking to Joseph Ottinger, something struck a chord and things started to take off. He suggested that it be made open on SourceForge.

I learned some very useful lessons: first, never write off collaboration; second, the more eyes that look at your code, the more bugs that will be identified and (hopefully) corrected. SourceForge supplies everything you need for your project including Web space and a CVS repository. You can work at your own pace and time (though I am disappointed about the amount of projects with no documentation or released files, just ideas). We ended up calling the RSS API "rsslibj"; you can see its progress (or get involved) at <http://rsslibj.sourceforge.net>.

The whole open-source ethic is widely documented, but I still advise you to have a look at *The Cathedral and the Bazaar* by Eric S. Raymond (O'Reilly).

4. Treat yourself to at least one music CD.

Well, you have to really, don't you? I'm going through a spate of excellent acoustic guitarists so this year I want to get "Facing the Wall" by Don Potter, anything by Michael Hedges, and anything by Adrian Legg. I've heard so much by the California Guitar Trio that I don't need anymore....

This year will be interesting; it will be

Who Needs Resolutions?

Since last month's *JDJ* was the Linux focus issue, I didn't get a chance to inflict my goals for the year. I call them goals, as I hate the term *New Year's resolutions* as resolutions are always broken by the end of the first week of the new year.

by Jason Bell

The Java Virtual Machine Profiling Interface

It's a situation nearly every Java developer faces – a critical application upon which everything depends suffers from an elusive heap memory leak and begins throwing `OutOfMemoryErrors`.

This article introduces the Java Virtual Machine Profiling Interface and will start you on the road to better memory and thread management.

by Rhett Aultman

Seeing Is Believing with Java 3D

Now that machines are faster, hardware 3D accelerators are a dime a dozen, and newer JVMs rival native code, client-side Java and 3D graphics are finally making headway.

by Dan Pilone

the year we find out whether a shift to things like .NET will really happen. The time for hype is over; now it's time for people to put their money where their mouth is! ☛

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The Java Virtual Machine Profiling Interface

The best way to fly



WRITTEN BY
RHETT AULTMAN

It's a situation nearly every Java developer faces – Murphy's Law strikes at the most inconvenient moment: a critical application upon which everything depends suffers from an elusive heap memory leak and begins throwing `OutOfMemoryErrors`.

After fruitless hours spent trying to recreate the conditions spawning the leak in a debugger, nothing is gained. If you're like me, you check the Java APIs one more time in vain, just to remember that the `System.getFreeMemory()` method is about the only indication you have of when memory is tight. "Of course, the memory's running thin!" you shout to yourself. "What I really need to know is where the memory is going!" Even worse than this is a critical deadlocking of threads, leaving a JVM staring blankly at frustrated programmers. It's generally around this time that a developer starts wishing that the JVM had a way to police its resource usage at a fine-grained level. It would be wonderful to have some sort of a "profiler object" that could provide information about the JVM and let the developer register actions based on it.

Sun definitely recognizes this shortcoming of the Java programming language and is taking some strides to try and overcome it. For example, the new Logging API in JDK 1.4 can be used in a limited fashion to gain post facto information about the internal operations of a running program. In addition, JDK 1.4 makes available some interesting new ways to get a snapshot of the thread activity in the JVM, including information on the locks the threads hold. Regardless of this though, a "pure Java" solution for peering inside the JVM and taking action based on what is found there is still not available.

Consider the following situation: an application server or other piece of infrastructure becomes memory intensive, and just one dynamically loaded component using it has starved the heap of memory. Situations like this call for more detailed attention to memory use, and while the Java APIs may not

make this easy, the answer is available in the form of JNI and its cousin API, the Java Virtual Machine Profiling Interface, or JVMPI. As Sun has kept relatively quiet about JVMPI, this article serves as an introduction to the technology and will start developers on the road to better memory and thread management.

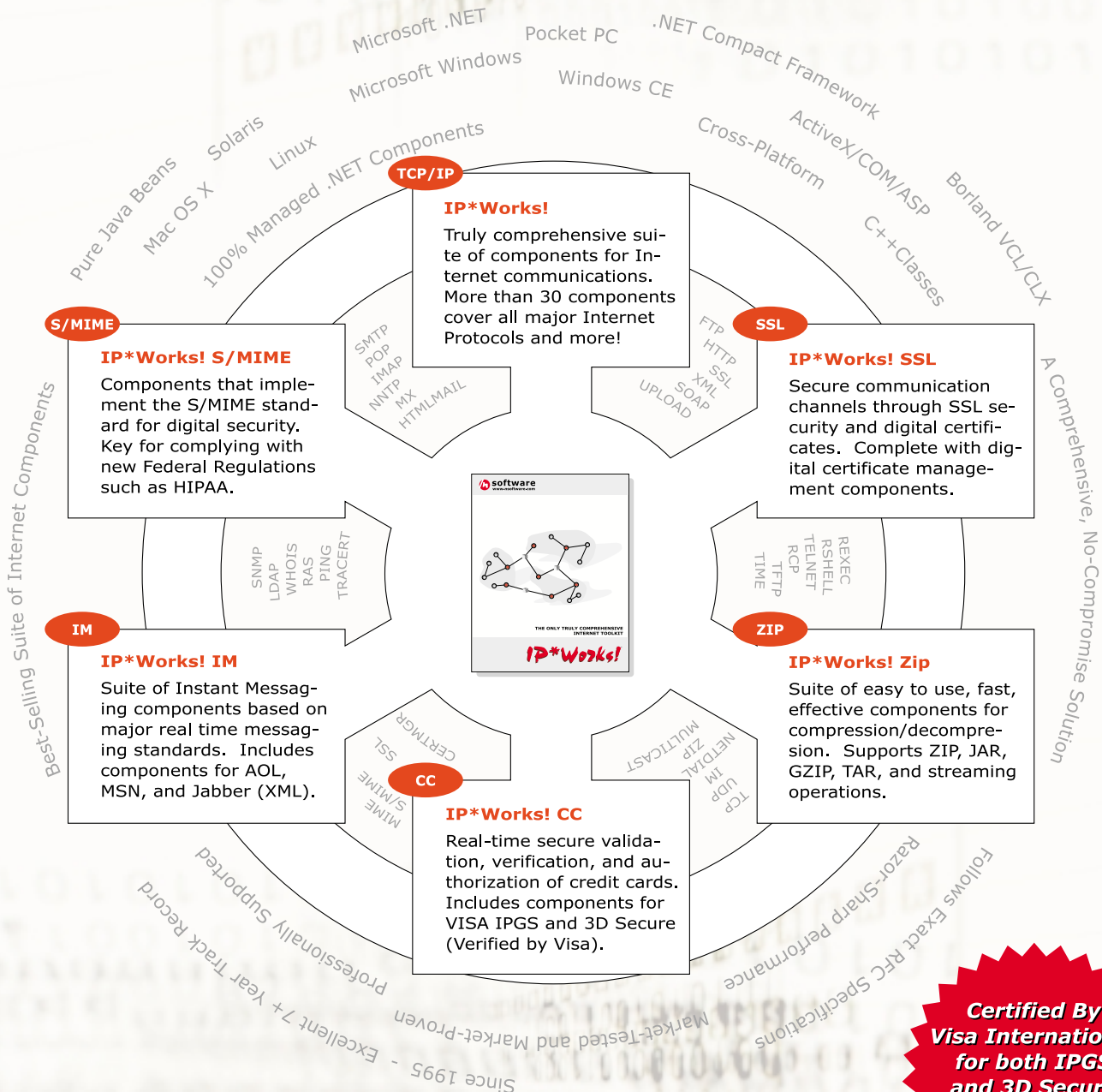
At first glance, you may wonder why a developer would even need to police the memory heap. After all, isn't the garbage collector supposed to take care of this? Unfortunately, the answer is "not exactly." It's the garbage collector's job to reclaim objects that are not being referenced, but greedy Java programs are creating new objects without releasing the old ones when their use has run out. The garbage collector might be good, but it's not a mind reader.

Another argument against this kind of memory protection has a point – micromanaging the running environment does not fit in with the idea of Java. This may be the case, but it doesn't help anything when memory is leaking and programs are crashing. Moreover, that argument has, in some ways, held Java back as a language for writing fault-tolerant servers. Consider the example of a Web application server that loads a memory-greedy object. The entire server suffers since it lacks knowledge of the source of the memory leak. The best memory protection a "pure Java" application server can hope for is to periodically check the heap's free space and, after too much has been used up, to politely ask loaded components to release extraneous object references. Not only is this strategy less than optimal, it can actually cause loaded components that are conforming to suffer at the hands of a greedy component. Clearly, a technique for finding the trouble spots and eliminating them is necessary.

However, possibly without even realizing it, Sun has given the dedicated developer a way to deal with these very issues. The answer lies in an unusual place – JVMPI. JVMPI is a mechanism through which a developer can receive notifications of extremely low-level events such as object allocations and deallocations. Its structure makes it clear that Sun intended JVMPI to be used for simple profiling of the JVM at runtime but, when coupled with JNI, JVMPI becomes the means through which an application developer can micromanage the virtual machine. With the power to easily record (and act on) low-level JVM events, any Java application can implement fine-grained system resource reporting and protection. Such a program can use strategies designed to eliminate components that misbehave, control thread behavior, and even guarantee completely deterministic system behavior. JVMPI is a powerful tool, but programming with it requires extreme care.

JVMPI is a native-code Java API. What this means, in essence, is that it is a way in which the developer can create a plugin to the Java Virtual Machine. The system profiling agent (the JVMPI code that monitors JVM activity) has to be written in C or C++. After the JVMPI code has been compiled into a shared library (a DLL or SO file), it's ready for use. Launching a JVM with a user-supplied memory profile requires the `-Xrunxxx` argument, where "xxx" is the name of the shared library without its extension. Once the JVM is up and running, the JVMPI agent will receive notifications about JVM activity. Since the agent receives notifications about the JVM launching and terminating, it has everything it needs to track system resource usage throughout the life of the

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program. In and of itself, this little-known feature of the JVM might be useful for the simple profiling of applications. In fact, Sun's reference implementation of a JVMPI agent (called "hprof") is built completely around the paradigm of reporting memory use at critical points, such as at JVM shutdown.

Thanks to JNI, though, JVMPI can be used for so much more. The secret lies in JNI's ability to dynamically bind native method calls to Java method calls through the `registerNatives()` function. It's through the use of this method that a Java developer can write a Java object to serve as an elegant bridge between Java code and a JVMPI profiler. Through this proxy object, a Java program can become aware of its behavior to a degree not offered by any "pure Java" solution and can also become capable of performing tasks not available with Java or even Java and JNI. There can be some pitfalls in this process, and this article will shed some light on some of them, but curious readers are encouraged to review the additional resources mentioned at the end of this article.

The first step in creating a runtime-accessible agent is to create the agent. The agent doesn't need to be very complex at this point, as the purpose is to get a simple

Now that a stub agent has been made, things can start getting interesting. The principles of this technique are common to JNI. The secret lies in the fact that a JVMPI agent is, to the JVM, just another shared library. Because it's a shared library, JNI techniques for representing Java methods in native code allow a developer to call a method in Java that acts on data in the JVMPI agent. The first step is to decide which kind of API you're going to use with your memory profiler. For starters, a simple, one-method mechanism for returning data about memory use works. Undoubtedly, just getting a snapshot of the JVM on demand is a necessary first step to even a complex memory management system.

Next, the object encapsulating this method needs to be made. The method is not going to be implemented in the object; it should be declared native and go unimplemented. Now, return to the source code for the agent and implement the method there as a JNI function.

Now that the method is implemented in JNI and has its corresponding native method available in Java, all that remains is to suture the two together using the JNI function `registerNatives()`.

one you're looking for, execute code designed to call the `registerNatives()` method.

There it is! Now it's possible to have a means of communicating with the JVM at a very fine-grained level. It should be noted that in order for the program in question to run, it must always run with the agent loaded (via the `-Xrun` argument) or proper care must be taken not to load the API object when the profiler isn't loaded, otherwise an `UnsatisfiedLinkError` will be thrown. Since it's possible to ensure that these conditions are met with simple launching scripts or compile-time variables (depending on the situation at hand), keeping the `UnsatisfiedLinkError` at bay is not difficult.

Now the agent is live and running, and can be interacted with via Java method calls. Everything is in place except for something very important – the actual implementation of the agent. The actual behavior of the agent will vary wildly as to its purpose, and a proper discussion of various agent programming techniques is beyond the scope of this article. Instead, this article will focus on some important issues relevant to good agent development that may not be immediately intuitive.

First and foremost, it's important to remember that when you're programming a JVMPI agent, you're not in Java anymore. This may seem obvious, but it's important to remember that C and C++, even with JNI, are not Java. There's no garbage collector. Passing and dereferencing pointers become important habits again. For the most part, all data structures are homebrew. Thread safety requires the explicit use of locks. These are all things that you have to keep in mind to avoid being a slave to Java programming habits. As a corollary to this, it's important to remember that a JVMPI agent is part of the JVM. What this means is that many of the checks the JVM builds against memory and threading issues are not present. For the most part, the JVM is going to accept the behavior of the agent even if the behavior is bad. Extreme care must be taken to ensure that deadlock and memory leaks do not occur.

Most memory management issues involved with C and C++ programming can be resolved only with conscientious programming. Far more important than memory management concerns, though, are thread-related concerns. The first important thing to remember is that most JVMPI events are sent in the same thread as the event that triggers them. Activity in an agent is generally not synchronous,

Most memory management issues involved with C and C++ programming can be resolved only with conscientious programming

agent that will properly launch at runtime. After including the `jvmpi.h` and `jni.h` header files, two functions have to be implemented: `JVM_OnLoad()` and `NotifyEvent()`. The former uses a pretty common bit of code to prepare the JVMPI environment when the JVM loads. The latter is the mechanism by which the agent receives event notifications from the JVM. Once these two functions are implemented, the profiler is usable, even if it doesn't really do anything. Compile the agent into a shared library using your favorite compiler (I've found the GNU C Compiler to work just fine), place it in the appropriate location for your system (`PATH` for Win32 systems, `LD_LIBRARY_PATH` for most UNIX systems), and run a Java application with it using the command line argument mentioned earlier.

This requires at least a little more programming of the agent (which is good, since the agent does nothing as of yet). To find the right moment at which to link the native method, the agent must listen for class-loading events. In JVMPI, class loads happen in a single-threaded context where the garbage collector is off. This means that the agent can spot the loading of the profiling API object and, when the class is loaded, register the native method implementation to its corresponding method in Java. The process can take a little time to do for someone who is unfamiliar with JNI, but in abstract, it's simple – when a class-loading event comes into the `NotifyEvent()` method, check to see if it is a class-loading event. If it is, check the name of the class being loaded. If it's the

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which means that the code for an agent may be processing many events at the same time. The same design-level care must be taken with regard to resources shared across threads as would be used in Java; however, the implementation of synchronization must be done explicitly using the monitor methods of JVMPI (`RawMonitorCreate()`, `RawMonitorEnter()`, `RawMonitorExit()`, `RawMonitorWait()`, `RawMonitorNotifyAll()`, `RawMonitorDestroy()`).

Using monitor locks on frequently received events (such as `Method Entered`) can damage the performance of the JVM in general, and so another technique is needed. JVMPI thus provides an additional mechanism for implementing synchronization techniques known as “thread local storage.” Thread local storage is similar to the concept of the `ThreadLocal` object in Java – it’s a means of storing data that is bound to the scope of a specific thread. For each thread running in the VM, JVMPI makes available a pointer that can be used to store profiling data specific to that thread. By initializing a data structure to use as local storage when a thread is made, and utilizing a thread’s local storage throughout its life cycle, a developer can record thread-specific information in data structures that are relatively immune to threading issues. At an appropriate time, such as when the thread dies, the local storage can be easily retrieved and merged into global data structures.

In addition, the agent must deal with JVM states that Java programs can effectively ignore. For example, an agent can enable and disable the garbage collector. Some events even broadcast while the garbage collector is disabled (for example, class loads). When the garbage collector is disabled, threads executing in the agent will block if they execute code that causes the creation of Java objects or forces the garbage collector to run (JVMPI allows for deterministic garbage collector calls). In addition, blocking dependencies between threads can become more complicated – if thread A is holding a lock and attempts to run the garbage collector when thread B disables the garbage collector and tries to acquire thread A’s lock, both threads deadlock unless some third thread enables the garbage collector again.

The other JVM state a profiling agent must carefully execute under is “thread-suspended mode,” during which the only thread executing is the one in the agent. This situation is easier to cope with than operating with the garbage collector disabled, but still carries its

own special conditions. When a thread is suspended, it continues to hold its locks (it’s for this reason that the `suspend()` method is deprecated). When all the threads are suspended, locks that the agent cannot check against may be held. These may be anywhere, including potentially blocking calls in the standard C library. Developers must take care not

excessively using memory so they can be dealt with. By identifying an errant thread (or whatever would be identified as a “resource hog”), application logic designed to perform forceful resource cleanup can be targeted where it’s needed, which effectively could not be done without JVMPI.

Where do you go from here? Curious

JVMPI allows for some very tight control and micromanagement of the JVM

to block the running thread while in thread-suspended mode. Failure to do so will cause unrecoverable deadlock.

If many of these cautions make it sound like programming in JVMPI can be difficult, that’s because it can be. JVMPI is essentially an API for writing a plugin to the JVM, and there’s almost no limit to what can be done with a mixture of C, Java, JNI, and JVMPI. Even without venturing deeply into native code programming, some amazing things can be done. JVMPI allows for some very tight control and micromanagement of the JVM. One method available in JVMPI that can be very useful is `GetThreadStatus()`, from which the state of a thread, including information regarding what it’s waiting on, can be discerned. It may also be preferable to see the actual amount of execution time that various threads are taking so greedy threads can be identified. With such information, it’s possible to implement policies in a Java program for dealing with various threading issues in ways not available before.

Such examples, however, are minor compared to the real power that JVMPI offers – the ability to clearly know how the JVM is being used. Since JVMPI is running as a part of the JVM, it can gather memory and resource use information in ways that aren’t available using the standard Java API. Just how this is leveraged varies from application to application, but a common strategy is to break down object allocation and use by thread. When it’s found that memory is running tight, a quick call to an agent proxy object (built using the `RegisterNatives()` technique mentioned earlier) can identify threads that may be

developers are encouraged to look at the example sources referenced in the resources section – one is written in highly portable C and the other in C++. Both are designed for basic memory and thread profiling, and while they may not employ fine-grained resource management strategies, they will definitely provide a good education in the underpinnings of profiling that are necessary for such a task.

Conclusion

JVMPI is definitely not for the faint of heart, but the kinds of projects with runtime profiling of the JVM (application servers, component architectures, Java development tools, etc.) are not either. If you’ve ever wished you could have absolute control of the JVM or that you could see what was really going on in your program, or if you’re writing some sort of a component architecture or server where identifying and handling regions of code that misappropriate objects could mean a boost in performance and reliability, JVMPI is by far the best way to fly.

Resources

Interested parties are encouraged to visit <http://java.sun.com/j2se/1.4/docs/guide/jvmpi/jvmpi.html> for documentation on JVMPI. This page includes links to the source code for a sample profiler to which the technique in this article can be applied.

C++ programmers are encouraged to visit <http://starship.python.net/crew/garyp/jProf.html> to see an excellent example of JVMPI programming in C++. ☛

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J. Rhett Aultman has been a Java developer for three years, offering his talents to the open source community both by himself and through Weatherlight Technologies, a co-op of independent developers (www.weatherlight.com).

