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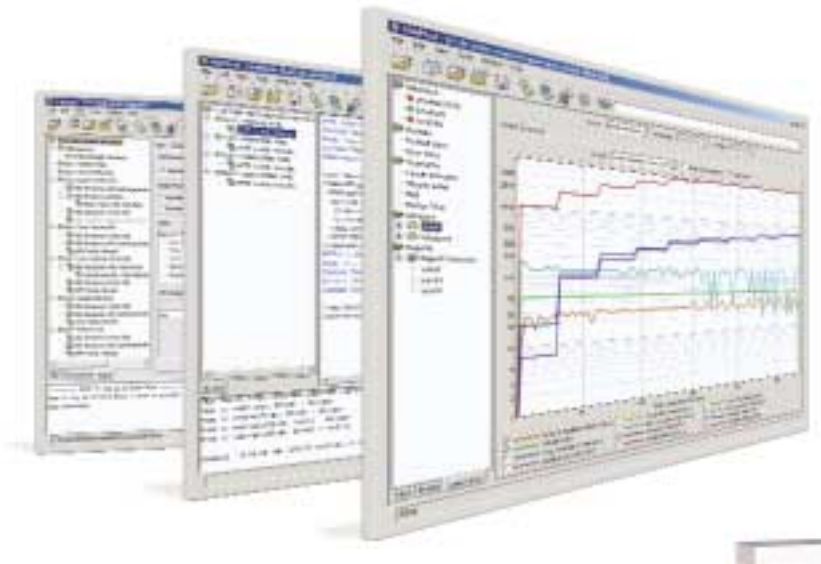

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The Whole Package

WRITTEN BY
SEAN RHODY

One of the more interesting observations I've made in the past year concerns the model on which corporations base their IT strategies. I've visited a large number of major corporations, and there's a very strong trend. These corporations are large, with established business practices and IT organizations, and one of the things they all have in common is that no one is writing a new business application. That's not to say that they're not actively redeveloping business processes that they already have, or updating an application to move it from the mainframe to a distributed platform, because they certainly are. But what's really interesting is that with few exceptions, corporations are not building new software. What they are doing is rebuilding existing software.

While this may not seem remarkable, it does have a profound effect on how they go about their approach to IT, and even to a certain extent how they approach their actual line-of-business processes.

Business process outsourcing (BPO for short) is one approach that is much considered, and represents the next step in the evolution of hosting services. Rather than just move an application or Web site to a hosting vendor to take advantage of the hosting center's volume cost model, businesses are increasingly looking to move the entire process out of the corporate mainstream and onto a set of processes provided by an outsourcer.

Another approach to this situation is to rely heavily on packaged applications that can be customized. Some well-known examples are Peoplesoft and SAP, but there are numerous other packages that are less well known, but tailored to a particular industry.

When an organization takes either of these approaches, it accepts a business model other than its own particular way of doing business. The business advantage of doing either tends to run toward cost containment, usually based on the recognition that the process in question is, if not commoditized, at least standardized to the extent that no real competitive advantage can be gained from creating a completely custom in-house process. Even when such processes exist, organizations recognize that the cost of maintenance exceeds the value that they bring to the corporation.

One large corporation recently admitted that for every dollar spent on IT, 98 cents is spent on maintenance and infrastructure. Businesses can't cope with such costs and continue to adapt to changing business climates. In such an environment, there's no headroom for new application development (and therefore, no room for new business processes).

Into such a world come packages and BPO (and sometimes a mix of both) as solutions to the issues. The BPO solution changes the pricing model and takes the infrastructure and maintenance costs out of the equation, although in the long run costs may be higher as the model does have an indefinite aspect to it (i.e., there's no final cost; there are yearly costs ad infinitum). Of course, when you go BPO a lot of your staff is surplus. Unfortunately, staff often equates to institutional memory, and cuts can have a negative impact on the ability of an organization to do their work (like cutting the only guy who knows how to run a key report).

Packages allow corporations to take the maintenance out of the equation, while leaving the infrastructure. In either case, what is left after you move to the new situation is the need for an interface. Something simple – an easy-to-access mechanism that can be utilized regardless of technology. Yes, Web services.