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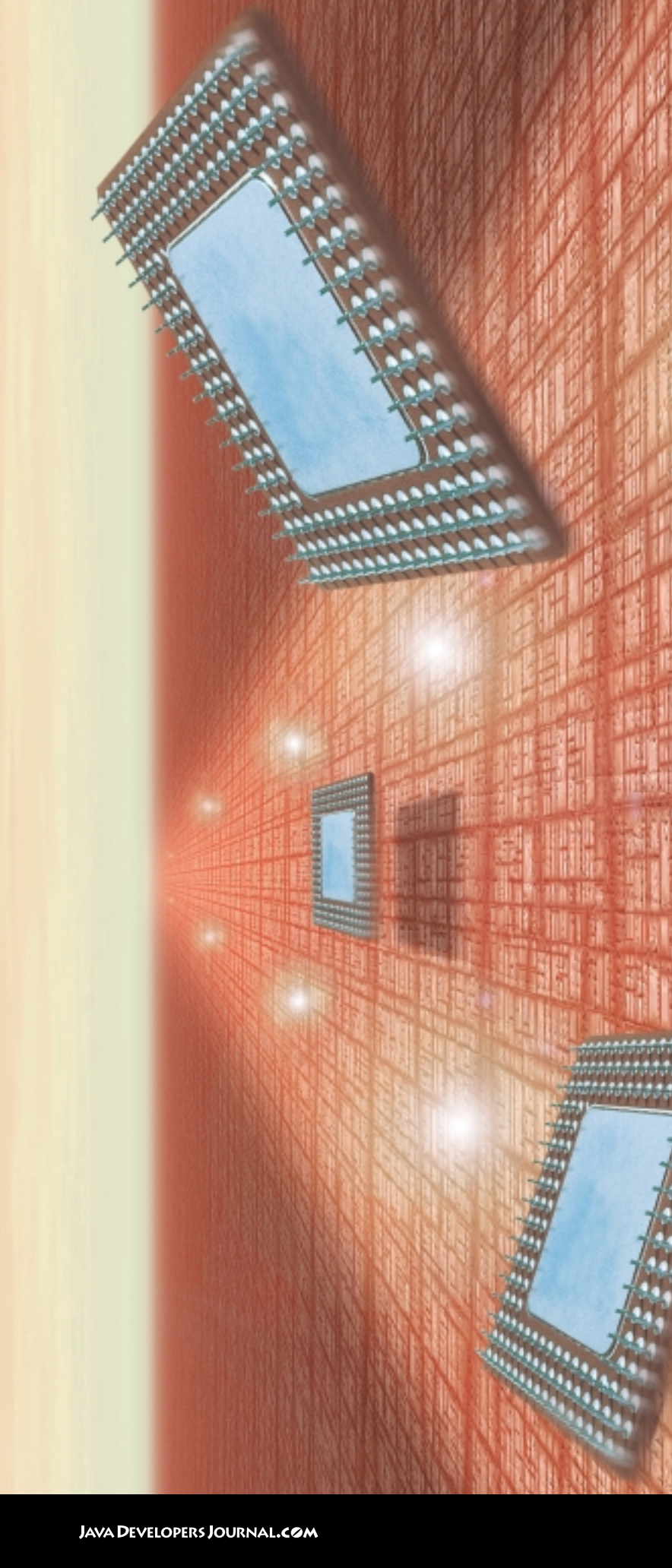
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JAVA 3D

AN INTUITIVE
AND CROSS-PLATFORM
3D API

AVA 3D IS NOT A
NEWCOMER TO THE JAVA
API WORLD; HOWEVER, IT
HAS SUFFERED FROM SLOW
ACCEPTANCE DUE TO THE
GENERAL RESISTANCE TO
CLIENT-SIDE JAVA.

WRITTEN BY DAN PILONE



Now that machines are faster, hardware 3D accelerators are a dime a dozen, and newer JVMs rival native code, client-side Java and 3D graphics are finally making headway. This article presents a brief background on Java 3D, a few example applications, then finally some hints on using it in the real world.

Historically, 3D graphics have been very computationally intensive and required highly tuned coding to get it right. Starting with Silicon Graphic's (SGI) GL, the API consisted of expressing points to make up lines and polygons. Rotations and translations were expressed as matrix manipulations using a matrix stack. To help spread the word about 3D graphics, SGI, along with a collection of other vendors, developed OpenGL, an open standard to describe 3D geometry and rendering attributes. OpenGL became the standard for 3D graphics for quite some time, to the point of implementing the specification almost exclusively in hardware.

OpenGL is a C-based specification, dealing with points, lines, and matrices like its predecessor. A typical set of OpenGL instructions looks like:

```
glPushMatrix(GL_MODELVIEW_MATRIX);
glRotatef(10.0, 0.0, 1.0, 0.0);
glBegin(GL_QUAD);
glVertex3f(0.0f, 0.0f, 0.0f);
glVertex3f(0.0f, 1.0f, 0.0f);
...
glEnd();
glPopMatrix();
```

Later came DirectX (or more appropriately, Direct3D), Microsoft's own 3D API. While not as widely accepted by the scientific and engineering industry, it has become successful in the gaming world. DirectX is still a C-based API, though it takes a slightly different approach to optimizing graphic rendering than does OpenGL.

As object-oriented programming became mainstream, people attempted to get away from the procedural approach to 3D graphics and introduced the concept of an object-oriented scenegraph. This is the basis of Java 3D. At the time of this writing, Java 3D is at version 1.3 and easily available for Linux, Windows, and Solaris with varying degrees of support for other platforms. Java 3D provides a platform and rendering language-independent 3D programming API.

Java 3D does not do its own 3D rendering. Rather, it delegates to a native library that uses the system's underlying OpenGL or DirectX capabilities. Only OpenGL is available for Linux or Solaris; however, Windows users have the option of either. By utilizing the OS's rendering capabilities, Java 3D can take full advantage of hardware acceleration without the need for special Java or Java 3D drivers. Likewise, if you don't have hardware acceleration, Java 3D can run happily in a software-emulated (e.g., Mesa) world. It's an optional API that's available as either an SDK or runtime environment and is installed after the Java SDK or JRE.

All the examples presented in this article were written under Linux using the Java 1.4.1 Release Candidate and Java 3D 1.3. They were tested under Mesa software OpenGL and nVidia's hardware-accelerated OpenGL drivers for both Windows and Linux.

As mentioned earlier, the concept of the scenegraph is core to Java 3D. A scenegraph is a directed graph that represents the geometry, material, and lighting, among other things, in your rendering (see Figure 1). The scenegraph starts at the root with a VirtualUniverse and includes transformations and geometries to define the objects in your virtual world. Hanging off the other side of this virtual world is the ViewingPlatform, the

peephole into your scene. Java 3D optimizes, culls, and draws your scenegraph for you. If you make use of Java 3D's Behavior classes it will even move your ViewingPlatform around the scenegraph in response to user navigation keys.

The scenegraph provides an object-oriented abstraction of 3D rendering much like a VRML or Ray Tracing language. Elements of your scenegraph are represented as Shape3Ds, which have Geometries to define their physical shape, MaterialAttributes to define their material, TextureAttributes to define textures, etc. This allows you to define your scene at a much higher level of abstraction than pushing and popping matrices, and encapsulates your geometry and rendering options in their own classes.

In addition to the higher level of abstraction, the scenegraph provides you with immediate scene optimization capabilities. OpenGL and DirectX don't offer any way of doing high-level culling of objects. To cull entire objects from a scene you would need to implement your own BSP-Tree or other geometry-sorting data structure. Java 3D's scenegraph provides culling, possible matrix or geometry combining, and multithreaded rendering with no effort on your part.

Without further ado, let's start with the "Hello World" of 3D graphics, a cube (see Listing 1). (Listings 1-3 can be downloaded from www.sys-con.com/java/sourcec.cfm.) All 3D rendering is done into the AWT widget Canvas3D. Since this is a heavyweight component, you must place it in a Swing container that can handle such components, such as a JFrame, JSplitPanel, etc. It will not behave properly inside a JInternalFrame, for instance. A Canvas3D wants the graphics configuration describing the type of canvas to create. This configuration describes the minimal capabilities that the Canvas3D, and by association the underlying 3D rendering library, must support. For the examples we'll be using a basic 3D environment so we'll use the default capabilities. These can be retrieved using `SimpleUniverse.getPreferredConfiguration()`.

Once the Canvas3D is in place we will create our VirtualUniverse. The VirtualUniverse is the top level of the graphics hierarchy in a Java 3D application. It knows about the Canvas3D it should render into and owns the scenegraph of objects to render. An application may subclass VirtualUniverse to provide custom initialization such as multiple viewing locations on the view side or multiple points of reference (Locales) on the rendering side of the scenegraph. Java 3D comes with a default VirtualUniverse implementation, a SimpleUniverse. The SimpleUniverse is adequate for most simple Java 3D applications and we'll use it here.

The initial viewing configuration places us, the trusty viewer, at 0,0,0 looking down the negative Z axis, +X is right, +Y is up. To place an object in our scenegraph we need to define where it lies in 3D coordinates. We specify location by applying rotations and transformations using Transform3D objects. We will place a cube 50 meters in front of us on the Z axis and rotated 20 degrees around X and Y for effect. A quick warning: a Transform3D is effectively a matrix and may be combined with other Transform3Ds to achieve the desired results. However, Transform3D's methods typically replace the current matrix with new values. For example, if after performing a 20 degree rotation around X, you then perform a 20 degree rotation around Y, you will overwrite (and therefore lose) your X rotation. To achieve both rotations you need to create two Transform3Ds, then combine them by multiplying one by the other. This is demonstrated in lines 33-39 in Listing 1.

Transform3Ds cannot be directly inserted into the scene-

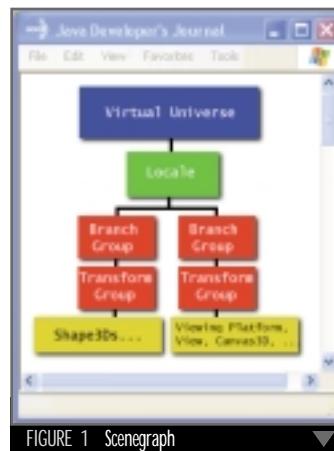


FIGURE 1 Scenegraph

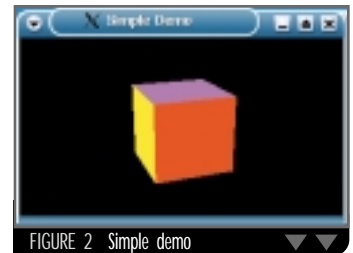


FIGURE 2 Simple demo



FIGURE 3 Material demo

graph; rather they are wrapped in a TransformGroup and the TransformGroup is placed into the scenegraph. The transforms will be evaluated in order beginning with the root of the tree, so we attach the translation group to the scenegraph, then the rotation group to the translation group (translate, then rotate). We now have rotations and translations to get us where we want to be, but nothing to draw.

All objects rendered in a scenegraph are described using Shape3Ds. Shape3Ds contain the geometry, material properties, texturing information, and what Java 3D calls rendering attributes (things such as depth testing, antialiasing, etc.). Shape3Ds may only be inserted once into a scenegraph; however, the geometry and other attributes may be shared between Shape3Ds. Sun provides a convenience class named ColorCube that is a Shape3D with geometry attached defining a cube with six different-colored faces.

As with Transform3Ds, Shape3Ds cannot be inserted directly into the tree. They must be attached to a group, so we attach the cube to the bottom TransformGroup. This entire branch is then attached to a BranchGroup (Java 3D's generic container group). To take advantage of Java 3D's optimization capabilities, you should call `compile()` on any BranchGroup before inserting it into the scenegraph. For a specific list of optimizations Java 3D can perform on a branch, consult the Java 3D documentation. After compiling we attach the branch to our Universe.

Finally, we place the Canvas3D in a JFrame as the center component in a BorderLayout. Run this application and you should see a cube doing its "Blue Steel" pose (see Figure 2).

If all Java 3D could do was render colored cubes, it wouldn't be very impressive. However, Java 3D's scenegraph can contain not only objects to render, but behaviors that manipulate those objects. In Listing 2, lines 55-60 add a MouseRotate behavior to our SimpleDemo.

```
// Create a MouseRotate Behavior
rotationGroup.setCapability(TransformGroup.ALLOW_TRANSFORM_WRITE);
rotationGroup.setCapability(TransformGroup.ALLOW_TRANSFORM_READ);

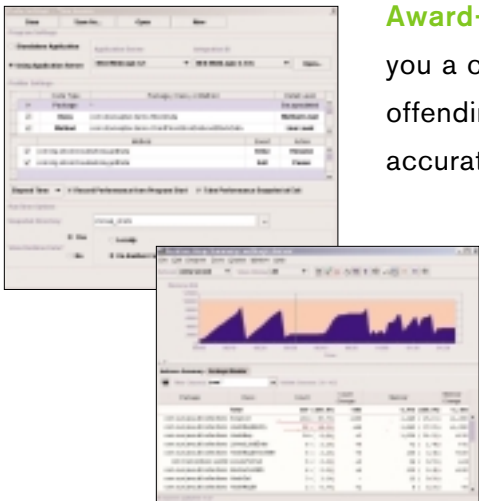
MouseRotate mouseRotate = new MouseRotate(rotationGroup);
mouseRotate.setSchedulingBounds(new BoundingSphere(
    new Point3d(0.0, 0.0, 0.0),
    Double.MAX_VALUE));
branchGroup.addChild(mouseRotate);
```

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Regardless of your 3D API there are some fundamental 3D concepts that are critical to understanding how the system works:

- **Coordinate systems:** 3D graphics are often expressed in terms of coordinate systems, sometimes called local and world coordinate systems. The local coordinate system is just that, local to the object. Think of the crosshairs in a camera's viewfinder. Even if you were standing on your head on a spinning merry-go-round, "up" on the viewfinder will always point to the top of the camera. However, obviously, the nausea you would experience would help you realize that what may be up to the camera is definitely not up in the real world. Up in the real world is the world coordinate system. When dealing with Java 3D and placing objects in the scene, think in terms of local coordinate systems. Without any transformations the object sits at 0,0,0 – in both world and local coordinate systems. When you translate in the +X direction, the object will head to the right. However, if you rotate first, you'll rotate that object's coordinate system. If you rotate 180 degrees around Y, then translate +X, the object will head to the left. Make sure you get your rotation and translation order right!
- **Materials:** "Material" is a rather generic term used to describe how an object in the 3D world looks when exposed to light. Specifically, it includes the reflective properties, color (but only when dealing with a lit environment), and whether or not that object emits its own light.
- **Texture mapping:** Despite sounding like something that should make your sphere feel like a basketball, texture mapping refers to pasting images on your objects. When you texture map an object, you define which part of the image goes where on the object. Like the rest of 3D graphics, textures have their own coordinate system; however, unlike the world and local coordinate systems, texture coordinates run from 0.0 to 1.0, representing the entire image. If you want the left half of the image stretched across one side of your cube, you would use texture coordinates of 0.0 to 0.5. More complex objects like spheres typically use lots of small-step coordinates to map the image more accurately to the surface.

To support dynamic updating of the rotation group we need to tell Java 3D that we will be modifying the matrix values. This prevents the scenegraph from optimizing out our rotations during compilation. Calling `setCapability()` with the constants `TransformGroup.ALLOW_TRANSFORM_WRITE` and `TransformGroup.ALLOW_TRANSFORM_READ` will allow us to modify the transform and update the rendered scene accordingly. Note that these must be done separately; you cannot OR capabilities together. Next, we create a `MouseRotate` behavior passing it the rotation `TransformGroup`. A behavior has the concept of bounds, meaning a spatial area around a point where this behavior is active. For our application we will create a `BoundingSphere` that covers the entire scene. Finally, we add the behavior to the scenegraph. When `BehaviorDemo` is run you can now rotate the cube by clicking in the `Canvas3D` and dragging the mouse. Not bad for five more lines of code.

Java 3D comes with a small collection of behaviors that will do fine for simple applications. However, more complex applications will likely need to provide their own behaviors or extend the included ones. Sun ships `KeyboardNavigation`, `MouseNavigation`, `MouseRotation`, and several `Interpolators` that allow you to rotate or translate objects based on a starting point, end point, and duration. In addition to position manipulation there are sound-based, frame-based, and level of detail-based behaviors you may add to your scenegraph.

The final example demonstrates adding lighting to the scene (see Listing 3). In this example I switched to a sphere, using another of Sun's utility classes. Since we are using a sphere we can eliminate our initial rotations. However, we'll

keep the `MouseRotate` to help show the effects of dynamic lighting. Once the rotations and translations are set up I create two lights, an `AmbientLight` that provides a not-quite-white light over the whole scene, and a directional light that causes the spectral highlights on the sphere. To have the sphere react to the lit environment, we need to define the material properties for the surface. In this case I created a blue sphere, no emission of internal light, blue reflection of external light, and white spectral highlights. The final 128.0 is the shininess factor, and since I am easily distracted by shiny things, this is all the way up. Running this demo gives a blue sphere with a white reflection on the top right (where the `DirectionalLight` hits it) as seen in Figure 3.

While Java 3D is a huge leap forward from OpenGL, it's not all peaches and cream. Fortunately, there are a good number of FAQs and mailing lists out there to help Java 3D developers, and the user community is very responsive. However, here are a few of the common problems encountered with Java 3D.

First is the overall issue of garbage collection. While this can cause slightly annoying pauses in normal applications, it could easily destroy the user's immersive experience using a 3D application. Unfortunately, there's not much I can offer by way of help here, other than to be aware of your memory allocation particularly in behaviors. Java 1.4.1RC actually seems to offer a smoother run of the application than even 1.4.0 did, but given enough memory allocation and release the pauses are noticeable. You've been warned.

Another common FAQ issue involves using Java 3D with Swing components. Java 3D plays nicely with most Swing components as long as you disable the lightweight popup support. Specifically, this almost always needs to be done for tooltips and menus. The following lines of code will handle that:

```
JPopupMenu.setDefaultLightWeightPopupEnabled(false);
ToolTipManager.sharedInstance().setLightWeightPopupEnabled(
false);
```

The final tip relates to Java 3D's multithreaded implementation. It fires off somewhere between four and eight (or more) threads to handle the scenegraph, rendering, behaviors, etc. The plus side is that things scale very well to multiprocessor machines. The downside is that you must be careful to avoid "half-baked" frames being drawn. For example, in an application I was working on we had a texture-mapped polygon with a billboarded text name next to it. These were two separate `Shape3Ds` with a `TransformGroup` between them.

We found out the hard way that Java 3D could manage to render a frame between the time we updated the polygon's new position and corrected the text for the new billboarding rotation. This led to text that would slide along with the polygon then snap back to face the user, lovingly coined "tail-whipping" by a co-worker. Worse yet, this seemed to appear only on faster machines (ones where Java 3D could render that split-second frame before we fixed the billboarding). Issues such as these require you to carefully lay out your scenegraph and be aware that rendering is happening in a separate thread.

Java 3D offers an intuitive and cross-platform 3D API for desktop applications as well as applets. The user community is very active and supportive. For more information, check out <http://java.sun.com/products/java-media/3D>. Mailing list information, FAQs, and community-written utilities are available at www.j3d.org. Finally there are no excuses left for not having 3D time-wasting games for Linux. ☺

AUTHOR BIO

Dan Pilone is a software architect for SFA Inc. He has worked with 3D graphics on numerous simulation and modeling projects. Comments and feedback are very welcome!



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Domains	1	2	5	Unlimited
Email Aliases	2	20	100	Unlimited
Servlet Contexts	1	1	10	Unlimited
Control Panel	✓	✓	✓	✓
FTP	✓	✓	✓	✓
Telnet/SSH		✓	✓	✓
Web Mail	✓	✓	✓	✓
Web Stats		✓	✓	✓
Perl/PHP		✓	✓	✓
Failover			\$27/month	\$25/month
Engine Choices	✓	✓	✓	✓
WAR/EAR	✓	✓	✓	✓
Tomcat	3.x-4.0.3	3.x-4.0.3	3.x-4.1.x	3.x-4.1.x
JBoss	2.4.1	2.4.1	-3.x	-3.x
Cocoon	1.8.x	2.x	2.x	2.x
RMI	✓	✓	✓	✓



JASON R. BRIGGS J2ME EDITOR

The Phone Smarts

Thanks to the nice folks at Metro-works, I finally have a smart phone to play with. As some of you may well be aware, I was suffering from an affliction of round-the-corner-itis that had prevented me from investing in a Java phone. However, when one is provided for you, this unfortunately common ailment is neatly bypassed. And so, shortly after Christmas, while my stomach was still painfully distended from consuming too many servings of turkey, cranberry sauce, roast potatoes, and Christmas pud, a Sony Ericsson P800 duly arrived on my doorstep.

In the best tradition of judging a book by its cover, I was expecting the P800 to be somewhat larger than a minivan and barely smaller than the space shuttle, thanks to the pictures I'd seen of it online (and a genetic aversion to reading the specs properly). I was refreshingly surprised to find that it fit quite neatly in the palm of my hand, and doesn't result in really annoying variations of "Is that a canoe in your pocket or are you just glad to see me?" when you walk around with it shoved in your pants pocket.

There's not enough space here for a proper review (forthcoming), but I do have a few initial thoughts and niggles. The P800 has good Java support (CLDC/MIDP and PersonalJava), as might be expected from a smart phone, but some "interesting" decisions have been made with regard to the user interface.

With the keypad open, the P800 functions more as a PDA, and with it closed it works as a phone – with an interface that will be familiar to users of other Sony mobile phones. Strangely though, there doesn't appear to be a way to run a MIDlet with the keypad closed. In other words, you have to be in PDA mode, which to me is an entirely nonintuitive and rather per-

verse way of doing things.

Logically, you would expect to use a MIDlet in phone mode (keypad closed) and a PersonalJava app in PDA mode. Still, I am using a precommercial-release phone, so perhaps some of these minor problems (light-blue screen of not-quite-death, anyone?) will have been resolved by the time the phones arrive in the shops.

Niggles aside, it's a relatively comfortable phone to use, and even the nontechnies I've handed it to have managed to find their way around the interface without too many difficulties, which is a testament to the simplicity of the Symbian operating system it's running.

Of course, there's nothing like experimenting with a device to make you think about how it could be better. There's one feature that I wish the P800 had – or that smart phones might have in the future – unlimited (or as close as possible) storage. You'll be thinking this is an odd feature to be asking for in a mobile phone. However, there are various mediums available, or forthcoming, that have staggering amounts of storage space for a not-too-exorbitant amount of money (StorCard's 5GB on a credit card is a good example). So I want my smart phone to have a slot that takes whichever one of those mediums takes up the least space and provides the most bang for the buck.

Why do I want all that space in my mobile phone? Call it an aversion to carrying a laptop around – I want to sync all my files (documents, pictures, music, whatever) onto the phone and cart it around with me instead. Give me a few gigs at least, so I can rip my CD collection (which I'm sure some music industry execs are going to be annoyed at), carry around every document I've ever worked on...I'll even carry the Java APIs around with me for a quick and easy reference. ☘

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AUTHOR BIO

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

The Phone Smarts

Thanks to the nice folks at Metroworks, I finally have a smart phone to play with. As some of you may well be aware, I was suffering from an affliction of round-the-corner-itis that had prevented me from investing in a Java phone. However, when one is provided for you, this unfortunately common ailment is neatly bypassed.

by Jason R. Briggs

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The Great J2ME API Rundown

Some of the more commonly asked questions on the various forums for J2ME seem to be "What is J2ME?" and "Is <so-and-so-product> a part of J2ME?" Here is where you will find all the APIs that fall beneath J2ME's umbrella, and the packages you will find within those APIs.

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Wireless Java Security

The need for wireless security is often motivated by the image of a teenage hacker driving by and stealing your data with a mobile scanner. While such sensationalist ideas make good copy, the simple fact is that, wireless or not, serious business applications do not get deployed on the Internet today without security. So if you are thinking of using your cell phone for something other than playing Tetris or downloading the latest Britney Spears ringtone, you'll need to give some thought to how you might secure access to your business applications.

by Dean Povey

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Some of the more commonly asked questions on the various forums for J2ME seem to be "What is J2ME?" and "Is <so-and-so-product> a part of J2ME?" Here is where you will find all the APIs that fall beneath J2ME's umbrella, and the packages you will find within those APIs.

CONNECTED, LIMITED DEVICE CONFIGURATION (CLDC) – VERSION 1.0

CLDC contains the following packages:

java.io – input and output through data streams
java.lang – fundamental classes
java.util – collections, data and time facilities, other utilities
javax.microedition.io – generic connections classes

You can find more information on CLDC at <http://java.sun.com/products/cldc>

MOBILE MEDIA (CLDC OPTIONAL PACKAGE) – VERSION 1.0

Mobile Media contains the following packages:

javax.microedition.media – interfaces and Manager class for obtaining resources
javax.microedition.media.control – specific control types to use with players
javax.microedition.media.protocol – protocol handling types

More information can be found at <http://jcp.org/aboutJava/communityprocess/final/jsr135>

WIRELESS MESSAGING API (CLDC OPTIONAL PACKAGE)

javax.microedition.io – modified for messaging use
javax.wireless.messaging – send and receive support, message types

You can find more details here: <http://java.sun.com/j2me/docs/pdf/WMA-RI.pdf>

BLUETOOTH API (CLDC OPTIONAL PACKAGE) – VERSION 1.0

The BTAPl contains the following:

javax.bluetooth – discovery, connection, remote and local devices, etc.
javax.obex – authentication, obex support, etc

More information can be found at the Motorola site: <http://e-www.motorola.com/webapp/sps/site/taxonomy.jsp?nodeId=03M0ym4sDZxM0zZ6m1Y6>

CONNECTED DEVICE CONFIGURATION (CDC) – VERSION 1.0

CDC contains the following packages:

java.io – input and output
java.lang – fundamental classes
java.lang.ref – reference object classes
java.lang.reflect – reflective information about classes
java.math – BigInteger support
java.net – networking support
java.security – security framework
java.security.cert – parsing and management of certificates
java.text – used for handling text, dates, numbers, and messages
java.text.resources – contains a base class for locale elements
java.util – collections, date/time, miscellaneous functions
java.util.jar – reading JAR files
java.util.zip – reading Zip files
javax.microedition.io – connections classes

Look for more CDC information at <http://java.sun.com/products/cdc>

J2ME RMI (OPTIONAL PACKAGE) – VERSION 1.0

RMIOP contains the following:

java.rmi – RMI root package (remote interface, naming, etc.)
java.rmi.activation – support for RMI activation
java.rmi.dgc – distributed garbage collection
java.rmi.registry – a class to locate the registry and an interface to refer to it
java.rmi.server – support for the unicast server

Find more information here: www.sun.com/software/communitysource/j2me/rmiop/index.html

MOBILE INFORMATION DEVICE PROFILE – VERSION 1.0

MIDP builds on CLDC and contains the following packages:

java.io
java.lang – CLDC, plus an additional exception
java.util – CLDC, plus timer facilities
javax.microedition.io – networking support based upon the CLDC framework
javax.microedition.lcdui – for user interfaces for MIDP applications
javax.microedition.rms – persistent data storage
javax.microedition.midlet – defines applications and interactions between app and environment

The products page for MIDP is at <http://java.sun.com/products/midp>

MOBILE INFORMATION DEVICE PROFILE – VERSION 2.0

MIDP2, the next generation of the MID profile, contains the following packages:

java.lang – see MIDP1.0
java.util – some changes from MIDP1.0
javax.microedition.io – some changes from MIDP1.0
javax.microedition.lcdui – some changes from MIDP1.0
javax.microedition.lcdui.game – support for gaming content
javax.microedition.media – a building block for the Mobile Media API
javax.microedition.media.control – control types that can be used with a player
javax.microedition.midlet – see MIDP1.0
javax.microedition.pki – support for secure connections (X.509)
javax.microedition.rms – some changes from MIDP1.0 (record sharing)

FOUNDATION PROFILE – VERSION 1.0

The Foundation Profile builds on CDC and contains the following packages:

java.io – see CDC
java.lang – see CDC
java.lang.ref – see CDC
java.lang.reflect – see CDC
java.math – see CDC
java.net – see CDC
java.security – see CDC
java.security.cert – see CDC
java.security.acl – access control lists
java.security.interfaces – interfaces for generating keys
java.security.spec – key specifications and algorithm parameter specifications
java.text – see CDC
java.text.resources – see CDC
java.util – see CDC
java.util.jar – see CDC
java.util.zip – see CDC
javax.microedition.io – see CDC

The profile products page is at <http://java.sun.com/products/foundation>

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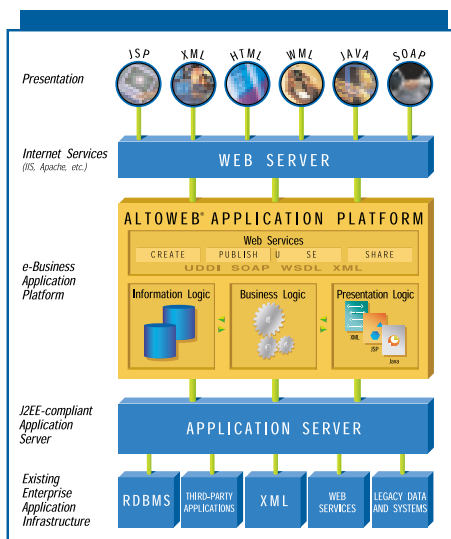
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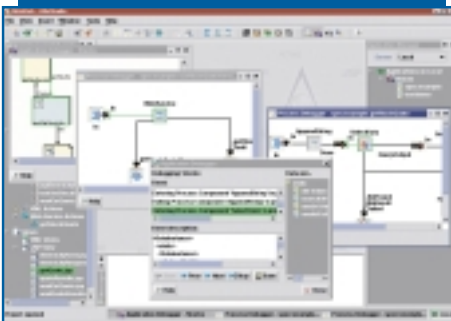
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**PERSONALJAVA SPECIFICATION – VERSION 1.2A**

PersonalJava will eventually be superseded by the Personal Profile on devices, but for now the specification contains the following packages:

java.applet – full support from JDK1.1.8

java.awt – modified from JDK1.1.8

**Note: There is an extra method for PJ for double-buffering in*

java.awt.Component

java.awt.datatransfer – full support

java.awt.event – full support

java.awt.image – full support

java.awt.peer – modified

java.beans – full support

java.io – modified

java.lang – modified

java.lang.reflect – modified

java.math optional – may or may not be supported

java.net – modified

java.rmi – optional

java.rmi.dgc – optional

java.rmi.registry – optional

java.rmi.server – optional

java.security – modified

java.security.acl – unsupported

java.security.cert – some classes required, some optional

java.security.interfaces – required if code signing is included

java.security.spec – required if code signing is included

java.sql – optional

java.text – full support

java.text.resources – modified

java.util – modified

java.util.jar – required if code signing is included

java.util.zip – modified

Additional PersonalJava specific packages are:

com.sun.awt – for mouseless environments

com.sun.lang – a couple of error and exception classes

com.sun.util – for handling timer events

For more information on the PersonalJava Application Environment see <http://java.sun.com/products/personaljava>

PERSONAL PROFILE – VERSION 1.0

The Personal Profile contains:

java.applet – applet and applet context

java.awt.color – color spaces

java.awt.event – event handling for the AWT

java.awt.datatransfer – used to transfer data between applications

java.awt.image – classes to create and modify images

java.beans – JavaBeans support

java.io

java.lang

java.lang.ref

java.lang.reflect

java.math

java.net

java.rmi

java.rmi.registry

java.security

java.security.acl

java.security.cert

java.security.interfaces

java.security.spec

java.text

java.util

java.util.jar

java.util.zip

javax.microedition.io – the generic collections classes

javax.microedition.xlet – interfaces used for app/app manager communications

javax.microedition.xlet.icx – inter xlet communications

See the following page for more info:

<http://java.sun.com/products/personalprofile>

PERSONAL BASIS PROFILE – VERSION 1.0

Has a similar package list to the Personal Profile, however, there are no java.applet or java.awt.datatransfer packages.

The Personal Basic Profile page is at <http://java.sun.com/products/personalbasis>

JAVA TV – VERSION 1.0

Java TV contains the following packages (in addition to PersonalJava):

javax.tv.carousel – access to broadcast file and directory data

javax.tv.graphics – root container access and alpha blending

javax.tv.locator – referencing data and resources

javax.tv.media – controls and events for management of real-time media

javax.tv.media.protocol – access to generic streaming data in a broadcast

javax.tv.net – IP datagram access

javax.tv.service – service information access

javax.tv.service.guide – supporting electronic program guides

javax.tv.service.navigation – services and hierarchical service information navigation

javax.tv.service.selection – select a service for presentation

javax.tv.service.transport – information about transport mechanisms

javax.tv.util – creating and managing timer events

javax.tv.xlet – communications interfaces used by apps and the app manager

Get off that couch and check out the JavaTV page at

<http://java.sun.com/products/javatv>

JAVA EMBEDDED SERVER – VERSION 2.0

JES contains the following packages:

com.sun.jes.service.http – servlet/resource registrations

com.sun.jes.http – basic authentication

service.http.auth.basic – management of users and their access

com.sun.jes.service.timer – for handling timer events

org.osgi.framework – consistent model for app. dev., supports dev. and use of services

org.osgi.service.device – detection of devices

org.osgi.service.http – http access of resources

org.osgi.service.log – logging facility

You can find more information on the Java Embedded Server at www.sun.com/software/embeddedserver

JAVA CARD – VERSION 2.2

Java Card contains the following packages:

java.io – a subset of the standard java.io package

java.lang – fundamental classes

javacard.framework – classes for the construction, comms, etc., for JavaCard applets

javacard.framework.service – aggregating service components

javacard.security – security framework

javacardx.crypto – extension package with security classes and interfaces

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Wireless Java Security

written by Dean Povey

u n d e r s t a n d i n g t h e i s s u e s

The need for wireless security is often motivated by the image of a teenage hacker driving by and stealing your data with a mobile scanner. While such sensationalist ideas make good copy, the simple fact is that, wireless or not, serious business applications do not get deployed on the Internet today without security. So if you are thinking of using your cell phone for something other than playing Tetris or downloading the latest Britney Spears ringtone, you'll need to give some thought to how you might secure access to your business applications.

What Is Security?

When we speak of "secure communications," what do we actually mean? Essentially, we are trying to ensure that data sent across these connections has the following properties:

- **Confidentiality:** Only the legitimate sender and receivers can obtain the content of a message sent across the connection.
- **Integrity:** The receivers are assured that messages are not modified in transit.
- **Authentication:** The sender of the message is who the receivers expect it to be (and/or vice versa).

These properties are usually achieved through a combination of various cryptographic techniques. While the details of these aren't terribly important for our purposes, it is useful to divide these techniques into two categories:

1. **Symmetric key cryptosystems:** Both the sender and receiver share the same keys.
2. **Public key cryptosystems:** The sender and receiver each have different keys (one called the public key and the other the private key).

Public key cryptosystems are extremely useful for Internet

applications; unlike symmetric key systems they can be used to establish secure communications without requiring any prior relationship between the sender and receiver. However, they have a significant drawback – one that is particularly problematic for constrained devices such as cell phones – they require large amounts of computational power. This is a severe limitation on constrained platforms such as cell phones. To save on the cost and to increase the battery life of the device, CPU power is deliberately limited. This means that public key cryptography is typically only used to establish the initial connection (which can take anywhere from a few seconds to minutes on a low-powered device), and subsequent communication is secured using considerably faster symmetric key techniques.

An important concept provided by public key cryptography is a digital signature. It uses a private key to authenticate data in such a way that it can be verified by anyone with access to the public key. If only one user has access to the private key, this can be used to authenticate that user and also provide integrity protection of the signed data.

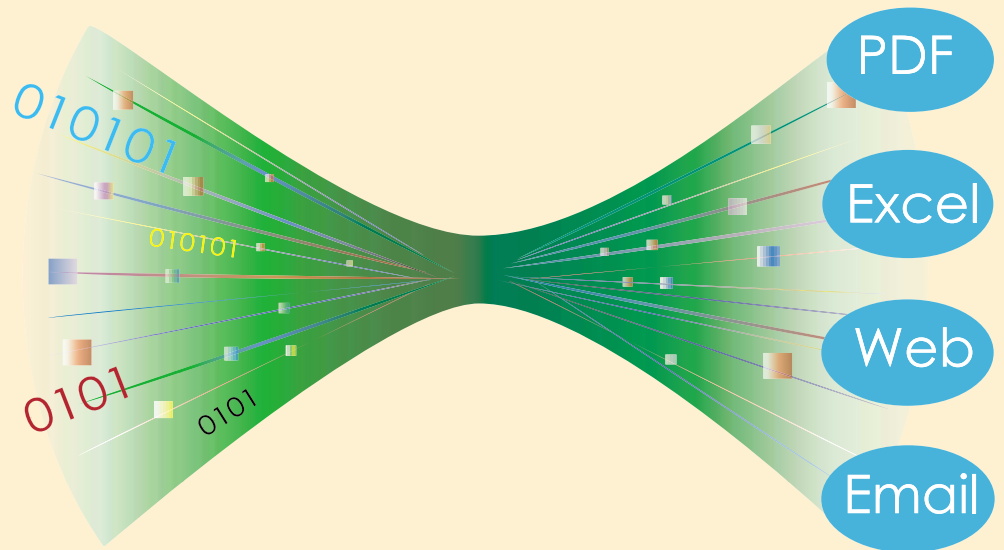
A final point to make about public key cryptosystems is that they require a mechanism to distribute public keys securely to users. This is done by using a certificate that contains the public key and is digitally signed by a third party called a Certification Authority whose public keys are known. Certificates can also be used to authenticate other certificates so they can be chained together back to a trusted root certificate.

Secure Sockets Layer

SSL is a protocol that is typically used in Internet applications to provide the three security "properties" for higher-level TCP/IP protocols such as HTTP. It consists of a handshake protocol that allows a client to negotiate security parameters and authenticate and exchange symmetric keys with a server, and a record protocol that can use these negotiated keys and parameters to encrypt data. A combination of public and symmetric key encryption is used to achieve the confidentiality, integrity, and authentication properties of the SSL connection. The particular combination of algorithms used is referred to as the ciphersuite. SSL supports a number of different algorithms including the RSA public key algorithm, MD5 and SHA-1 digest algorithms, and the RC4 and DES symmetric key algorithms.

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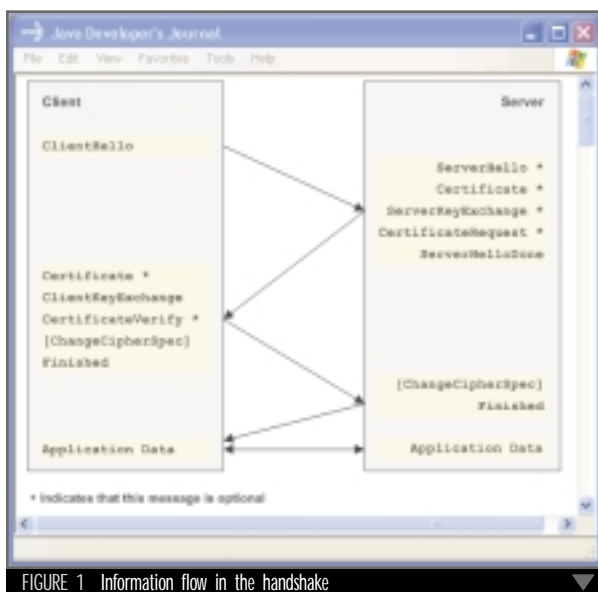


FIGURE 1 Information flow in the handshake

Handshake

The most important part of the SSL protocol is the handshake. It's used to authenticate the peers and establish a set of symmetric keys for encrypting data using the record protocol. Figure 1 shows the flow of information in the handshake and a simplified explanation of the protocol follows:

- **ClientHello:** This message is sent by the client to say "I want to start talking." It lists the ciphersuites that the client wishes to use along with some random values and other information that will be used later to generate keys.
- **ServerHello:** This message is sent by the server to say, "Okay, let's talk." The server selects a ciphersuite from one of the ones presented by the client, and tells the client the session ID to use to identify the session.
- **Certificate:** This message can be sent by either the client or server, and contains the list of certificates that should be used to authenticate the sender. While the Certificate message is optional, in practice the server nearly always sends it; it's rarely sent by the client.
- **ServerKeyExchange:** Certain public key algorithms can be used for both authentication and key exchange (e.g., RSA), while others can be used only for authentication (DSA, ECDSA) or key exchange (Diffie-Hellman). This message is sent in the latter case where information other than the server public key is needed to complete the handshake.
- **CertificateRequest:** SSL can authenticate either the server or client. Server authentication is usually performed by default, but client authentication using public key cryptography is optional and is not often used in practice. If the server wishes the client to authenticate itself using public keys, it will indicate this by sending a CertificateRequest message, and the client will respond with a Certificate message.
- **ClientKeyExchange:** This message is always sent by the client. It contains key material that will be used later to create a number of symmetric keys, encrypted using the public key of the server (or for certain algorithms such as Diffie-Hellman, this will be a public value that is combined with the server's public value to generate these keys). If the RSA algorithm is being used, this also serves to authenticate the server, as the server will only be able to decrypt this message if they have the correct private key.
- **CertificateVerify:** This message is sent by the client if the server requested client authentication.
- **ChangeCipherSpec:** Strictly, speaking this message is not

part of the handshake protocol, but is its own protocol. The ChangeCipherSpec message is sent by both client and server to indicate to the receiver that the following messages will be encrypted using the negotiated keys.