I know, I dove right from 30,000 feet to sea level on that one. But the reality is that once you make the high-level decisions, you need the ground-floor support to make them work out. In this case, Web services is the key to achieving that ROI that everyone talks about. Which is why package vendors are moving towards it in droves, and BPO vendors are considering it the way to eliminate multiple versions of their software. In this issue we'll examine some of the ways Web services are being applied to packages and how this will impact the way we do the business of IT. Enjoy, and welcome to the brave new world of IT.

About the Author

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Mindreef News
Volume 2 February 2004 www.mindreef.com

Hot New Features in SOAPscope 3.0

Graph View

When you're debugging a Web service performance problem and you have many messages in your SOAPscope database, you want to be able to easily discover the exceptional messages, or "outliers," that may be causing the problem. SOAPscope 3.0 can build a graphic visualization of your message log that allows you to quickly drill down to the messages that need closer inspection. Graph View renders data in the following modes:

- Average and maximum response time vs time.
- Average and maximum message size vs time.
- Successful transactions and faults in a specified time period

IDE Integration

We know where you live — in your IDE! So we've integrated SOAPscope right into Microsoft® Visual Studio® .NET. Writing a Web service? Analyze the WSDL at any time with the click of a button. Debugging a Web service? No need to write a bunch of small tests to call the different methods — just use SOAPscope's WSDL Invoke feature from within the IDE. Debugging a Web service client? Look at the message log to see what really got sent on the wire. Eclipse version coming soon.

Start and Stop from the Taskbar

SOAPscope 3.0 can now run as a Windows® service. Just click on the SOAPscope icon in the taskbar to start and stop SOAPscope.

Message Analysis

Do you have a Web service that you suspect is sending invalid messages? Check the message out with SOAPscope's Analyze feature. It will pinpoint the exact part of a message that is invalid and highlight it for you, providing you with a detailed, understandable description of each problem. The Analyze feature checks for:

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- Conformance of request and response to the applicable WSDL file
- Proper formatting of request and response

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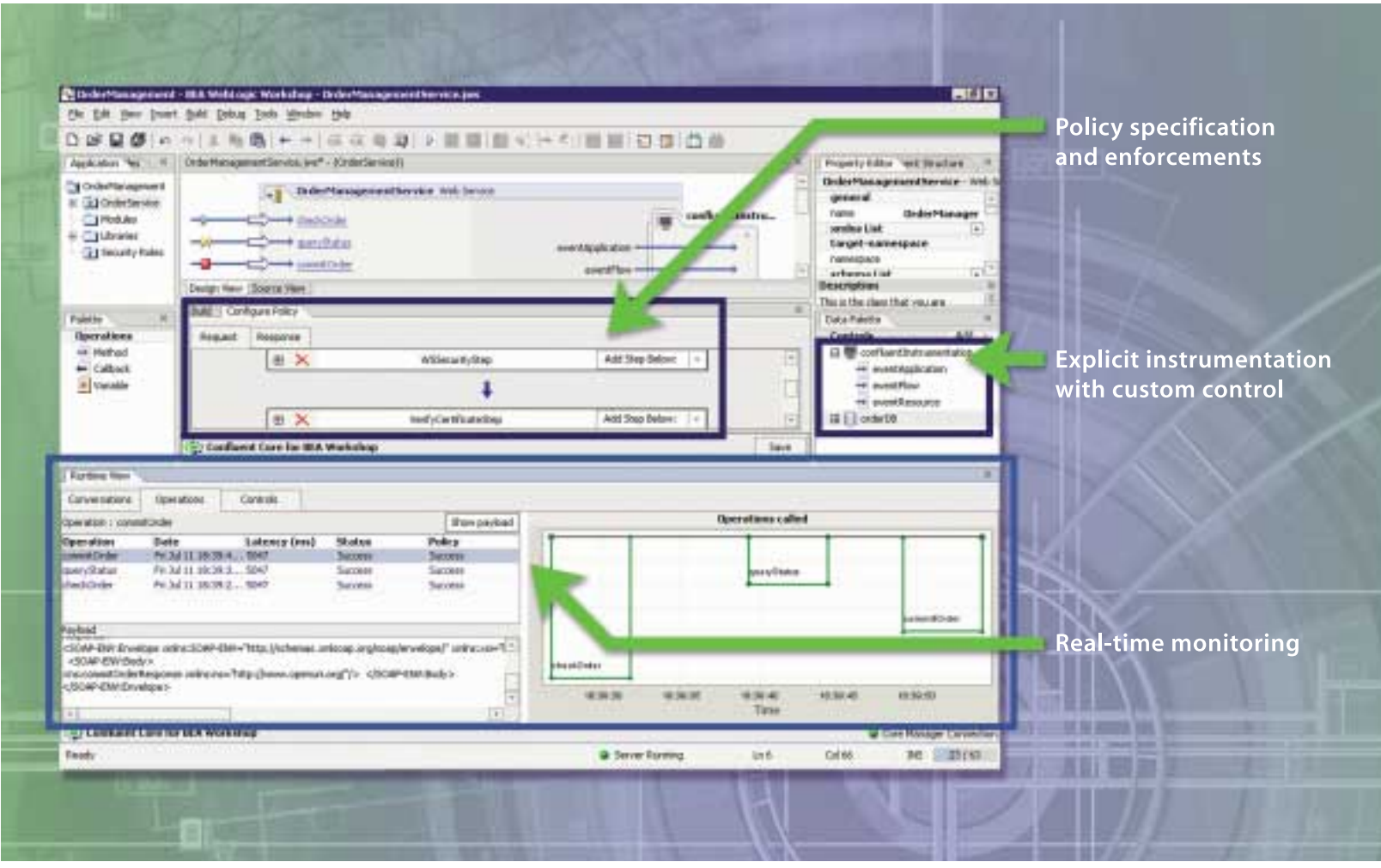