- **Finished:** This is the last message in the handshake, sent immediately after the ChangeCipherSpec message by both client and server, and is used to verify that the keys were exchanged correctly and to ensure the integrity of the message sent during the handshake. It is encrypted using the negotiated keys.

HTTPS

While SSL provides a generic protocol for secure communication over TCP/IP, it is also commonly used to secure HTTP connections for Web browsers. The HTTPS protocol is simply the HTTP protocol performed over an SSL connection. Apart from some additional mechanisms to handle proxying of secure requests, the HTTPS protocol is identical to HTTP, only using SSL rather than raw TCP/IP as a transport and using the default port of 443, rather than 80.

A Secure Wireless E-Mail Application

That's all very interesting, but what does it mean for developers looking to deploy secure applications on J2ME MIDP platforms? To demonstrate how to use HTTPS we will look at a simple e-mail application that can connect to a Web server to retrieve e-mail headers and messages, allowing mobile users to browse their e-mail from their cell phone. HTTPS is a good choice for this application, as the infrastructure to support it is easily available, and we can quickly build the back end out of existing components without having to write much code (for this example it took approximately half a day to set up the back end starting from building the Web server source). Using this example, I'll demonstrate the basic concepts of using the `javax.microedition.io.Connection` interface to make an HTTPS connection to a server, show how you can authenticate the client using the standard HTTP Authentication mechanism, and then provide a sample MIDlet that can be used to seed the random number generator.

SSL vs TLS

Netscape originally developed the SSL protocol for use in their Web browser. They released two different versions in their products: SSLv2 and SSLv3. When the Internet Engineering Task Force (IETF) was looking to develop a new standard for security for Internet applications, it chose to base this protocol on SSL, but confusingly called the new protocol Transport Layer Security (TLS) and gave it the v1 version number. Despite this, the differences between SSLv3 and TLSv1 are fairly small, and I use SSL in this article to mean either SSL or TLS.

The Basic Application

Our basic application consists of a simple `javax.microedition.lcdui` GUI that allows the user to authenticate and select folders and messages to browse. Figure 2 shows the `lcdui` GUI for a wireless e-mail client example.

The back end is implemented as a simple CGI script that responds to commands and formats messages accordingly. Most of the processing is handled by the back end, with the client only being responsible for retrieving the data and presenting it to the user. To do this, a MIDlet invokes methods of the interface provided in Listing 1. (Listings 1-7 can be downloaded from www.sys-con.com/java/sourcecode/cfm.)

The back end for each method is a simple GET operation over HTTPS. This means that each method may be implemented simply using the standard `Connector.open` mechanism in MIDP. Listing 2 shows how the `getMessage` method can be

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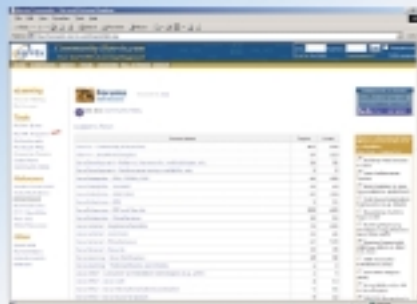
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implemented.

That's pretty much all that's required to do a simple data retrieval over HTTPS. Seems easy doesn't it? A couple of things to note about the code:

- We call `Connector.open` passing an HTTPS URL. This works only if the MIDP implementation has support for HTTPS. For MIDP 1.0 applications this is not guaranteed; however, HTTPS is supported in the Sun reference implementation using kSSL, and in the IBM J9 MIDP platform using Wedgetail Communications' JCSI ME SSL toolkit. The recently released MIDP 2.0 specification describes a standard interface for HTTPS; however, the reference implementation was not available at the time of writing.
- The result of the `Connector.open` method is an extension of the `Connection` interface. In this case we narrow it down to an instance of the `HttpConnection` interface. For MIDP 2.0 applications we could narrow the result to an instance of the new `HttpsConnection` interface. This provides a single extra method to allow access to security information about the connection, such as the negotiated ciphersuites, the SSL/TLS version, and the server certificate.
- Creating the `HttpConnection` instance in this code does not actually cause the connection. This only happens once the `getResponseCode` method is called. At this point the SSL handshake will be started, and when complete, the HTTP GET request will be sent to the server and the result retrieved. When we call `openInputStream` on the connection, we are sent an `InputStream` that contains the data returned from the HTTP request. In this case it's the text of the e-mail message we requested. The remaining code simply breaks the input up into an array of strings – one for each line.

Authenticating the Client

While this example seems simple, we're still missing a number of things that are needed to make a secure application. Most important is the fact that the standard `Connector.open` call does not provide any way of authenticating the client. Only the server is authenticated in this scenario.

Currently, while SSL supports client authentication using certificates, neither kSSL nor JCSI ME SSL support it. Furthermore, the new standard `HttpsConnection` interface has no provision for client authentication. This is somewhat understandable, as client authentication requires more messages to be exchanged in the handshake and more CPU power for an already expensive operation. Instead, we'll have to fall back on good old username/password authentication for this application. Fortunately, HTTP already has a basic authentication mechanism that is suitable for our purposes, but is a little tricky to implement.

When an HTTP server wishes to request authentication for access to a specific resource, it responds with a "401 Authorization Required" response. The response contains a "WWW-Authenticate" header field, which describes the authentication method requested. If the authentication method

"Fortunately, HTTP already has a basic authentication mechanism that is suitable for our purposes"

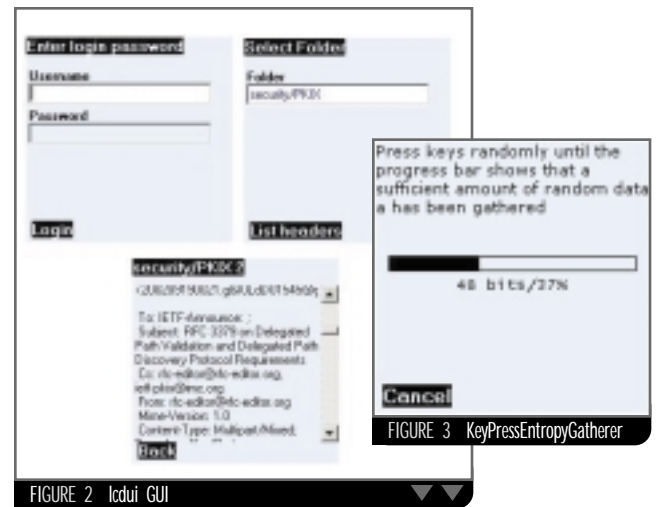


FIGURE 2 Icdul GUI

requested is of type "Basic," it also includes a string describing the realm for which the authentication should take place.

The client can then prompt the user for a username and password and resubmit the request using the Authorization request header, as follows:

```
Authorization: Basic <encoded username and password>
```

Where the encoded value consists of the username and password concatenated as follows:

```
username:password
```

and then encoded using the Base64 encoding method.

Implementing the HTTP BasicAuthentication Scheme

The following example shows how we can use Basic authentication to authenticate the user in our application. Because we want to limit the amount of data to send, we're going to prompt for the username and password before we connect, and then perform a simple login command over HTTPS to ensure that the password works.

First we'll have to create a simple utility method to perform the Base64 encoding (see Listing 3).

Next we'll have to take the username and password and do the encoding. To do this, we'll implement the login method described in Listing 1 (see Listing 4).

Because we'll want to use the same authenticator each time we make an HTTPS request, we'll create a simple utility method to perform the connection, and then call this from the login, getHeaders, and getEmailMsg methods (see Listing 5).

Now, the login method can call `doCommand("?cmd=login")` to attempt to log in. If successful, all the other methods of the EmailBackend implementation can also call this same `doCommand` method to get their data, and their requests will be authenticated.

Now we have an application that can not only do secure data transfer over HTTPS, but also ensures that the client is authenticated using a username and password. Surely our work here is done?

Seeding the Random Number Generator

A critical part of the SSL handshake is the generation and exchange of a set of symmetric keys for subsequent communications. Because these keys are generated randomly by the client, the MIDP SSL implementation requires a source of high-quality entropy (randomness or unguessability). If the generated keys are not sufficiently random, it is possible that

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an attacker will be able to guess enough of the material that they can recover the keys and break the security of the connection. The importance of this simple step cannot be stressed enough, and it is often overlooked in implementations of security protocols. This attack was practically demonstrated on an early version of the Netscape browser, which used simple sources of randomness such as the time and the process IDs of the application to seed the random number generator.

The MIDP specification assumes that the seeding of random number generators is taken care of in a meaningful way by the implementation. Unfortunately, Sun's current reference implementation does not do an adequate job and simply mixes in the current time in milliseconds. While it provides extra methods to supply seed to the random number generator, this functionality can't be accessed through the `com.sun.kssl` classes. This means that the reference implementation as it currently stands should not be used for production applications that require security.

If the MIDP SSL implementation does not provide a good source of entropy, it's possible that it may provide application-specific methods to seed the random number generator. To demonstrate how to generate random data when you don't have access to a good hardware source, we'll write a simple MIDlet that requires users to enter some random keys on their numeric keypad and use the timing information between presses. Even if a particular MIDP application does provide a good source of entropy, this MIDlet will still be useful for secure applications that are not using SSL or HTTPS (such as secure e-mail), as there is no interface in either MIDP 1.0 or MIDP 2.0 to gain access to the random entropy source in use.

KeyPressEntropyGatherer Class

One simple way to gather random data from a mobile device that has no guaranteed access to a good hardware

source of entropy is to get the user to press keys randomly and measure the intervals between these key presses. This yields a small but sufficient amount of entropy (provided we gather enough key presses) that can be used to seed the random number generator. Listing 6 demonstrates how this can be achieved in MIDP using the `keyPressed` method of the `javax.microedition.lcdui.Canvas` class.

The crux of this code is the `keyPressed` method, which is invoked each time a key is pressed. If the interval between the last key press and this one is nonzero, then the low order, 8 bits of the interval, is saved to a `ByteArrayOutputStream`. The code also updates a counter of the amount of gathered entropy. This number largely depends on the estimate given for the randomness of the key interval data (here I have arbitrarily chosen 4 bits, so that at least half of the data we save is considered unguessable). The number you use in your application depends largely on the specific distribution of the key-press intervals. For some devices that have low resolution timers or where the key polling interval is long, the entropy estimate may need to be less. While I have chosen to gather information from key presses here, on some MIDP devices you can also obtain information from the various pointer events. This can be done in a similar fashion to the code for `keyPressed` in Listing 6.

The constructor for this class takes the minimum amount of entropy required and a `javax.microedition.lcdui.Command` object. Once the minimum amount of entropy is gathered, the passed-in `Command` object is added to the list of `Commands` for the `KeyPressEntropyGatherer` object. The handler for this command can then invoke the `getEntropy` method to retrieve the gathered data (see the `SeedRngMIDlet` in Listing 7).

In this example, I have omitted an implementation of the `paint` method, which can be used to give visual feedback to users about what is happening when they enter key presses. For this example, a simple `lcdui` GUI displaying a progress bar and giving the amount of entropy gathered was used. Figure 3 shows the `KeyPressEntropyGatherer` as displayed in IBM's WebSphere Studio Device Developer.

Random Number Seeding MIDlet

Now we have a mechanism that allows us to gather entropy in a cross-platform way; I'll demonstrate how this can be integrated into a particular MIDP implementation. Listing 7 shows how to write a MIDlet that does this for Wedgetail's JCSI ME SSL. This toolkit stores the seed in a special RMS store "jcsiSSL_seed". We can use the `KeyPressEntropyGatherer` class described earlier to gather randomness from the user and concatenate this with any existing seed material.

Summary

Security is an oft-neglected part of developing applications, so it's important to make sure you have a good understanding of the issues before embarking on an adventure in the world of Java wireless. While the HTTPS protocol is not supported by default in MIDP 1.0, implementations do exist, and the MIDP 2.0 specification defines a standard interface for HTTPS that can be used to develop applications.

Despite this fact, care must be taken to ensure that your application has access to a good source of random data or else all your secure programming will account for nothing. One mechanism is to provide a source of random entropy using the `SeedRngMIDlet` in Listing 7, but your success will depend largely on whether the HTTPS implementation for your MIDP platform supports this. So get to it, and maybe you can show those teenage hackers a thing or two! ☛



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Dean Povey is a technical analyst with Wedgetail Communications. He has spent the past six years working with information security and has published several papers in the fields of distributed systems security, access control, and PKI. He coauthored the PKI and cryptographic toolkits Oscar and uPKI, and has contributed to both Australian and International standards in security.

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We work in the IT services department of a large insurance company and were asked to rewrite an old PC-based finance application using a Web-based Java solution. The project development team's background was based on mainframe technologies with some client/server and Web experience (HTML, ASP, basic Java, and JSP).

Our first attempt to build a different server-side Java application ended in frustration and an ungainly heap of code. Java scriptlets intermingled with HTML meant that organizing the JSP assets was cumbersome and Java debugging almost impossible. Furthermore, we couldn't believe that we were developing in a "modern development environment" without visual tools! There had to be a better way...

Salmon LLC, a New York-based consulting company, had recently completed a project for us using SOFIA (the Salmon Open Framework for Internet Applications). SOFIA, now available as open-source software, seemed to address some of our concerns regarding separation of code and gave us a visual environment to develop in.

What Is SOFIA?

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

SOFIA integrates with Macromedia's Dreamweaver so that visual portions of an application can be "painted" instead of hand-coded. SOFIA also provides code generators for many nonvisual tasks such as database access and event handling. Finally, SOFIA integrates these tools, along with J2EE servers (Apache Tomcat, BEA WebLogic, IBM WebSphere), into best-of-breed integrated development environments (IntelliJ IDEA and Eclipse).

SOFIA's goal is to improve programmer productivity while avoiding vendor lock-in. It does a good job of meeting its stated goals. SOFIA integrates the products from several different vendors into a cohesive development environment. The various tools supported by SOFIA can be swapped out to suit individual

tastes and needs as well as any budget considerations. For this project we used Eclipse 2.0, Dreamweaver MX, and Tomcat 4.0.3 on MS Windows 2000 accessing a mainframe DB2 database.

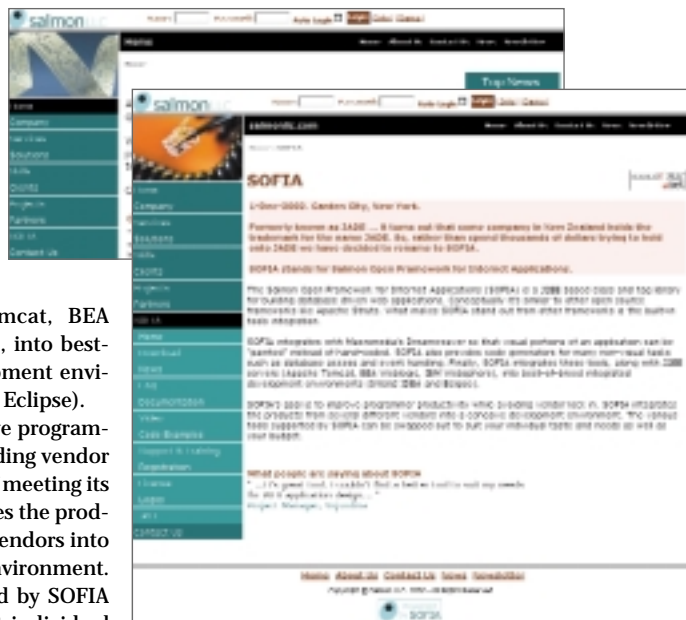
Dreamweaver has been extended to provide the ability to "paint" screens using SOFIA's drag-and-drop components so results can be seen in real time. The Dreamweaver integration provides a lot of power and enhances productivity. For developers using Unix or Linux, Dreamweaver is currently not available – a text editor would be needed to edit the JSPs. However, deploying finished applications to these operating systems should be fine.

Installing SOFIA

SOFIA is unusual in that it helps combine tools from a number of vendors. Some of the tools are open source, such as Eclipse, Tomcat, and the MySQL database engine, while others are commercial products, such as Macromedia's Dreamweaver and IntelliJ's IDEA. This can make the installation somewhat time-consuming since the commercial tools must be downloaded from the different vendors' Web sites and installed individually prior to launching the SOFIA installation program. However, once that's done, the menu-driven installation program ties the many pieces together automatically.

Features

SOFIA is architected around the MVC design pattern to cleanly separate the business logic from the user interface. This leads to easier code maintainability. Unlike some frameworks that require the developer to



write tedious code to integrate the various MVC components, SOFIA automates this process so that no application code is required to move the data from form fields on the browser page to server-side model components. SOFIA also provides a persistence framework so that getting the data from the models into the database can be accomplished with only a few lines of code. SOFIA handles all the underlying “plumbing” required to achieve these tasks transparently. We did not have to be concerned with form submission logic, embedding Java in-line in a JSP, or writing a lot of JavaScript. This, in turn, allowed us to focus on the business logic.

SOFIA provides a palette of over 50 GUI components implemented as a JSP custom tag library. There are simple components that provide support for form fields and more complex components such as trees, navigation bars, and data grids. This in and of itself is a very powerful feature, but it is the Dreamweaver integration that really breathes life into SOFIA (see Figure 1). There are SOFIA extensions for Dreamweaver to

support the SOFIA tag library in much the same way it handles standard HTML tags. This, in effect, creates a GUI development environment for JSPs similar to Visual Basic or PowerBuilder.

The SOFIA custom tag library enables a developer to create a static rendition of the page, which can be made dynamic through the use of controllers. With SOFIA, Java code is placed in the controller and a separate class is edited in the IDE, rather than in the GUI tool. SOFIA allows GUI runtime dynamic manipulation through the Java code in the controller and so requires no in-line code in the JSP. This separation allows for easy debugging, so we didn’t have to step through the machine-generated servlets to locate a problem in our page.

To further simplify some of the coding tasks, SOFIA provides functionality directly from the IDE toolbars to generate the code for models, controllers, and forms. For instance, a model can be automatically generated by simply choosing the database tables and columns required (see Figure 2).

When it’s time to test the application, the IDE integration will automatically redeploy code changes to the Tomcat application server and launch the browser so that results may be verified with a minimum number of clicks.

Conclusion

The Salmon Open Framework for Internet Applications enabled us to build and deploy a server-side Java application in a short amount of time. We found the framework easy to use and understand. Salmon LLC provided excellent documentation, examples, and support to help us get our project started. With integration and support for tools such as Dreamweaver to create the view and Eclipse to develop the model and controller, SOFIA makes for a productive visual development environment. To us the most valuable feature of SOFIA resides in its handling of all the tedious plumbing associated with developing business applications, thus enabling us to concentrate our efforts on satisfying the business requirements. ☛

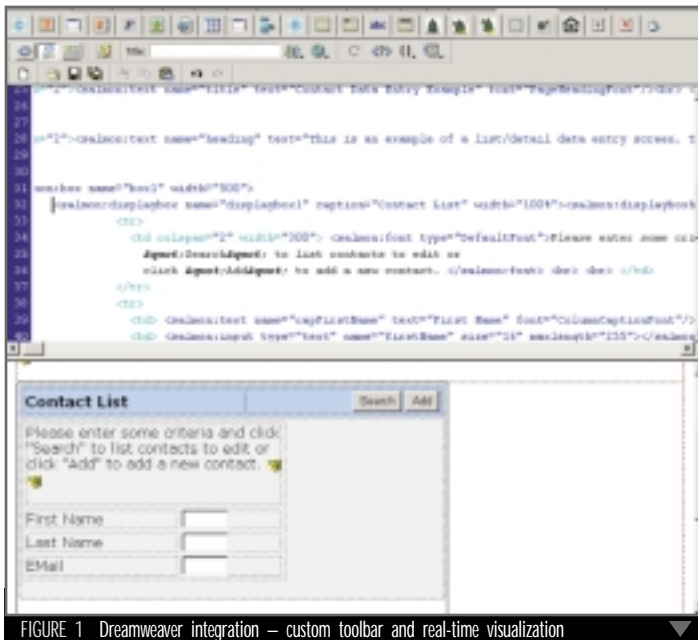


FIGURE 1 Dreamweaver integration – custom toolbar and real-time visualization

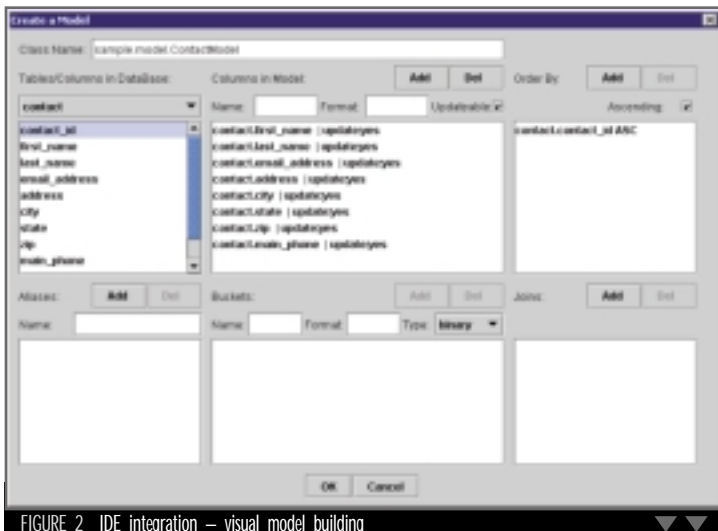


FIGURE 2 IDE integration – visual model building

Product Snapshot

Target Audience: Java programmers, Web designers

Level: Intermediate to advanced

Pros:

- Extensive custom tag library
- IDE integration (Eclipse 2.0 and IntelliJ’s IDEA 2.5.2, 2.6, 3.0)
- Dreamweaver integration

Cons:

- Complex install process

► **Lufthansa/South African Airways Upgrade to Java-Based Developer Tool** (Southlake, TX) – Sabre Holdings Corporation has announced that South African Airways and Lufthansa German Airlines have selected the new Java-based Sabre Qik Developer Tool as a key component of their next generation of customer service tools.

The Java-based Qik Developer Tool, a reservations and airport development solution, allows companies to create user-friendly interfaces, improving the ability of reservations and airport personnel to service customers.

www.sabre.com

► **Motorola/FID Bring Multimedia Features to New Cell Phones via J2ME** (Chicago) – First International Digital, Inc. (FID), a digital multimedia software developer, and Motorola, Inc., a global communications giant, have announced the availability of multimedia capabilities and content for the latest line of cell phones. The offerings demonstrate the power of Motorola's implementation of J2ME technology across its handsets, in cooperation with innovative third-party solutions such as FID's patent-pending maxMIDI technology, which enables users to take full advantage of the phone's features by downloading files that include MIDI audio along with synchronized pictures and lyrics.

www.fidinc.com

www.motorola.com

► **Leading ISVs Adopt Borland Solutions** (Scotts Valley, CA) – Borland Software Corporation has announced its success

with independent software vendors (ISVs) and the introduction of the Borland ISV Partner Program. Designed to expand worldwide revenue opportunities for ISV partners and Borland alike, the program enables ISVs to embed fast, flexible development and deployment technology from Borland into their packaged software applications for an improved customer experience. With direct access to

Borland products and expertise, partners further benefit from increased productivity, reduced costs, and faster time-to-market. Borland is already seeing adoption with ISVs such as CARNOT Inc., DSR Solutions Ltd., Flashline, Savvion, and XLN Inc.

www.borland.com

► **Nokia Brings Mobile Java Toolkit to Linux Developer Community** (Helsinki) – Nokia has introduced the Nokia Developer's Suite for J2ME, version 1.1 for Linux, expanding the universe of creative talent targeting mobile application development. It will provide developers with tools to create, test, and deploy downloadable applications that are designed for J2ME. Nokia has announced that it is supporting Java technology in a wide selection of its current and future mobile terminals.

www.nokia.com

► **Oracle Makes Java Development Tool Available to Apple Developers** (Redwood Shores, CA) – Oracle Corporation has announced the immediate, free availability of Oracle9i JDeveloper version 9.0.3 for Apple Computer's UNIX-based operating system. Now, Java developers using Mac OS 10.2.2 and creating J2EE applications and Web services will benefit from the productivity features of Oracle's award-winning integrated development environment (IDE). The developer's release for Mac OS 10.2.2 is available for free download and evaluation to all registered Oracle Technology Network (OTN) members.

www.oracle.com

► **Inceptor Releases Excedia 4.0** (Maynard, MA) – Inceptor, Inc., a provider of conversion marketing tech-

MACROMEDIA TOUTS JAVA SERVER FOR MAC OS X

(San Francisco) – Boosting Java development for Apple users, Macromedia has announced the availability of JRun 4 for Mac OS X, a J2EE-compatible application server. JRun 4 for Mac OS X is a commercial J2EE-compatible application server that can be used on Xserve, Apple's rack server for Mac OS X.

www.macromedia.com

nology and services, has released version 4.0 of Excedia, a comprehensive Web-based application for executing, tracking, analyzing, and optimizing cross-channel marketing initiatives in real time. Rewritten in Java and designed to integrate with Oracle database technology, Excedia 4.0 provides e-commerce sites and Internet publishers with real-time insight into improving the performance of marketing campaigns, converting more customers into buyers, and increasing the return on marketing investments by lifting conversion rates and revenues.

www.inceptor.com

► **SYS-CON Media Announces Linux Business & Technology at LinuxWorld** (Montvale, NJ) – SYS-CON Media has announced its newest title, **Linux Business & Technology**, to launch in May 2003. "There is no escaping the penetration of Linux into the corporate world," said Alan Williamson, *LBT's* founding editor and editor-in-chief. "Linux is an operating system that has traditionally been held in the highest esteem primarily by the hardcore developers of the world, the so-called geeks. With its roots firmly seeded in the open-source model, Linux is very much born from the 'if it's broke, then fix it yourself' attitude. Now, though, Linux has arrived in the boardroom."

LBT will focus on the higher logistical level of Linux deployment. Every month there will be a different focus, allowing a detailed analysis of all the components that make up the greater Linux landscape. Each issue will include advice on hardware and software, through to related issues such as recruiting the trained personnel required to successfully deploy a Linux-based solution.

www.sys-con.com

SUN DELIVERS INDUSTRY'S FIRST LIBERTY-ENABLED WEB SINGLE SIGN-ON PRODUCT

(Santa Clara, CA) – Sun Microsystems, Inc., has announced the general availability of the Sun ONE Identity Server 6.0, an open standards-based network identity solution. It provides a standards-based, future-proofed implementation that leverages Java technology, the Liberty Alliance, Security Assertion Markup Language (SAML), and XML specifications.

www.sun.com

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Major corporations including IBM, Oracle, Sun, and Dell have all committed significant resources and money to ensure their strategy for the future involves Linux. Linux has arrived at the boardroom.

Yet until now, no title has existed that explicitly addresses this new hunger for information from the corporate arena. *Linux Business & Technology* is aimed squarely at providing this group with the knowledge and background that will allow them to make decisions to utilize the Linux operating system.

Look for all the strategic information required to better inform the community on how powerful an alternative Linux can be. *Linux Business & Technology* will not feature low-level code snippets but will focus instead on the higher logistical level, providing advice on hardware, to software, through to the recruiting of trained personnel required to successfully deploy a Linux-based solution. Each month will see a different focus, allowing a detailed analysis of all the components that make up the greater Linux landscape.

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WRITTEN BY
BLAIR WYMAN

There have been lots of reasons bandied about lately about why Java is good or bad or indifferent. I'm afraid I've been too busy to follow the discussions closely, but that rarely stops me from chiming in. Others find my ignorance entertaining; perhaps you will, too.

Blair's Reasons for Being a Java Bigot

1. Java helps us sell our boxes

Allow me to expand, briefly, on each of these points...

Okay, so it's not much of a list. At least I can remember the whole thing! (And if not, it fits easily on a single 3x5 notecard.)

Well, I guess if we're going to get any value out of this little exercise, we'll have to tease it out of this Lone Reason. ("Scalp 'em, Tantric!") No, wait! Maybe there's a pattern here? Instead of aspiring to create a "List of a Thousand Reasons," we could have a thousand "Lists of One Reason Each." Yeah, that's it! Sorta like refactoring! ...but I digress.

Why does Java help us sell our boxes? Why does it help anyone? Well, clearly, people need to get things done. To do many of these things, they use boxes. On those boxes, for whatever reasons, folks are increasingly choosing Java to assist them. So, to whatever extent some box "does Java" – and does it well – that box will be "in demand." Being in demand is, well, a nice state of being to be in, no?

By the way, can you tell I'm fond of small, easily remembered lists? How about these:

Blair's Reasons for Digging Linux

1. Linux helps us sell our boxes

Blair's Reasons for Splurging on a Digital Video Camera

1. Folks are buying our boxes

Blair's Reasons for Honoring Commercial Freight Carriers

1. Commercial freight carriers help us ship our boxes

The list of Lists goes on and on, but I digress...

I've been privileged to work on the IBM eServer iSeries for most of my professional career, though our box hasn't always been called that. Back before the great rebranding, it was known as the IBM AS/400, with the "AS" proudly standing for "Applications Systems." There are a few hundred thousand of these boxes around the world – in closets and back rooms and raised-floor computing centers – quietly and reliably crunching the payrolls, calculating the profits, offering the products, billing the customers, and changing the world.

Oh, I know. A few hundred thousand boxes isn't all that many. Thankfully, though – and in part owing to our unqualified success integrating Java and its wide functional swath into the machine – that figure is an ever-moving target. Our box does Java well, so we are in demand. Just why we do Java so well is an interesting subject, but I'll have to leave something for next month...

While our box is doing its part to change the world, the box itself is also changing. In the old days, when I started with the company, about all the box could talk to was SNA hosts, 5250 "dumbhead" terminals, and massive "shake and bake" band printers, all in sparkling EBCDIC.

Age of Reasons

Now, in the endlessly culminating drive for consummate perfection and universal connectivity, it's much easier to enumerate the few things that an iSeries will not talk to. (As far as I know, the only modern language we don't currently support is Klingon. Of course, cats and small children remain impenetrably blasé.)

Of course, when a person starts speaking to the world – any world – it is wise to speak carefully. Back when I thought I was pretty smart, I found what seemed to be a funny tag line on the Usenet. I promptly replaced the Zappa/Feynman/Lehrer/Flintstone quote in my e-mail signature with this newfound gem, which read:

"Hiroshima '45 – Chernobyl '86 – Windows '98"

Yeah. Ha-ha. Very funny, you bet. Cataclysms are always funny. I must've been catatonic.

One day I got a note from a colleague in Japan. In plain English, he told me my signature wasn't funny. I found and activated the one brain cell I then had available, and it was immediately obvious he was right. I humbly apologized for my ignorant insensitivity, he graciously accepted, and I silently thanked my lucky stars he wasn't Klingon! ...but I digress.

So, yup: Java helps us sell our boxes. Java helps me feed my family. Java feeds my head. I'm just thankful I lived well after the Age of COBOL. (What's Klingon for "whew"?)

blair@blairwyman.com

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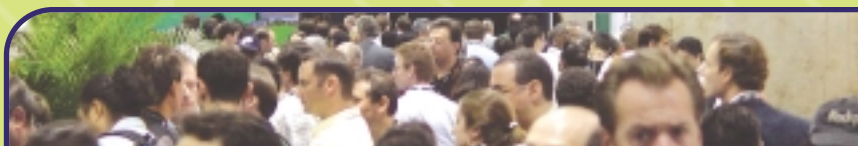
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John Magee
Vice President, Oracle9i

ORACLE

John Magee is vice president, Oracle9i, at Oracle. He has more than 14 years' experience in the enterprise software industry and has held positions in product development, product management, and product marketing. In his current role,

Magee manages technical product marketing for Oracle's application server and development tools products, and is responsible for evangelizing Oracle technology initiatives around J2EE, XML, and Web services.

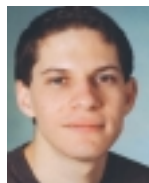


Mark Herring
Director, Java, Web Services & Tools Business

Sun Microsystems

Mark Herring is responsible for helping to define, set, and drive Sun Microsystems' product direction in the Java, Web Services & Tools Business. Prior to his current role, Herring was director of corporate

strategy & planning, looking after Sun's interest in the Project Liberty Alliance and Network Identity. Herring joined Sun Microsystems in October 1999 as a result of Sun's acquisition of Forte Software. Forte Software was a leading provider of enterprise-class development and integration products. During his four years at the company, he ran several aspects of Forte's marketing organization, including product marketing and the Web channel.



Miguel de Icaza
Cofounder and CTO



As the founder and leader of the GNOME Foundation, Miguel de Icaza is one of the foremost luminaries in the Linux development community. With his seemingly boundless energy, de Icaza has galvanized the effort to make Linux

accessible and available to the average computer user. He brings this same excitement to his role as CTO of Ximian. de Icaza was instrumental in porting Linux to the SPARC architecture and led development of the Midnight Commander file manager and the Gnumeric spreadsheet. He is also a primary author of the design of the Bonobo component model, which leads the way in the development of large-scale applications in GNOME.



Mark Hapner
Distinguished Engineer, Sun Microsystems

Mark Hapner is a Sun Distinguished Engineer and is currently lead architect for Java™ 2 Platform, Enterprise

Edition (J2EE™). He has guided the overall architecture for J2EE 1.2, 1.3, and now the upcoming 1.4 release. In March of 1996, he joined

Sun's JavaSoftware Division to participate in the development of the Java database connectivity API (JDBC). Following that, he was co-spec lead of the Enterprise JavaBeans specification and spec lead of the Java Message Service specification.



Simon Phipps
Chief Technology Evangelist, Sun Microsystems

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



Dave Chappell
VP, Chief Technology Evangelist, Sonic Software

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



Eric Newcomer
Chief Technology Officer, IONA

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



Dean Guida
CEO and President, Infragistics

Dean Guida is CEO and president of Infragistics and was CEO and a cofounder of ProtoView Development Corporation. Mr. Guida has over 15 years of experience in the technical industry and oversees all aspects of the company's business operations and corporate direction. He is also responsible for cultivating strategic alliances and other external relationships, as well as managing corporate financial affairs.

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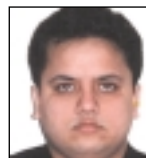
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	10:00AM – 10:50AM	Web Services Keynote: John Magee, Oracle		
	11:00AM – 11:50AM	(JV2) Testing Your Java Using JUnit Kyle Gabhart, LearningPatterns	(WS2) Web Services Management James Phillips, Actional	(NT2) Introduction to ASP.NET Russ Fustino, Microsoft
	1:00PM – 1:50PM	WS-I Panel: "A Road Map for Web Services Standards" - Moderated by Rob Cheng, WS-I		
	2:00PM – 2:50PM	.NET Keynote: "The MONO Project" - Miguel de Icaza, Ximian		
	3:00PM – 3:50PM	(JV3) Building/Deploying the Ant Way Kyle Gabhart, LearningPatterns	(WS3) Strategies for Using Databases in a World of Web Services Mike Lehmann, Oracle	(NT3) Introduction to VB.NET Russ Fustino, Microsoft
	4:00PM – 4:50PM	(JV4) Unlocking the Secrets of JDK1.4 Raghavan Srinivas, Sun Microsystems	(WS4) Using Web Services to Integrate J2EE and .NET Enterprise Applications - Odysseas Pentakalos, SYSNET International	(NT4) How to Develop an End-to End .NET Connected Application Allan da Costa Pinto, Microsoft
WEDNESDAY MARCH 19	8:00AM – 4:00PM	Registration Open		
	9:00AM – 9:50AM	(JV5) Java APIs for Web Services Security Standards Sang Shin, Sun Microsystems	(WS5) Combining BPM and BRM Technologies: A Major Step Towards Corporate Agility Henry Bowers, ILOG	(NT5) .NET: The Virtualized Execution Engine Yahya Mirz, Aurora Borealis
	10:00AM – 10:50AM	Java Keynote: Mark Herring, Sun Microsystems		
	11:00AM – 6:00PM	EXPO OPEN 11:00 a.m. - 6:00 p.m.		
	11:00AM – 11:50AM	(JV6) Using SWT Under Eclipse\ Alternative - IBM	(WS6) Web Services for Real-Time Data Access in an Industrial Setting Stephan Van Dijk, ABB/SKYVA	(NT6) Introduction to DotGNU Barry Fitzgerald, DotGNU
	12:00PM – 2:00PM	BREAK & EXPO		
	2:00PM – 2:50PM	.NET Panel Discussion - Moderated by Derek Ferguson, .NET Developer's Journal		
	3:00PM – 3:50PM	(JV7) Unlocking the Power of XML Hitesh Seth, ikigo	(WS7) Web Services Architecture: The Next Big Spec. from the Mouths of the W3C Eric Newcomer, IONA (moderator)	(NT7) Introduction to SSCLI Yahya Mirz, Aurora Borealis
THURSDAY MARCH 20	4:00PM – 4:50PM	(JV8) Java and .NET Derek Ferguson, Expand Beyond	(WS8) Web Services: Next Steps After the Hype Claire Dessaux, Oracle	(NT8) Mobile Development with the Compact Framework Brad McCabe, Infragistics
	8:00AM – 4:00PM	Registration Open		
	9:00AM – 9:50AM	(JV9) Writing SOAP Services Nigel Thomas, SpiritSoft	(WS9) Web Services Best Practices Chris Peltz, HP	(NT9) Best Practices for .NET Development Joe Stagner, Microsoft
	10:00AM – 10:50AM	.NET Keynote - Jesse Liberty, Liberty Associates		
	11:00AM – 4:00PM	EXPO OPEN 11:00 a.m. - 4:00 p.m.		
	11:00AM – 11:50AM	(JV10) Working with Data the JDO Way Patrick Linsky, SolarMetric	(WS10) Web Services Startups: Telltails of the Future Simeon Simeonov, Polaris Venture Partners	(NT10) Best Practices for ADO.NET Development Thom Robbins, Microsoft
	12:00PM – 2:00PM	BREAK & EXPO		
	2:00PM – 2:50PM	Java Panel - "The Future of Java", Moderated by Alan Williamson, Java Developer's Journal		
	3:00PM – 3:50PM	(JV11) Enterprise: The Next Generation Mark Hapner, Sun Microsystems	(WS11) Open Standards for Web Services Messaging Dave Chappell, Sonic Software	(NT11) How to Debug with .NET Tony Denbow, STAR Information Technology
	4:00PM – 4:50PM	(JV12) Overcoming the Challenges of J2ME Dr. Jeff Capone, Aligo	(WS12) Web Services Security Marc Chanliau, Netegrity	(NT12) XML and Web-Enabling Legacy Applications Using BizTalk Mike Cramer, Microsoft

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	(XM2) OASIS Standards Update Karl Best, OASIS	(VN2) The XMLSPY 5 Enterprise Edition Development Environment Trace Galloway, Altova		
	(XM3) A Definitive Introduction to XML Schemas Hitesh Seth, ikigo	(VN3) SOAP and Java: Marrying Them Off Skip Marler, Parasoft		
	(XM4) XML in Print - XSL:FO Frank Neugebauer, IBM	Visit www.sys-con.com for details	 9:00AM – 5:00PM Java 2 Platform Programmer Certification Fast Path This session, developed and delivered by Philip Heller, author of the two leading Java technology certification preparation manuals, helps to prepare you for the Sun Certified Programmer for the Java 2 Platform exam. Philip provides code-level, detailed review of the skills and knowledge needed to confidently approach the exam.	 9:00AM – 5:00PM Russ' Tool Shed Join Russ as he shows you how to use Visual Studio.NET. 9:00-12:15 - Introduction to Web Services Using VS.NET 1:00-2:30 - Advanced Web Services Using ASP.NET 2:45-4:15 - .NET Remoting Essentials 
	(XM5) XML Security Integration Challenges Phil Steitz, American Express	(VN5) Process-Centric Enterprises Eric Pulier, Digital Evolution		
	(XM6) Case Study: XML in Life Sciences Tim Matthews, Ipedo	(VN6) Pattern Driven Application Development Tom Shore, Compuware		
	(XM7) Using XML for EAI - Best Practices Dan Enache, TIBCO	(VN7) Managing the Developer Relationship Mike Bellissimo, Sun Microsystems	 9:00AM – 5:00PM Java 2 Platform Architect Certification Fast Path This intense one-day session helps prepare attendees to pass the Sun Certified Enterprise Architect for J2EE Technology exam. This session provides an overview of the components comprising the J2EE architecture as a whole, emphasizes the incorporation of J2EE technology into an architecture, and reviews each of the certification exam's testing objectives.	 9:00AM – 5:00PM Mobile .NET In this session, Derek Ferguson, editor-in-chief of <i>.NET Developer's Journal</i> , will give you a thorough introduction to the use of .NET with all manner of mobile computing devices. 
	(XM8) Delivering Web Services to Mobile Clients with XML Transformation Frameworks Paul Lipton, Computer Associates	(VN8) Web Services Diagnostics Dave Seidel, Mindreef		
	(XM9) Delivering Web Services to Mobile clients with XML Transformation Frameworks - Paul Lipton, computer Associates	Visit www.sys-con.com for details		
	(XM10) XQuery Mike Champion, Software AG	(VN10) Model Driven Development of Web Services in UML for the J2ME Bill Graham, Rational Software		
	(XM11) XPath & XSLT 2.0 Kurt Cagle, Cagle Communications	(VN11) Why Web Services Management? Jon Atkins, HP		
	(XM12) Third Generation XML Tools Michael Leventhal, Commerce One	Visit www.sys-con.com for details		

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Java Technology Track



The Java track has been specifically designed to allow you to squeeze as much information out of

each session as possible. This track is designed for the Java developer who wishes to catch up on the latest techniques and APIs and will be led by industry-leading speakers and authors.