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Practical Application of the Web Services Distributed Standard

WRITTEN BY
JEFFREY TUCK

The creation and adoption of "standards" help to bring about interoperability. Within the management area, the Web Services Distributed Management (WSDM) specification, currently being developed within OASIS, is an attempt to bring about interoperability for the management of distributed computing environments. It essentially defines a protocol for interoperability of management information and capabilities via web services. This article provides you with a few thoughts on how WSDM could be applied in practice, and why this particular initiative is so important in aligning IT and business.

Before looking into the utilization of WSDM, let's first quickly examine why the standard is being created. After all, there are standards currently in place for management, such as SNMP, JMX and WMI, to name a few. However, while these standards are effective in managing specific resources within the enterprise, they do not address the management of business processes and the underlying application services they rely on. There is no standard available for expressing the relationships that exist between resources, business processes, and related services. And there is a significant gap for management standards to provide a means to correlate business and IT. The WSDM Technical Committee within OASIS is attempting to address some of these issues.

So what exactly is WSDM? In short, the WSDM specification will define WSDL for exposing management information and capabilities. It defines a standard for the management of Web services, as well as defines a standard for management using Web services. Considering the fact that WSDM utilizes Web services to expose management information, applications within the management domain gain all the benefits associated with this type of loosely coupled distributed paradigm in the same way that business applications have. For example, firewall traversal via HTTP for inter-enterprise communication, as well as platform and container neutrality.

The WSDM specification will provide a direct means for applying interfaces to management information across the entire technical stack within the enterprise, which provides a unique opportunity for utilizing this management information in alternate ways. There is no doubt that management information will still be utilized concretely to manage status such as service levels and availability. However, if business metrics are also available, there is an opportunity to correlate the two.

Let's walk through a simple example. Suppose a furniture manufacturer offers a guarantee to deliver a product within 30 days of an order being placed. If the order is not shipped within 30 days, a 10% discount will be applied to the order. The manufacturer has several shippers to choose from, and selects one based on cost and delivery time frames. All shippers the manufacturer conducts business with have implemented the WSDM standard in order to expose information about their services in order to provide enhanced customer service.

The manufacturer utilizes a business process for orders based on the Business Process Execution Language (BPEL) standard. WSDM can be used to monitor the end-to-end response time of a BPEL process as well as the time taken by each step. The manufacturer uses this to monitor the 30-day guarantee pledged to customers. In addition, the manufacturer also listens for WSDM based notifications from its shipper to gain insight into their ability to ship on time. These notifications could be based on IT or business events.

As the manufacturer receives WSDM events from suppliers, the information can be correlated with the order process to judge whether the

–Continued on page 27

Composition and Management of Web Services

Development that makes a good symphony

Father James Keller, the founder of a religious order called The Christophers and a popular religious television and radio personality in his day, wrote an amusing story about Mozart. He said, "A young man, just beginning the study of musical composition, once went to Mozart and asked him the formula for developing the theme of a symphony. Mozart suggested that a symphony was rather an ambitious project for a beginner; perhaps the young man might better try his hand at something simpler first. 'But you were writing symphonies when you were my age' the student protested. 'Yes, but I didn't have to ask how.'"