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

(JV1) Squeezing the Best Out of Java

ALAN WILLIAMSON, JAVA DEVELOPER'S JOURNAL

Tuesday March 18, 2003 9:00 A.M. - 9:50 A.M.

Java is a very powerful language, and while it offers the developer a rich array of tools, the fundamentals should not be overlooked. Improving your code at the core layer will result in great improvements in efficiency and fewer bugs. We'll look at the dos and don'ts of programming and learn lots of hints and tips that will accelerate your Java coding.



BIO: Alan Williamson is editor-in-chief of *Java Developer's Journal*. In his spare time, he holds the post of chief technical officer @ n-ary (consulting) Ltd, one of the first companies in the UK to specialize in Java at the server side. Reach him at alan@n-ary.com (<http://www.n-ary.com>). Rumor has it he welcomes all suggestions and comments!

(JV2) Testing Your Java the JUnit Way

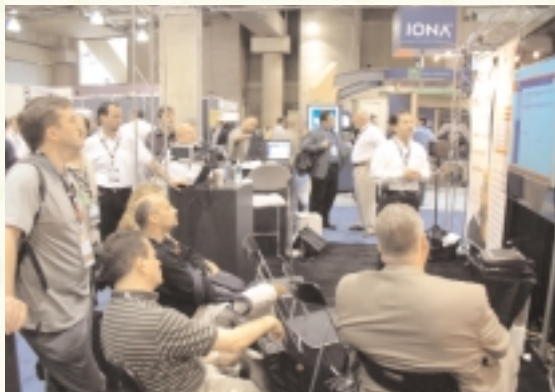
KYLE GABHART, LEARNINGPATTERNS

Tuesday March 18, 2003 11:00 A.M. - 11:50 A.M.

A critical measure of the success of software can be found in whether or not it executes successfully. Equally important, however, is whether or not that software does what it was intended to do. JUnit is an open-source testing framework that provides a simple means for developers to define their intentions for how their software should work. JUnit then provides test runners that process your intentions and verify that your code performs as intended. The result is software that not only works, but works in the correct way.



BIO: Kyle Gabhart is a senior mentor for LearningPatterns, a dynamic knowledge company providing consulting, training, and mentoring in emerging technologies. He is a prolific writer, with more than two dozen technical articles and books to his name. Kyle is highly regarded as a dynamic and enthusiastic public speaker with an innovative perspective on technology.



(JV3) Building/Deploying the Ant Way

KYLE GABHART, LEARNINGPATTERNS

Tuesday March 18, 2003 3:00 P.M. - 3:50 P.M.

A defined and easily repeatable process is one of the most necessary but often least-used aspects of good software development. A defined build process ensures that your project's software is built, deployed, and tested identically each time. Without this type of control and predictability, valuable time is often lost chasing down bugs that don't exist or rejecting solutions that were only partially implemented.

Apache's Ant is a powerful scripting tool that enables developers to define and execute routine software development tasks using the simplicity and extensibility of XML. Ant provides a comprehensive mechanism for managing software development projects, including compilation, deployment, testing and execution. Additionally, it is compatible with any IDE or operating system.

BIO: Kyle Gabhart is a senior mentor for LearningPatterns, a dynamic knowledge company providing consulting, training, and mentoring in emerging technologies. He is a prolific writer, with more than two dozen technical articles and books to his name. Kyle is highly regarded as a dynamic and enthusiastic public speaker with an innovative perspective on technology.

(JV4) Unlocking the Secrets of JDK 1.4

RAGHAVAN SRINIVAS, SUN MICROSYSTEMS

Tuesday March 18, 2003 4:00 P.M. - 4:50 P.M.

With the release of JDK 1.4, a number of new features were added to the core API, such as nonblocking IO, regular expressions, assertions, and XML. This session will take you through the major additions and demonstrate where you might use them.



BIO: Raghavan Srinivas is a Java technology evangelist at Sun Microsystems who specializes in Java and distributed systems. He has spoken on a variety of technical topics at conferences around the world, and brings with him more than 15 years of software development experience. Prior to joining Sun, Raghavan worked for Digital Equipment Corporation. He has worked in several technology areas, including internals of VMS, UNIX, and NT.

(JV5) Java APIs for Web Services Security Standards

SANG SHIN, JAVA TECHNOLOGY EVANGELIST, SUN MICROSYSTEMS

Wednesday March 19, 2003 9:00 A.M. - 9:50 A.M.

Everybody is talking about Web services as a way to perform business transactions over the Web in ways never done before. Yet, security is the most critical piece that still needs to be addressed before the promise of Web services can be realized. This session introduces the various Web services security standards, such as XML signature, XML encryption, XKMS (XML Key Management Services), XACML (eXtensible Access Control Markup Language), SAML (Security Assertion Markup Language), WS-Security, and Liberty First and their corresponding Java APIs, especially the standards APIs that are currently being defined through the Java Community Process (JCP). Wherever possible, example code will be presented.



BIO: Sang Shin has been with Sun Microsystems for over 12 years, working in various research and engineering projects mostly in data communication, networking, Internet, and Java-related areas. Prior to Sun, he worked in several startup companies in various engineering and managerial capacities. He currently teaches two graduate-level software engineering courses (XML, Distributed programming using Jini networking technology) in Brandeis University's continuing education program in Massachusetts.

(JV6) Using SWT Under Eclipse

TO BE ANNOUNCED

Wednesday March 19, 2003 11:00 A.M. - 11:50 A.M.

The release of the Eclipse project introduced a new windowing toolkit, the Standard Widget Toolkit. Discover what all the fuss is about with the Standard Widget Toolkit and why everyone is talking about it. This session will detail the underlying windowing infrastructure of the SWT Toolkit.



(JV7) Unlocking the Power of XML

HITESH SETH, *ikigo*

Wednesday March 19, 2003 3:00 P.M. - 3:50 P.M.

There is more to XML than just one block of String. Understand the difference between a DTD and a schema and the APIs you can utilize within Java that will bring the power of XML to your Java development.



BIO: Hitesh Seth is the chief technology officer of *ikigo*, Inc., a provider of XML-based Web services monitoring and management software. A freelance author and well-known speaker, he regularly writes for technology publications on VoiceXML, Web services, J2EE and Microsoft .NET, wireless computing, and enterprise/B2B integration. He is also the editor-in-chief of *XML-Journal*.

(JV8) Integrating Java and .NET

DEREK FERGUSON, *EXPAND BEYOND CORPORATION*

Wednesday March 19, 2003 4:00 p.m. - 4:50 p.m.

Two technologies that aren't often mentioned in the same breath are Java and Microsoft. However, it is the rare developer who is able to completely avoid either of these two worlds nowadays. In this presentation, we will examine several tools both free and commercial that can be used to bring these two development platforms together. Some knowledge of Java and Windows development is advisable.



BIO: Derek Ferguson is chief technology evangelist for Expand Beyond Corporation (www.xb.com), the worldwide leader in mobile software for enterprise management. He is also editor-in-chief of *.NET Developer's Journal* and author of the book *Mobile .NET*.

(JV9) Writing SOAP Services

NIGEL THOMAS, *SPIRITSOFT, INC.*

Thursday March 20, 2003 9:00 A.M. - 9:50 A.M.

J2EE 1.4 mandates the use of JMX to manage compliant products. Early adopters of JMX mostly use protocols like RMI and HTTP to communicate between the management application and the agents it is managing. This presentation describes how JMS is utilized to manage large deployments of managed agents in the Enterprise and optimize the delivery of alerts and notifications in complex environments. The processing of management alerts, using open source components (such as Jelly) to provide an Event-Condition Action (ECA) framework, will also be discussed.



BIO: Nigel Thomas joined SpiritSoft as director of product marketing in April 2001. Prior to SpiritSoft, Nigel spent five years with EAI pioneer Constellar, serving in consulting, support, sales support, and development roles. He became product architect and then director of product manage-

ment for the flagship Constellar Hub product. Nigel spent over eight years at Oracle, architecting and delivering Oracle's Accounting products and then moving on to worldwide performance consulting and CASE development assignments.

(JV10) Working with Data the JDO Way

PATRICK LINSKEY, *SOLARMETRIC*

Thursday March 20, 2003 11:00 A.M. - 11:50 A.M.

Java Data Objects is an alternative way of looking at your data compared to JDBC. Looking at your data in an object-oriented way offers many advantages over the sequential manner of JDBC. Learn how JDO can be adopted for your own requirements through practical examples.

BIO: Patrick Linskey manages and drives SolarMetric's technology development as vice president of Engineering. Patrick has been intimately working with JDO for nearly two years and has been involved in object/relational mapping for over four years. Over the past year, Patrick has evangelized the JDO specification at local Java User Groups and software symposiums throughout the world.

(JV11) Enterprise: The Next Generation

MARK HAPNER, *SUN MICROSYSTEMS*

Thursday March 20, 2003 3:00 P.M. - 3:50 P.M.

With the latest release of the J2EE 1.4 framework, a whole new suite of APIs have been added to this already comprehensive edition. Chances are, there are goodies lurking in there you didn't even know about. This session will take a look at unearthing some of the gems of the J2EE framework.



BIO: Mark Hapner is a Sun Distinguished Engineer and is currently lead architect for Java™ 2 Platform, Enterprise Edition (J2EE™). He has guided the overall architecture for J2EE 1.2, 1.3 and now the upcoming 1.4 release. In March of 1996, he joined Sun's JavaSoftware Division to participate in the development of the Java database connectivity API (JDBC). Following that he was co spec lead of the Enterprise JavaBeans specification and spec lead of the Java Message Service specification.

Prior to his work on Java enterprise APIs, Mark was a member of Sun's Object Services Group where he wrote several of Sun's initial CORBA object services submissions and worked on the integration of object oriented and relational databases with Sun's ORB.

(JV12) Overcoming the Challenges of J2ME

DR. JEFF CAPONE, *ALIGO*

Thursday March 20, 2003 4:00 P.M. - 4:50 P.M.

J2ME has brought the power of Java to the mobile space. However, it is fair to note that not all the JDK is available to you. Discover what is and what isn't available to you and how you can potentially work around some of what seems to be "must have" tools.



BIO: Dr. Jeff Capone has devoted his career to researching wireless and wireline networks and applications. As Aligo's CTO, Jeff leads the technology development and is the principal architect of the innovative M-1 Server. Prior to leading Aligo's engineering team, he was an assistant professor at Arizona State University and director of the Network Engineering and Wireless Telecom Lab.



Web Services Track



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

(WS1) Web Services Infrastructure

CARL SJOGREEN, BEA

Tuesday March 18, 2003 9:00 A.M. - 9:50 A.M.

Web services have evolved from an over-hyped vision of an interconnected world to a set of real standards and technologies that can solve real-world problems in the enterprise. Building, deploying, and managing Web services in an enterprise-class environment, however, still raises many questions about the infrastructure on which those Web services are deployed.

This session will introduce several real-world Web services case studies, the requirements placed on Web services infrastructure, and several hands-on examples of enterprise-class Web services implementations that address the issues raised above.

BIO: Carl Sjogreen is product manager for BEA WebLogic Workshop, BEA's latest Java innovation and an integrated development environment for building Web services. He has been involved with XML, Web services, and developer tools since 1998, when he founded Transformis, a software startup specializing in XML tools. Passionate about the power of XML and bringing new technologies to the masses, he is a key contributor to growing the BEA WebLogic development community.

(WS2) Web Services Management

JAMES PHILLIPS, ACTIONAL

Tuesday March 18, 2003 11:00 A.M. - 11:50 A.M.

Service-oriented architectures (SOAs) have been held out for years as a substantially more cost-effective and flexible approach to architecting enterprise software systems than historical strategies such as monolithic system design or tightly coupled client/server approaches. Many customers and industry observers believe Web services technology finally makes possible the widespread adoption of the SOA approach. But while Web services and SOAs substantially ease the application development and integration burden, they bring with them a new collection of management challenges. In this session, you will learn about the essential management criteria for growing and sustaining a "mission-critical" service-oriented architecture.



BIO: In his role at Actional, James has worldwide responsibility for Actional's product and market strategy and market execution. Prior to joining Actional, he served as CSO and vice president of product marketing and business development with Ensim Corporation. James is a frequent speaker and editorial contributor on Web services-related issues and serves on the international advisory board of *Web Services Journal*.

(WS3) Strategies for Using Databases in a World of Web Services

MIKE LEHMANN, ORACLE

Tuesday March 18, 2003 3:00 P.M. - 3:50 P.M.

Databases continue to be at the core of most IT infrastructures yet the knowledge of how they play in the world of SOAP-based Web services is less well understood. This presentation covers strategies for publishing database components as Web services and, as important, techniques for consuming Web services within databases. Find out how to plug your database infrastructure into the world of Web services.

BIO: Mike Lehmann has worked in the IT industry for over 12 years as a developer,

consultant, and project manager in emerging technologies. His current areas of focus include J2EE and Web services. Mike frequently authors articles and papers on Web services and speaks regularly at industry events.

(WS4) Using Web Services to Integrate J2EE and .NET Enterprise Applications

ODYSSEAS PENTAKALOS, PH.D.,

SYSNET INTERNATIONAL, INC.

Tuesday March 18, 2003 4:00 P.M. - 4:50 P.M.

The Web services phenomenon promises to resolve all interoperability issues through an open architecture that is based on widely accepted industry standards such as SOAP, WSDL, and HTTP. This session will explore component reuse across the two major enterprise application platforms, J2EE and .NET, using Web services as the medium of interaction. Through examples, this tutorial will cover the current state of interoperability between J2EE and .NET and will focus on best practices and issues that arise. The Axis SOAP implementation will be used in this session as the Web services platform for exposing J2EE components.



BIO: Odysseas Pentakalos is vice president of SYSNET International, Inc., where he focuses on architecture, design, and development of large distributed systems that utilize Java and J2EE technologies. He holds a Ph.D. in computer science, is the author of the *Windows 2000 Performance Guide*, has published over two dozen papers in conference proceedings and journals, and is a frequent speaker at industry conferences.

(WS5) Combining BPM and BRM Technologies: A Major Step Towards Corporate Agility

HENRY BOWERS, ILOG

Wednesday March 19, 2003 9:00 A.M. - 9:50 A.M.

Corporate agility: the ability to quickly respond to unexpected change inside and outside the corporation, is a coveted quality of the modern enterprise. This presentation discusses how corporate agility is driven by technical agility. It introduces business rule management (BRM), business process management (BPM), and Web Services technologies, and explains how together these technologies provide an enabling foundation for technical agility.



BIO: Henry Bowers has spent more than 15 years in the high-tech sector, building and managing software products for both private industry and government. He has more than 7 years' experience working with rules-based systems and business rules in general. Henry is currently a product manager for business rules at ILOG.

(WS6) Web Services for Real-Time Data Access in an Industrial Setting

STEPHAN VAN DIJCK, ABB/SKYVA

Wednesday March 19, 2003 11:00 A.M. - 11:50 A.M.

Real-time processes deliver and require data in order to participate in business transactions. We will present an application under development at ABB for linking real-time process control with business processes via Web services, and explore how plant floor control can be a consumer and producer of Web services. We will use solutions from ABB, IBM WebSphere, and Microsoft .NET.



BIO: Stephan Van Dijck holds a master's degree in engineering mechanics from K.U. Leuven, Belgium, and a degree in business management from I.A.G. U.C., Louvain, Belgium. He has worked as a process engineer at the EXXON facility in Antwerp, Belgium, where he supervised logistics planning and optimization of loading and unloading operations with Honeywell Europe as an application and software development manager, product line marketing manager for Batch control systems, and marketing manager for the chemicals and pharmaceuticals business unit Europe. In 1998 he joined SKYVA, a provider of e-manufacturing solutions by making use of Web services.

(WS7) Web Services Architecture: The Next Big Spec, from the Mouths of the W3C Authors

ERIC NEWCOMER, IONA (MODERATOR)

Wednesday March 19, 2003 3:00 P.M. - 3:50 P.M.

The World Wide Web Consortium (W3C) was created to develop interoperable technolo-

gies and to provide an open forum for discussion about the future of the Web. A significant effort currently underway within the W3C's Web Services Activity is the development of a Web Services Architecture Specification to help guide the future direction of Web services.

This panel session will discuss the role of the W3C in the development of Web services standards through this effort. The panel includes coauthors of the working group and editors of the spec, with representatives from BEA Systems, Contivo, IBM, IONA, and Software AG. Providing conference attendees with an opportunity to learn more about what the W3C is doing with regard to Web services, this panel will demonstrate the benefits and examine the challenges of working together to develop an open standard architecture.



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

(WS8) – Web Services: The Next Steps After the Hype

CLAIRE DESSAUX, ORACLE

Wednesday March 19, 2003 4:00 P.M. - 4:50 P.M.

Because Web services are still very new, many companies have yet to understand what Web services mean for their line of business and how they can make the most of this evolutionary technology. This session will highlight real-life examples where Web services have been successfully implemented and examines where services make sense, especially as they relate to integration. It will conclude with recommendations on how to best plan for a Web service strategy.



BIO: Claire Dessaux joined Oracle Alliances in 1994 with a main focus on helping partners implementing Oracle technology. Since then she has worked in various capacities on the incorporation of J2EE, XML and Web services into Oracle's product lines.

(WS9) Best Practices for Web Services Development

CHRIS PELTZ, HP

Thursday March 20, 2003 9:00 A.M. - 9:50 A.M.

There has been a fair amount of hype around Web services and the benefits they can bring to an organization. For many, it is difficult to determine how to best get started with Web services. This talk will outline a number of first steps that can be taken to begin planning a Web services pilot. It will also address a series of design guidelines, patterns, and architectural recommendations to enable an organization to build robust, flexible, and secure services. The talk will conclude with a look at tips and techniques for developing, testing, and managing Web services.



BIO: Chris Peltz is a senior software consultant within HP's Developer Resources Organization. He provides technical and architectural consulting to enterprise customers on J2EE, Web services, and mobile development. Chris has over 10 years of software experience in object-oriented technologies, 4GL development, GIS, and Web applications design.



(WS10) Web Services Startups: Telltale of the Future

SIMEON SIMEONOV, POLARIS VENTURE PARTNERS

Thursday March 20, 2003 11:00 A.M. - 11:50 A.M.

You must have seen them; they're everywhere. Web services startups are popping up like mushrooms after rain. Or has the Web services hype created a microcosm of startup activity that is going to mirror the boom and bust cycle of the late '90s? As a Web services technologist, where should you focus your energies? As a customer, how should you choose your vendor? As an investor, where should you put your money to work? In this presentation you'll get an overview of startup activity in the Web services space within the context of emerging industry dynamics and evolving customer needs. We will cover Web services tools, appliances, runtimes, integration, security, testing, and management.



BIO: Simeon Simeonov is a principal at Polaris Venture Partners, a leading early-stage venture firm, where he focuses on investments in information technology. Prior to joining Polaris, Sim was chief architect and vice president of emerging technologies at Macromedia, where he led the development of Web services technologies and platform infrastructure for next-generation Internet applications. Prior to that, he was a founding member and chief architect at Allaire, where he was responsible for the ColdFusion application server and cross-product technology strategy.

(WS11) Open Standards for Web Services Messaging

DAVE CHAPPELL, SONIC SOFTWARE

Thursday March 20, 2003 3:00 P.M. - 3:50 P.M.

Web services hold the promise of driving down the cost and complexity of application integration both between internal systems and between business partners. But unless Web services communications are made reliable, organizations will not be able to trust them for mission-critical operations, such as complex business-to-business transactions or real-time enterprise integration.

In this session, Dave Chappell, a coauthor of the WS-Reliability specification, will examine the emerging Web services reliability standards, including a detailed discussion on WS-Reliability, a new specification for open Web services messaging.



BIO: Dave Chappell, vice president and chief technology evangelist for Sonic Software, has over 18 years of experience in the software industry covering a broad range of roles including R&D, code-slinger, sales, support, and marketing. Dave has a strong passion for shaping the future of technology and enjoys sharing his knowledge and experience with others.

(WS12) – Web Services Security

MARC CHANLIAU, NETEGRITY

Thursday March 20, 2003 4:00 P.M. - 4:50 P.M.

Web services deployments typically use transport-level security for authentication and application-based access control for authorization. This presentation shows the limitations of transport-level security and introduces the XML technologies that complement the transport-level approach to provide a secure authentication solution. This presentation also covers the issues involved in providing access control in back-end applications and suggests a better, centralized approach to abstract authorization information out of back-end applications and into a single point of control using XML-based query technologies.

BIO: Marc Chanliau is a product manager for Netegrity, Inc. He has been in the software industry for over 20 years in many different capacities. Marc started the OASIS Security Services Technical Committee which culminated in the adoption of SAML as an official OASIS standard in November 2002. He holds an MS in linguistics from the University of Paris-Jussieu, France.



Microsoft .NET Track



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

development department and created several client/server application and system software products. Russ's specialties include development with VB.NET, XML Web services, ASP.NET, and debugging.

(NT3) Introduction to VB.NET

RUSS FUSTINO, MICROSOFT

Tuesday March 18, 2003 3:00 P.M. - 3:50 P.M.

Looking to learn the latest release of Visual Basic, VB.NET? Wait no longer and jump right in! See first hand why VB is the language of choice for developers. Whether you are changing from another language or just re-tooling, make sure you hit this session. You won't regret it! We will cover the Visual Studio Integrated Development Environment, Win Forms, Web forms and ASP.NET, classes and objects, XML Web services, ADO.NET introduction for data access and debugging.

BIO: Russ Fustino is a Microsoft Principal Technology Specialist and a Microsoft Certified Professional with over 20 years of software development experience. He has an expertise in developing Visual Basic and Web-based solutions using Microsoft tools. Prior to Microsoft, Russ was a VB instructor, headed up a development department, and created several client/server application and system software products. Russ's specialties include development with VB.NET, XML Web services, ASP.NET, and debugging.

(NT1) .NET Framework Overview

BOB FAMILIAR, MICROSOFT

Tuesday March 18, 2003 9:00 A.M. - 9:50 A.M.

This session will introduce the architecture and technologies within the .NET Framework, including the Common Language Runtime, ASP.NET, and ADO.NET, as well as XML and SOAP support. Integration with COM and COM+ services will be covered, as well as a discussion of the .NET Framework SDK.



BIO: Bob Familiar is a Microsoft Architectural Engineer and Certified Microsoft Solution Developer with over 14 years of experience in software engineering. He has developed solutions in C, C++, Java, SQL, and Visual Basic, and has over 7 years of experience using Microsoft Development Tools. Bob holds a patent for technology that maps relational database tables to object-oriented software components. His current areas of interest include object oriented analysis and design of distributed object models and distributed computing using COM+.

(NT4) How to Develop an End-to-End .NET-Connected Application

ALLAN DE COSTA PINTO, MICROSOFT

Tuesday March 18, 2003 4:00 P.M. - 4:50 P.M.

This session will show you how to design and create a sample application using multiple Microsoft .NET Enterprise Server products. We will show you how to integrate .NET technologies into an effective solution. The following products and technologies will be covered in this session: VS.NET, ASP.NET, VB.NET, C#, XML Web services, BizTalk, and SQL Server 2000. (Note: The demos in this session have been updated for VS.NET RTM version.)



BIO: Allan de Costa Pinto is a Microsoft Certified Application Developer for .NET and works for Microsoft Consulting in the Connecticut Area. Allan focuses on architecting and building solutions using Microsoft Visual Studio® .NET and XML Web services.

(NT2) Introduction to ASP.NET

RUSS FUSTINO, MICROSOFT

Tuesday March 18, 2003 11:00 A.M. - 11:50 A.M.

We will look at the next version of Active Server Pages, ASP.NET, a major upgrade to the current version of ASP. Xcopy deployment; control-based encapsulation; clean separation of code from HTML; strongly typed, compiled languages; and event-based page processing will change the way you develop UI for server-based Web applications. This session covers the ASP.NET Page Framework from the ground up: architecture; ASP.NET syntax; server controls; control families: intrinsic controls, list controls, and rich controls. Finally, this session will cover business objects, Web services, and migration issues.



BIO: Russ Fustino is a Microsoft Principal Technology Specialist and a Microsoft Certified Professional with over 20 years of software development experience. He has an expertise in developing Visual Basic and Web-based solutions using Microsoft tools. Prior to Microsoft, Russ was a VB instructor, headed up a

(NT5) .NET, the Virtualized Execution Engine

YAHYA MIRZ, AURORA BOREALIS

Wednesday March 19, 2003 9:00 A.M. - 9:50 A.M.

With .NET, Microsoft has introduced a major evolution in their computing platform. At the core of .NET, is a language agnostic runtime, currently being standardized by ECMA. This effort is called the Common Language Infrastructure or the CLI. The objective of this presentation will be to provide insight into the design decisions that led to the CLI's Execution Engine and their rationale. Additionally, I will explain through an example, how a component works its way through the Virtualized Execution Engine of the CLI.

BIO: Yahya Mirza is striving to balance commercial development with component-based language research. Since 1999, Mr. Mirza has been working on .NET projects at Microsoft, Source Dynamics and Safeco Life. His passion lies in language design for music and computer animation.

(NT6) Introduction to DotGNU

BARRY FITZGERALD, DOTGNU

Wednesday March 19, 2003 11:00 A.M. - 11:50 A.M.

This session will feature a brief overview of the many GNU projects currently implementing and extending ECMA CLI standards. These projects include SEE, phpGroupWare, Portable.NET, Web Services, and Virtual Identities.

BIO: Barry Fitzgerald is one of the cofounders of the DotGNU Free Software Project to create a 100% open source GNU implementation of the ECMA Common Language Infrastructure (CLI). He is also a member of the Steering Committee for DotGNU.

(NT7) Intro to SSCLI

YAHYA MIRZ, AURORA BOREALIS

Wednesday March 19, 2003 3:00 P.M. - 3:50 P.M.

In early 2002, Microsoft released a "Shared Source" implementation of the .NET





Common Language Infrastructure available on BSD UNIX, Linux, Mac OSX, and the Windows platform codenamed "Rotor". For enthusiasts, Rotor provides an opportunity to understand the .NET technology at a deeper level. For language designers, Rotor can serve as an effective runtime core for experimentation at the language feature level. For compiler and virtual machine researchers, Rotor provides a context for applied research into alternative object representations, method dispatch, garbage collectors, JIT compilers, etc. My goal will be to provide an introduction into the Rotor code base.

BIO: Yahya Mirza is striving to balance commercial development with component-based language research. Since 1999, He has been working on .NET projects at Microsoft, Source Dynamics and Safeco Life. His passion lies in language design for music and computer animation.

(NT8) Mobile Development with the Compact Framework

BRAD MCCABE, INFRAGISTICS

Wednesday March 19, 2003 4:00 P.M. - 4:50 P.M.

With the release of the Compact Framework, Microsoft has brought mobile development to the masses. In this session we will look at some of the differences and similarities between the .NET Framework and the Compact Framework. We will also examine the consideration that must be factored into the architecture and development of mobile application such as dealing with user interface considerations and effective mobile data strategies



BIO: Prior to joining Infragistics, Brad McCabe served as systems architect for the network solutions development team at Verizon Communications. Concurrently, Brad held the position of lead .NET Evangelist within Ajilon Consulting and was responsible for content and delivery of material for the national Inside .NET tour. Brad has been working as a senior developer and a software engineer, and his current responsibilities include developing reference applications and working with enterprise customers on project implementation.

(NT9) Best Practices for .NET Development

JOE STAGNER, MICROSOFT

Thursday March 20, 2003 9:00 A.M. - 9:50 A.M.

This advanced session covers the wide array of best practices for the most productive .NET development topics. We'll start with an overview of design guidelines for .NET, ensuring that developers write consistent, predictable code that integrates well between languages. We will cover memory management and the garbage collector as well as the best methods for cleaning up unmanaged resources. A section will cover how to best use ADO.NET to access relational data, and how to assimilate that data with the .NET XML classes. We'll look at tips for creating both components and controls, how to best use the System.NET classes to access HTTP responses, the .NET threading model, and key security concepts will also be examined.



BIO: Joe Stagner is a technical evangelist of Developer Technologies at Microsoft, and has been developing software for 25 years, on Microsoft platforms since DOS 1.0. Joe currently focuses on helping Microsoft's Independent Software Vendors make the most of .NET Developer technologies and also works with medium business developers and the academic community in New England.

(NT10) Best Practices for ADO.NET Development

THOM ROBBINS, MICROSOFT

Thursday March 20, 2003 11:00 A.M. - 11:50 A.M.

One of the biggest changes in data access recently is that common clients and servers on the Internet work in a disconnected, stateless fashion. ADO.NET provides an optimized, XML-based framework for data access in a disconnected environment. With the advent of XML, programming for data access and manipulation, the mechanism is changing from a relational to a hierarchical form. ADO.NET classes read and write XML at their core. The ADO.NET framework fully supports disconnected reads and writes, and we'll discuss the performance implications of this as well as how to use different types of objects in their various states. ADO.NET also has classes that provide optimized performance with SQL Server or other OLE DB data sources. This session covers the best practices on how to handle data access for best performance, error handling, transaction support, and security. We'll discuss the best practices for retrieving, single item, single row and multiple rows of data as well as transaction handling, and look at examples of the performance differences in using DataReaders versus DataSets. This session will also cover the best ways to cache data from data sources and the transformation to XML.



BIO: Thom Robbins is a senior technology specialist with Microsoft. He is a frequent contributor to various magazines include .NET, Visual Studio.NET and the Web Services Journal. Thom is also a frequent speaker at a variety of events that include VS Live and others. When not writing code and helping customers, he spends his time with his wife at their home in New Hampshire.

(NT11) How to Debug with .NET

TOBY DENBOW, STAR IT

Thursday March 20, 2003 3:00 P.M. - 3:50 P.M.

This session shows how the rules for debugging have completely changed with the advent of Microsoft .NET Framework. It will cover the core debugging concepts using the Microsoft .NET Framework. In addition, this session will discuss many advanced features that allow you to write better diagnostic and error-handling code.

BIO: Toby Denbow is VP of technology at STAR Information Technology. He has been a featured speaker at several Microsoft and industry trade shows. Toby has been working with .NET for over a year and was trained directly by the .NET developers in Redmond. He works with a wide variety of customers in various emerging technologies and has personally trained over 500 developers on Visual Studio.NET.

(NT12) XML and Web-Enabling Legacy Applications Using BizTalk

MIKE CRAMER, SENIOR PRINCIPAL TECHNOLOGY SPECIALIST, MICROSOFT

Thursday March 20, 2003 4:00 P.M. - 4:50 P.M.

This session examines how to integrate legacy line-of-business applications using BizTalk 2000 Server. It will examine BizTalk Server tools that allow you to create the components necessary to interface to legacy systems. This includes a scenario with four phases that demonstrates integration by using industry-standard XML and EDI file formats, delimited and positional files, and COM bridges.

BIO: As a member of the New England BSG Team and focusing on integrating heterogeneous applications, Mike Cramer works with existing and prospective Microsoft customers in New England on adopting the .NET platform. Mike joined Microsoft during the 1995 acquisition of Netwise Inc. (Boulder, CO). Prior to the acquisition, Mike worked for Netwise for approximately three years as a consultant and later consulting manager.



XML Technology Track



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

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

(XM1) XML: A Manager's Guide

JP MORGENTHAL, SOFTWARE AG

Tuesday March 18, 2003 9:00 A.M. - 9:50 A.M.

This session will provide an essential introduction to XML from a manager's perspective. As more and more IT projects utilize XML and its derivatives as fundamental technologies, it is key for today's manager to be aware of the various ingredients of XML. From core XML processing, transformation, metadata definition and schemas, applications in Web, wireless and speech applications, Web services, industry-standard vocabularies, and more, the session will offer a comprehensive review of the various technologies related to XML that today's IT Manager must be aware of.



BIO: JP Morgenthal serves as the chief services architect for Software AG, Inc. He is an internationally prominent authority on XML with more than 15 years of experience designing, developing, and analyzing software and technology. In his role as chief services architect, JP will explore and manage the design of complete professional services solutions based on Software AG technology and partner products in existing and emerging industries.

(XM2) OASIS Standards Update

KARL F. BEST, OASIS

Tuesday March 18, 2003 11:00 A.M. - 11:50 A.M.

OASIS is a not-for-profit, global consortium that drives the development, convergence, and adoption of e-business standards. Members of OASIS are providers, users, and specialists in standards-based technologies, and include organizations, individuals, and industry groups. The OASIS standards process can best be described as open, lightweight, and independent.

This session will address, OASIS Initiatives, current TC status, OASIS Technical Agenda, collaborative work at OASIS, EbXML, ISO/IEC/ITU/ECE Memorandum of Understanding (MoU) for electronic business, standards, liaison memberships in various ISO TCs and ISO/IEC JTC1 SCs and more ongoing, sponsor of Interoperability Summit, vendors submit specs to OASIS, dot-orgs move to OASIS, convergence at OASIS, and current Technical Committees.



BIO: Karl F. Best is the director of technical operations for OASIS, where he is responsible for managing the consortium's industry standards efforts. He is a former chief strategy officer and board member of the consortium, and has been involved in the XML/SGML industry since the early 1990s. Karl has been a member of a number of industry standards committees for SGML, XML, and associated standards, and a speaker at many industry conferences. He was previously employed by Novell, Adobe, and Sun Microsystems, designing and implementing electronic documentation systems.

(XM3) A Definitive Introduction to XML Schemas

HITESH SETH, IKIGO

Tuesday March 18, 2003 3:00 P.M. - 3:50 P.M.

XML Schemas have emerged as the standard way of representing XML vocabularies. Schemas extend the basic mechanism for defining the structure and content of XML documents established by Document Type Definitions (DTDs) to include rich data-type information and features such as simple/complex types, extensions/restrictions, etc. Get started with XML Schema development with this introduction to the standard and best practices for XML Schema design. We will also preview how XML Schema compares to RELAX NG.

BIO: Hitesh Seth is the chief technology officer of ikigo, Inc., a provider of XML-based Web services monitoring and management software. A freelance author and well-known speaker, he regularly writes for technology publications on VoiceXML, Web services, J2EE and Microsoft .NET, wireless computing, and enterprise/B2B integration.

(XM4) XML in Print: XSL-FO

FRANK NEUGEBAUER, IBM

Tuesday March 18, 2003 4:00 P.M. - 4:50 P.M.

Today developers frequently use XSLT to convert XML into markup languages such as HTML. XSL Formatting Objects (XSL-FO) promises to abstract the details of rendering and allow developers to specify the layout and semantic properties of presentation regardless of rendering. This presentation will provide a thorough introduction to XSL-FO and how it relates to the other XML processing standards and will highlight the benefits of XSL-FO in XML application development. Using demonstrations, the session will highlight the features that XSL-FO provides for creating an open standards-based print process and its applications.



BIO: Frank Neugebauer is a consultant in the Insurance Solutions division of IBM Global Services, specializing in distributed Java solutions based on IBM's Insurance Applications Architecture (IAA). He is also a freelance writer and has contributed several articles to leading industry publications.

(XM5) XML Security Integration Challenges

PHIL STEITZ, AMERICAN EXPRESS

Wednesday March 19, 2003 9:00 A.M. - 9:50 A.M.

This session will highlight the key security integration challenges faced by application teams developing enterprise solutions using loosely coupled, XML-based interfaces and service-oriented architectures. We will discuss how emerging standards and technologies address the practical security problems faced by development teams, the gaps that still remain, and the tradeoffs and compromises that architects and developers need to make to implement secure solutions today.

BIO: Phil Steitz is vice president, e-commerce applications development, at American Express. He has over 20 years of experience as a developer, architect, and technology leader involved in distributed systems development. Before joining American Express, Phil served as a middleware architecture consultant, designing large-scale distributed systems for enterprise customers. He holds a PhD in mathematics from the University of Maryland.



(XM6) Case Study: XML in the Life Sciences

TIM MATTHEWS, IPEDO

Wednesday March 19, 2003 11:00 A.M. - 11:50 A.M.

The importance of XML-based information in the health care and biotech industries has grown tremendously over the last two years, from R&D to clinical trials to manufacturing. Life sciences companies today are required to transfer and share huge quantities of information among the myriad of researchers and partners involved in the product development life cycle. The future of the life sciences market will be influenced by how well companies acquire, share, and apply knowledge to exploit the wealth of new opportunities while minimizing the deluge of new risks and costs. This session will provide a case study of how one life sciences company is implementing XML for a competitive advantage. It will also discuss how XML Management technology was used to provide scientists and analytic applications with the ability to efficiently search and analyze the data using sophisticated queries.



BIO: Tim Matthews has extensive experience in high-tech engineering, marketing, and sales. Prior to cofounding Ipedo in 2000, he was director of product marketing at RSA Security, where he oversaw a line of developer security products and a line of security infrastructure servers. Previously, Tim worked in international sales and business development at Digital Equipment Corporation in Tokyo and Irvine, California.

(XM7) Using XML for EAI: Best Practices

DAN ENACHE, TIBCO SOFTWARE

Wednesday March 19, 2003 3:00 P.M. - 3:50 P.M.

According to Gartner Group, EAI is the hottest IT market. Even in a slow economy, the EAI market is expected to grow at a steady pace, faster than most of the other sectors. How can you take advantage of EAI and help your company reap the benefits? What are the best practices in using XML to implement large EAI systems? What are the pros and cons in using XML as a "lingua franca"? How are people in the trenches using XML and EAI to build systems that work?



BIO: Dan Enache is a senior software architect for TIBCO Software. He is an expert in large integrations both in the EAI space and on the Web, as well as large portals and Single Sign-On integration solutions. Dan has extensive experience with high volume/high availability transactional/financial systems, and a great deal of expertise in implementing large security systems. He is a J2EE developer and Sun Java Architect.

(XM8) Delivering Web Services to Mobile Clients with XML Transformation Frameworks

PAUL LIPTON, COMPUTER ASSOCIATES

Wednesday March 19, 2003 4:00 P.M. - 4:50 P.M.

Much of the discussion on Web services focuses on the server side, but careful consideration of the delivery of Web services to client platforms is also necessary. Important technology and business trends will increase the diversity of client platforms, and will require that you consider mobile devices at the earliest stages of design. In fact, proper visualization, aggregation, and delivery of Web services in the new world of highly variable client platforms will be essential for the ultimate success of many projects.



BIO: Paul Lipton is the Web services technology leader for the field services organization and a technology strategist in the Office of the CTO. He has been an architect and developer of enterprise systems for more than 20 years, and has worked closely with key CA customers to architect distributed solutions using J2EE, .NET, wireless, and Web services technology.

(XM9) XML, Ontologies & the Semantic Web

AYESHA MALIK, OBJECT MACHINES

Thursday March 20, 2003 9:00 A.M. - 9:50 A.M.

The Semantic Web has generated much talk ever since Tim Berners-Lee, the inventor of the World Wide Web, first mentioned it a few years ago. Get the architecture details behind a Semantic Web. In particular, the session links the study of ontologies for modeling knowledge representation with the requirements of a Semantic Web. Track W3C's standardization activity in building XML standards for the Semantic Web including and RDF and OWL (Web Ontology Language).



BIO: Ayesha Malik is a senior consultant for Object Machines, a software engineering firm providing Java technology and XML solutions to businesses. Ayesha has worked extensively on large XML and messaging systems for companies such as Deutsche Bank and American International Group (AIG). Most recently, she has been researching new ways to make schemas extensible and object oriented.