WRITTEN BY
PAUL LIPTON

Mozart was able to compose monumental symphonies out of simple melodic themes. Moreover, Mozart's symphonies always appear to work well as a whole. If there are bugs or mistakes in his compositions, it is usually far beyond most people's abilities to distinguish them. For those of us lacking a Mozart-like ability to create near-magical distributed computing solutions of perfect reliability or robustness, the idea of a service-oriented architecture (SOA) implemented using Web services standards could not have come at a better time.

Service-Oriented Architecture

A good way to understand the importance of an SOA is to think about classical chamber music. In a chamber group there is no conductor. With only a few instruments and frequently no percussion, the cello often serves as the foundation for higher-level musical activity. In short, its deep tones carry the beat. A service-oriented architecture is frequently a foundation for higher-level activity and offers many benefits. Used correctly, it can enable the creation of higher-level distributed applications based on Web services that are less brittle than many systems developed in the past based on technologies like Microsoft DCOM or Java RMI.

One of the key concepts behind an SOA is the idea of loose coupling – of reducing the dependency between distributed components through the dynamic discovery of services. This is an excellent architectural approach to take for many applications. Rather than hard coding dependencies (tight coupling) between components, loose coupling allows distributed applications to be less brittle and more responsive to changing business conditions. Services that provide specific functionality can more easily be switched with equivalent services and alternative services more easily invoked without breaking the application. Increasingly, Web services are the choice for implementing a SOA within and across enterprises.

Web Services in an SOA

Today Web services are commonly understood to mean a collection of standards, derived from XML, that facilitate interoperability between diverse platforms and applications. Web services have found increasing success and use in a broad range of companies from e-retailers like Amazon to financial giants like Merrill Lynch. Smaller companies are also finding the affordability and rapid return on investment (ROI) of Web services very compelling. As a result of this industry momentum, most informed observers these days believe that Web services will increasingly be used as the foundation for building new distributed applications both within the corporate fire-

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The relationship between a SOA and Web services is itself loose. It is possible to create a SOA without using Web services, but the core Web service standards such as SOAP for message protocols, WSDL for service description, and UDDI for service lookup offer the best mechanism to implement a SOA across platforms, development languages, and enterprise domains. There are many reasons for this, but the fact that these core standards are based on XML is certainly an important factor. XML's extensibility, platform neutrality, self-description capabilities, and more have all been leveraged by the core Web services standards as well as the newer Web services standards, such as OASIS WSBPEL and WSS (a continuation of the work done on the WS-Security specification).

Composable Web Services Standards

But there is another aspect of Web services standards that has significantly contributed to their success. Web services standards have largely been designed to be composable. Composability is a design principle that stipulates that it is possible to build more powerful and feature-rich functionality from simpler elements. Each simple element must have discrete, independent capabilities of its own, but can also be added to (composed with) other elements to create more complex solutions.

Web services composability works along similar lines. Again, thanks to the extensibility of XML, it is possible to compose additional independent functionality into any SOAP message or other types of Web services document, such as WSDL. Listing 1 illustrates a simplified example of this. The code shows that it is possible to add WS-Security information and/or WS-Reliability information (one of the specifications contributed to the OASIS Web Services Reliable Messaging (WS-RM) technical committee) to a SOAP message without changing any other information in the message and without impacting consumers of the SOAP message that may not be able to process that additional information. Similarly, it is possible to add WS-Policy information to a WSDL document without interfering or intermingling with the standard description information that is typically found in WSDL.

Consumers of a Web service can take an incremental approach to utilizing information in a Web services document (normally a SOAP message), rather than being forced to understand it all. The creators of a service consumer must only support those standards that are necessary for their business requirements. For example, if they need message reliability added to SOAP, they can implement support for handling the WS-RM elements that could be placed in the SOAP messages. The ability to pick and choose just what you need for your business requirements helps reduce the complexity of service implementation, and therefore the cost.

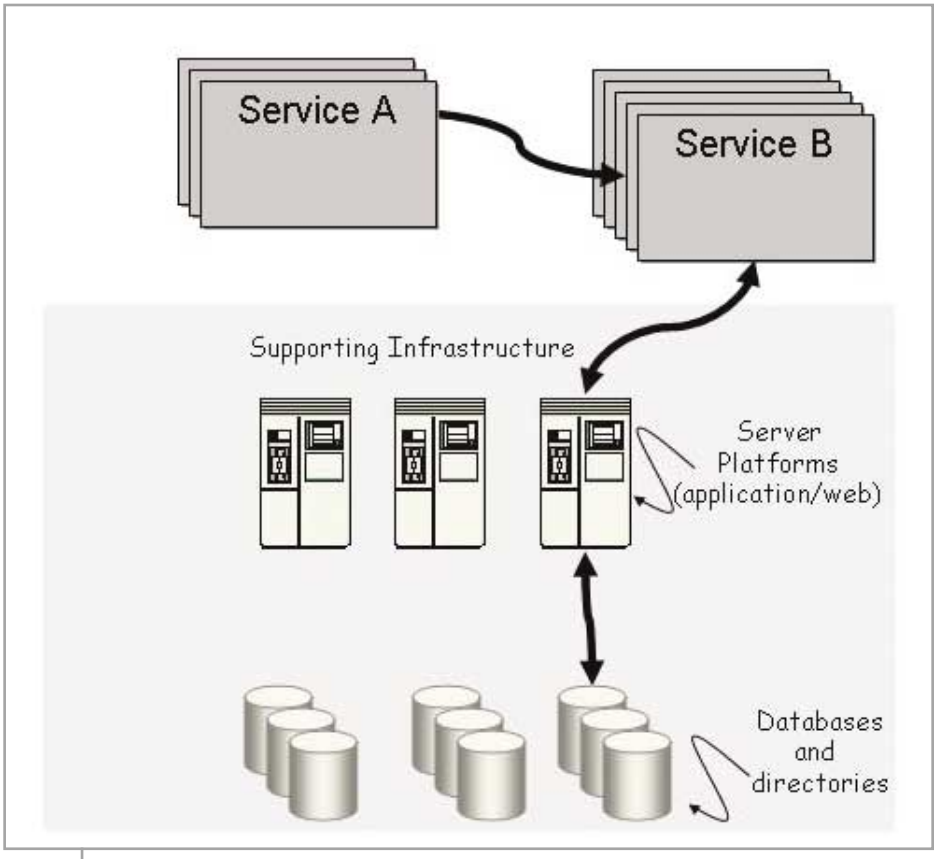


FIGURE 1 **Root-cause analysis from service A to service B to the underlying problem within the infrastructure of servers, databases, etc.**

Composable Web Services Standards in a SOA

One of the benefits of a SOA is that it can encourage the reuse of services, enabling many service consumers to use the same service in order to fulfill business and technical requirements. This can reduce development costs and speed time to market. In an SOA it is easier to locate and share services because there is a central repository that contains service information that can be utilized by service consumers. The Web services UDDI standard improves upon this by providing a universally accepted service discovery and publication mechanism. Because UDDI is so widely accepted (there are alternatives, but none likely to figure prominently in most solutions), there is a plethora of low-cost and easy-to-use development environments able to utilize UDDI and other Web services standards that are available from a variety of vendors, as well as the open source community.

This same incremental approach to utilizing information in a Web services document can also be of immense benefit in a SOA. Consumers need to use only those standards composed within the service that they actually need, while other consumers are free to use the service along with a different mix of composed standards that are useful to them. So, Web services standards composability not only increases the usefulness of a service- oriented architecture, but

also facilitates loose coupling in that architecture as services do not have to rigidly match the requirements of only one consumer or one group of homogeneous consumers. Rather, consumers can be diverse, with different requirements, and yet still interoperate with the same service.

Management of Web Services in a SOA

Clearly, the advantages of a SOA based on Web services standards are driving ever-increasing industry momentum and IT commitment. This trend is already beginning to push the use of Web services beyond the corporate firewall toward new B2B scenarios and electronic marketplace opportunities. As these opportunities grow in value and complexity, the need to meet service obligations and to ensure the reliability and performance of Web services that are often themselves utilized by higher-level, mission-critical Web services becomes paramount. Yet this can be a daunting and near-impossible task without management solutions that are specific to Web services, functioning at the level of the SOAP messages that form the basis of an SOA in action. In other words, SOAP message traffic exists at a logical level above the middleware, operating systems, and hardware that forms the supporting infrastructure for Web services. It is the semantic content of those SOAP messages, including both business and security information, that must be observed in order to properly manage a SOA and its supporting Web services.