(XM10) XQuery

**MIKE CHAMPION, RESEARCH AND DEVELOPMENT
SPECIALIST, SOFTWARE AG**

Thursday March 20, 2003 11:00 A.M. - 11:50 A.M.

As the ubiquitous data description and encapsulation standard, XML has quickly evolved into a container for all kinds of data. It is imperative that a standardized and flexible query and processing language be available to utilize the immense wealth of data that XML stores represent. Currently, even though established standards such as XSLT/XPath are available for transforming XML documents, the development around XQuery language has demonstrated the need for a flexible language for extracting data from XML documents. This session provides an introduction to XQuery language and illustrates its application through real-world scenarios.



BIO: Michael Champion is a research and development specialist at Software AG, working out of Ann Arbor, Michigan. He has been a software developer in the USA for 20 years, working primarily in the area of middleware for client/server document and image management systems. He has been active in the W3C's Document Object Model (DOM) Working Group for more than three years and was an editor of the core XML portion of the DOM Level 1 Recommendation. He is now cochair of the Web Services Architecture Working Group.

(XM11) XPath & XSLT 2.0

KURT CAGLE, CAGLE COMMUNICATIONS

Thursday March 20, 2003 3:00 P.M. - 3:50 P.M.

XPath and XSLT 1.0 are about to get a face-lift. Most of the improvements to the languages center on support for XML Schema, XML's official type system, although there are other compelling improvements that make the languages more usable as well. We'll walk you through "what's new" in both XPath and XSLT 2.0 and provide several examples using a reference implementation.



BIO: Kurt Cagle is the president of Cagle Communications, a consulting firm specializing in XML-related technologies, and is the author of 14 books on XML, XSLT, XQuery, and SVG. He is a columnist for *XML Magazine*, and publishes an e-newsletter that can be subscribed to from The Metaphorical Web.

(XM12) Third-Generation XML Tools

MICHAEL LEVENTHAL

Thursday March 20, 2003 4:00 P.M. - 4:50 P.M.

XML has become the ubiquitous infrastructure for Web services and a host of other software applications. The tools for building XML applications have progressed from the first generation of "hackerware" to a mature second generation of public and private domain tools providing SAX and DOM programming interfaces, robust parsing, well-formed and validation checking, and transformation with XSLT. Is there anything more to come? This presentation looks at two areas where interesting, third-generation tools are beginning to emerge: XML programming objects and streaming. With XML programming objects developers deal directly with document-specific classes derived from XML Schemas rather than generic document structures, as in the DOM or document events in SAX. JAXB reference implementation and Castor are two tools in this area, but there are also interesting developments coming that tightly mesh XML objects into programming languages. Streaming is based on the event model of XML parsing but goes beyond SAX with sophisticated techniques for analysis and processing of XML documents with ultra-low memory usage and high throughput. Streaming is being used in SOAP processors, search engines, entity resolvers, and transformation tools. Examples include the STX and XST transformation engines, Apache AXIS, and sequential XPATH implementations. At the end of this session we'll discuss ideas for next-generation XML tools.



BIO: Michael Leventhal led the team that architected and developed a document-style SOAP framework for Commerce One. He has led numerous projects in the area of Web applications and infrastructure and XML (and SGML) over the last 10 years and wrote the first book on XML software development for the Internet in 1998.

(VN2) The XMLSPY 5 Enterprise Edition Development Environment

TRACE GALLOWAY, CORPORATE SALES MANAGER, ALTOVA

Tuesday March 18, 2003 11:00 A.M. - 11:50 A.M.

XML-related technologies have begun to reach critical mass in many areas of business today. From e-commerce solutions to data integration initiatives to content authoring and publishing, XML related technologies are being used to meet many of the present and future business challenges. Altova™'s XMLSPY 5 Enterprise Edition Development Environment is ideally suited to meet the needs of developers, Web designers, and line of business users that are required to develop and work with XML related technologies. XMLSPY 5 Enterprise Edition is the industry-standard XML Development Environment for designing, editing, and debugging enterprise-class applications involving XML, XML Schema, XSL/XSLT, SOAP, WSDL and Web Services technologies. It is the ultimate productivity enhancer for J2EE, .NET and database developers. In this presentation, attendees will be introduced to many of the features available in the Development Environment.



BIO: Trace Galloway is the corporate sales manager at Altova, Inc, creators of XMLSPY, the award-winning and industry-leading tool suite for XML. Prior to joining Altova, Trace served as the chief evangelist for Infoteria Corporation, a global technology company specializing in the development of B2B-centric, XML-based servers and components. He has presented at numerous industry conferences including Web Services Edge New York, XML Conference Baltimore, and ASP.NET & XML Web Services Solutions Conference. He was co-author of a chapter entitled "Lead Tracking by Web and Email" in the *XML Handbook* Third Edition.

(VN3) SOAP and Java: Marrying Them Off

ALEXANDER MARLER, PARASOFT

Tuesday March 18, 2003 3:00 P.M. - 3:50 P.M.

SOAP is a lightweight, XML-based protocol for exchanging structured and typed information between peers in a decentralized, distributed environment. Although SOAP strives to be agnostic with respect to programming languages, some languages facilitate working with SOAP better than others. The combination of Java's strong typing system and its reflection API make Java especially conducive to implementing SOAP-based Web services. The presentation will explore how Java facilitates the automation of activities such as WSDL (Web Services Description Language) generation and SOAP deployment. It will also discuss how these features are influencing the development of Java-based SOAP tools.



BIO: Alexander Marler, software technical consultant, joined Parasoft to provide technical pre and post sales support along with business development for specific product lines. He has over 15 years of sales and technical expertise in the high tech industry. He has been responsible for product and business development at Sybase Inc., Charles Schwab, and Hunt-Wesson Foods. Marler received his Bachelor of Science in Management Information Systems from Washington State University.

(VN5) Process-Centric Enterprises: The Coming Revolution in Web Services-Driven Business Analytics

ERIC PULIER, CHAIRMAN AND CEO, DIGITAL EVOLUTION

Wednesday March 19, 2003 9:00 A.M. - 9:50 A.M.

As major companies transition to Web services and the Service Oriented Architecture (SOA), they are beginning to tap into the SOAs ability to provide greater visibility into business operations in real time. This presentation will explore how exposing the IT functions of a given business process as Web services makes it possible to monitor the activities of that process, even if the process occurs across multiple lines of business and IT systems. The result is what Mr. Pulier terms the "Process-centric" enterprise, which benefits from the functionality of integrated applications and systems without the rigid, time-consuming, and costly process of actual application integration. This session will address these issues and others as he lays out his vision of where enterprise computing is heading.



BIO: Recently named one of 30 e-Visionaries by VAR Business, Eric Pulier is a popular speaker at many elite technology conferences. As CEO and founder of Digital Evolution, he drives the operations and strategic vision of a company that is making the service-oriented architecture revolution a reality. Pulier has been a pioneer in the interactive industry for over 15 years. In 1997, the Presidential Inaugural Committee selected Mr. Pulier to create and execute the Presidential Technology Exhibition in Washington, D.C. He is a graduate of Harvard University.

(VN6) Pattern-Driven Application Development

TOM SHORE, SENIOR PRODUCT CONSULTANT, COMPUWARE

Wednesday March 19, 2003 11:00 A.M. - 11:50 A.M.

OMG's model-driven architecture (MDA) allows organizations to build platform and language neutral models and specifications of functionality. This approach will improve the stability, durability, and reuse of models, as they are not bound to any specific technology. Furthermore, it will boost developer productivity by increasing the code generation capabilities of development tools. As models are translated from a platform independent model (PIM) to a platform specific model (PSM), and further to an implementation (code) model, intelligent code generation engines are able to produce more and better code. Compuware's OptimaJ J2EE development tool is the only implementation of the OMG MDA so far. This presentation discusses how OptimaJ implements OMG's MDA.

BIO: Thomas S. Shore is a senior product consultant with Compuware Corporation's Application Development & Portal Solutions Software Division. Thomas joined Compuware in 1993 and held various positions before focusing on J2EE and related technologies. He has also held various software engineering and consulting positions in the manufacturing, oil & gas exploration and database software markets.

(VN7) Managing the Developer Relationship

MIKE BELLISSIMO, SUN MICROSYSTEMS

Wednesday March 19, 2003 3:00 P.M. - 3:50 P.M.

More and more vendors are developing extensive programs to capture developer interest and loyalty. These programs must adopt a philosophy of managing and enhancing the individual developer's entire experience through the life cycle of the relationship. This includes managing the developer's experience in all places where it touches the vendor. Mike Bellissimo, senior director of Sun Microsystems Software Developer Marketing and Management, will discuss how he believes developers can and should be supported with programs that help them learn, plan, evaluate, and develop their products and services.

BIO: In over a decade at Sun, Mike Bellissimo has managed sales operations for iPlanet and JavaSoft, software training and services for SunSoft, and developer programs and strategy in Sun's market development organization. Previously he managed product training for field and reseller organizations.

(VN10) Model Driven Development of Web Services in UML for the J2ME Platform

BILL GRAHAM, RATIONAL SOFTWARE

Thursday March 20, 2003 11:00 A.M. - 11:50 A.M.

Mobile and wireless clients are an integral part of the vision for Web services. The hardware computing and memory limitations of handheld and wireless devices require the use of lean-and-mean utilities to make Web services practical. This presentation looks at some of the possible solutions in the context of a typical J2ME platform. Models of possible architectures for J2ME applications are explored through the use of UML. Using models to generate code and therefore applications through Model Driven Development (MDD) are also introduced.

BIO: Bill Graham is the embedded Java evangelist at Rational Software. He has over 14 years of experience in working with real-time and embedded systems. He has presented at JavaOne, the Rational Users Conference, and the IEEE International Performance, Computing, and Communications Conference (IPCCC). Bill has a B. Eng. and a M. Eng. from Carleton University, Ottawa.

(VN11) Why Web Services Management?

JON ATKINS, HP

Thursday March 20, 2003 3:00 P.M. - 3:50 P.M.

The popularity of Web services continues to grow because they reduce integration costs and enable greater flexibility and ease in exposing applications as new sources of revenue. However, this benefit is achieved with less secure, less reliable communications. To get the most out of Web services, you must be able to manage and control the new risks that come with them. This lively and informative presentation will answer these questions and reveal the importance of developing Web services with manageability in mind.

BIO: Jon Atkins is the product manager for HP's Web Service Management Platform. He brings 10 years of marketing, sales and advertising experience, primarily in high technology.



Java UniversitySM Program: Aggressive, code-level training courses for experienced developers using Java[™] technology, brought to you by Sun Microsystems, Inc. Attend seminars designed by industry luminaries and recognized experts. Sessions cover Sun certification and Web services technology. Whether you're a beginner or a veteran developer, architect, or software engineer, you'll benefit from these value-packed full-day courses. Register now. Seating is limited.

The Java UniversitySM program complements this year's Web Services Edge conference by offering 3 full-day training lectures for experienced software developers, architects, and engineers.

Java UniversitySM Program Take-Aways:

- Training designed and presented by expert Java technology engineers
- Student guides full of source code, examples, references and copies of instructors' materials
- Free Web-based training courses from Sun Educational Services

Tuesday, March 18, 2003 Web Services Using Java[™] Technology and XML

SANG SHIN,
SUN MICROSYSTEMS, INC.

Who Should Attend

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

Prerequisites

Experience using the Java programming language and basic knowledge of XML

Overview

This one-day seminar provides in-depth knowledge on Web services and shows how to develop Web services using the Java programming language and XML, the technologies of portable code and portable data respectively.

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

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

Benefits

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

Wednesday, March 19, 2003 Java[™] 2 Platform: Programmer Certification Fast Path

PHILIP HELLER, PRESIDENT,
HELLER ASSOCIATES

Who Should Attend

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

Prerequisites

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

Overview

The development community recognizes that competency developing solutions using Java technology is vital to productivity, reaffirms your value to your organization, and increases your career advancement opportunities. This session, developed and delivered by Philip Heller, author of the two leading Java technology certification preparation manuals, helps to prepare you for the Sun Certified Programmer for the Java 2 Platform exam. Philip provides code-level, detailed review of the skills and knowledge needed to confidently approach the exam.

Benefits

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



Thursday, March 20, 2003 Java[™] 2 Platform: Architect Certification Fast Path

**SIMON ROBERTS, TECHNOLOGY
EXPERT AND COURSE DEVELOPER,**
SUN MICROSYSTEMS, INC.

Who Should Attend

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

Prerequisites

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

Overview

Many of the solutions in today's "Net economy" are, or soon will be, developed using the Java 2 Platform, Enterprise Edition (J2EE) architecture. Gaining recognized competency architecting J2EE platform-based solutions is vital to your success as an architect, reaffirms your value, and increases your career opportunities.

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

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

Benefits

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

XML Certified Developer *Fast Path*

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

Audience

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

Prerequisites

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

Overview

XML is the foundation of two important emerging technologies: Web services and the Semantic Web. XML

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

Outline

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

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

Presenter Bio

Joel Amoussou is the founder and chief learning architect of XMLMentor. Joel is the author of the first XML training course specially designed to prepare developers for IBM® Test 141 on XML and related technologies. He has created XML content management applications for the aerospace, pharmaceutical, and publishing industries.

Microsoft® FREE .NET Web Services Tutorial



Russ' Tool Shed
Wednesday, March 19, 2003
9:00 a.m. – 5:00 p.m.

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

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

One of the key ideas behind the .NET strategy is the concept of software as a service, or in short, Web services. This session will explain what a Web service is and provide an overview of its related technologies like XML, SOAP and UDDI. We will demonstrate how the .NET Framework makes it easy to implement them for new and existing applications. This session will also provide concrete best practices for building XML Web services using Visual Studio .NET. We'll answer many common questions like: How will my Web service scale? How can my XML Web services enable interoperability with Web services from other vendors as well as within my own organization? We'll delve into building highly reliable and secure Web services. Also, we will discuss issues such as

dealing with complex data types using WSDL (Web Services Description Language), as well as securing SOAP messages using encryption. We'll see how developers can use enterprise-level XML Web services to simplify customer solutions.

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

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

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

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



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

Mobile .NET



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

Overview

In this session, Derek Ferguson, editor-in-chief of *.NET Developer's Journal*, will give you a thorough introduction to the use of .NET with all manner of mobile computing devices.

The morning will begin with a comprehensive survey of the five most popular mobile computing platforms: Pocket PC, Palm OS, WAP, i-Mode, and J2ME. It will conclude with a thorough examination of how the Mobile Internet Toolkit (a.k.a. "the MIT"), a key part of

Microsoft's mobile .NET strategy, can be leveraged to build Web-based applications capable of working with any of these devices.

In the afternoon, we will discuss Microsoft's technology for building self-contained .NET applications for execution on "smart devices" the .NET Compact Framework. Before the end of the session, such advanced topics as COM Interoperability, SQL Server CE, and MIT extensibility will be covered.

Presenter Bio

Derek Ferguson is chief technology evangelist for Expand Beyond Corporation (www.xb.com), the world-

wide leader in mobile software for enterprise management. He is also editor-in-chief of *.NET Developer's Journal* and author of the book *Mobile .NET*.



Derek Ferguson

Editor-in-Chief, *.NET Developer's Journal*
Chief Technology Evangelist, Expand Beyond Corp.

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Exhibit Hall A

Wednesday, March 19:

11:00am - 6:00pm

Thursday, March 20:

11:00am - 4:00pm

Opening Night

Reception on the

Expo Floor

Wednesday, March 19:

5:00pm - 6:00pm

- Actional
- Altio
- Altova
- asp.netPRO
- ASPstreet.com
- Attachmate
- BEA WebLogic Developer's Journal
- Borland
- ColdFusion Developer's Journal
- Compuware
- Digital Evolution
- EAI Industry Consortium
- Ektron
- Fair, Isaac and Company
- Forum Systems
- GAO Web Services Inc.
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- HSPstreet.com
- Infragistics
- IONA
- Java Developer's Journal
- JavaWorld
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4

A. Your Job Title

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

B. Business/Industry

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

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

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

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

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

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

- ☐ \$10 billion or more ☐ \$1 million - \$9.9 million
☐ \$1 billion - \$9.9 billion ☐ Less than \$1 million
☐ \$100 million - \$999 million ☐ Don't know
☐ \$10 million - \$99.9 million

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

01 ☐ Yes 02 ☐ No

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

- ☐ Application Servers
☐ Web Servers
☐ Server Side Hardware
☐ Client Side Hardware
☐ Wireless Device Hardware
☐ Databases
☐ Java IDEs
☐ Class Libraries
☐ Software Testing Tools
☐ Web Testing Tools
☐ Modeling Tools
☐ Team Development Tools
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☐ Frameworks
☐ Database Access Tools / JDBC Devices
☐ Application Integration Tools
☐ Enterprise Development Tool Suites
☐ Messaging Tools
☐ Reporting Tools
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What's in the next issue of *JDJ*?

SWT

A RICH SET OF NATIVE UI CLASSES FOR JAVA

The Standard Widget Toolkit (SWT) is a Java class library that allows you to create GUI controls and is designed to provide efficient, portable access to the user interface facilities of the operating system on which it's implemented. Unlike Swing, which uses a lightweight drawing framework to create its controls, SWT uses native widget resources wherever possible. This article introduces SWT and describes how to use it to build a GUI, as well as where and why SWT differs from the AWT and Swing.



JDJ ASKS...BORLAND

Tony de la Lama is vice president and general manager of Java solutions for Borland. He's responsible for the strategic and technical direction, business development, engineering, and marketing efforts of Borland's core Java products, including the JBuilder development platform. *JDJ* readers had the opportunity to ask Tony what Borland is up to in the Java space. Here are his answers.

WANTED: JAVA APPLICATION WITH NATIVE OS LOOK AND PERFORMANCE

In his editorial "Swing Is Swinging Java out of the Desktop" (Vol. 7, issue 10), Alan Williamson lamented the current state of Swing and AWT for building competitive desktop applications. One alternative he mentioned is a technology called Standard Widget Toolkit (SWT) that was developed as part of the Eclipse Project (www.eclipse.org). If you're wondering why the Eclipse community, led by IBM, developed SWT instead of using J2SE's AWT or Swing classes, here's the reason.



DEBUNKING THE MYTH OF IN-PROCESS APPLICATION LAYER CACHING

J2EE applications are characterized by the continuous creation, consumption, and destruction of various types of application objects. Creation and destruction of these objects is expensive – object creation usually requires accessing persistent storage in back-end systems, while object destruction requires releasing resources used by the object.



JAVA DATA OBJECT

Java Data Object (JDO) is a standard API used generically to store, retrieve, and query user-written object classes to and from a data store. What makes JDO stand out among other persistence options is that it's easy to use and flexible. JDO provides transparent persistence so it's easy for developers to persist objects without doing any extra work. This article will show you the basics of JDO and also demonstrate how easy it is to use JDO, and how it can help you with your development.



EXPLORE



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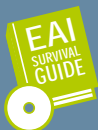
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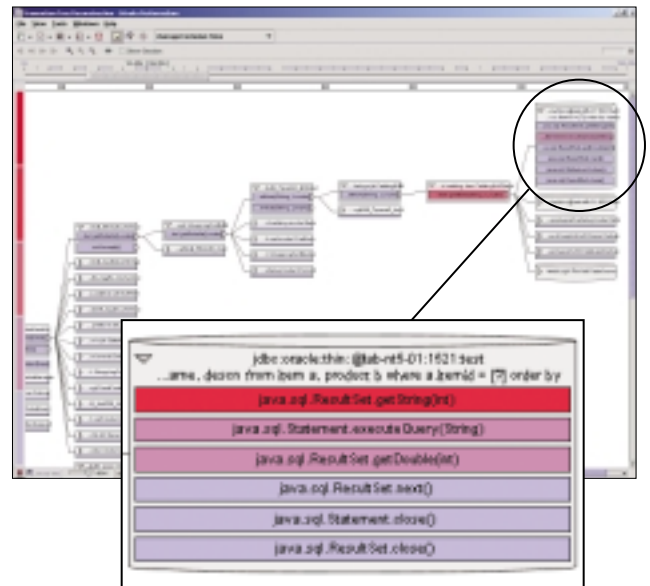
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The Transaction Tree provides an end-to-end method-level view of any transaction's path through the distributed J2EE system. Clearly see component interactions within the application architecture on a per-transaction basis, with performance hotspots highlighted in red.