Another consideration is that well-managed enterprises often have existing enterprise management solutions from leading vendors like CA. These solutions typically offer comprehensive IT infrastructure management from the hardware to the operating systems and middleware. There is a need to unify management at both the Web services and the infrastructure level in a consistent fashion and using a consistent user interface.

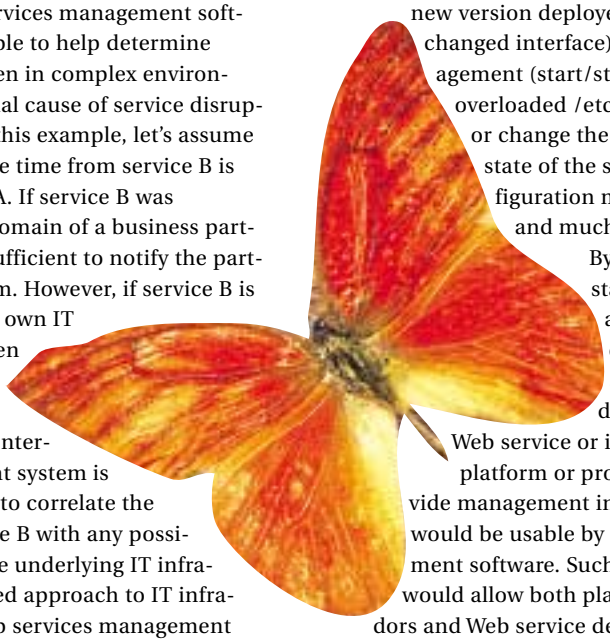
Such unification is needed for two reasons. First, a Web services management solution that is not unified with IT infrastructure management can add to the cost, and reduce the responsiveness, of operations staff to service problems. This is because the IT operations staff is already familiar with the GUI and metaphors expressed by their existing enterprise management solution. To appropriately monitor and control Web services in a SOA, operations personnel would either have to be trained on both systems or learn to live with the overhead of miscommunication that would inevitably be caused by the dissimilar terminology and user interfaces in the two management systems.

Of even greater importance is the extreme difficulty in uncovering the true root cause of service problems when the integration between Web services management and IT infrastructure management is superficial or absent. At least for those services deployed within the enterprise domain, there must be some means of correlating a service with its underlying IT infrastructure. For example, service A may be performing poorly (see Figure 1). However, that poor performance may be the result of problems with other services that are consumed by service A. Web services management software should be able to help determine which service, even in complex environments, is the actual cause of service disruption in a SOA. In this example, let's assume that slow response time from service B is affecting service A. If service B was deployed in the domain of a business partner, it might be sufficient to notify the partner of the problem. However, if service B is deployed on your own IT infrastructure, then significant and meaningful integration with the enterprise management system is required in order to correlate the problem of service B with any possible issues with the underlying IT infrastructure. A unified approach to IT infrastructure and Web services management would allow us to determine the exact underlying cause of service B's poor performance, which in this case might be database memory problems.

Enterprise management also plays an important role in rectifying problems in the underlying IT infrastructure. With advanced on-demand capabilities it is often possible to rectify even serious resource allocation problems automatically. This sort of rapid response is essential in the fluid environment of an SOA. So, as Web services evolve toward more mission-critical scenarios, a unified approach to enterprise and Web services management will become an increasingly important requirement. Similarly, requirements for meaningful integration with enterprise security systems will also be a long-term trend for Web services management systems. This integration is likely to go far beyond superficial lookup of identity towards unified administrative portals and other advanced features.

A Web Services Management Standard

Although many management functions require SOAP message observation, especially when meaning or context is a concern, many management functions would be better defined as a management capability of the Web service itself (or its proxy or intermediary). For example, useful management behaviors defined for Web services would likely include life-cycle support and notification for a variety of events (such as a new version deployed or a changed interface), state management (start/stop/up/down/overloaded /etc.) to monitor or change the behavior or state of the service, configuration management, and much more.



By defining standard management capabilities and interface descriptions, a Web service or its containing platform or proxy could provide management interfaces that would be usable by any management software. Such a standard would allow both platform vendors and Web service developers to provide manageability to Web services management systems that would otherwise be proprietary and platform specific. For example, an application server could automatically compose and deploy standard management interfaces into any Web service.

Since an important benefit of Web services is interoperability between dissimilar systems and applications, SOAs often contain diverse Web services platforms. A standard would enable Web services management systems to provide deeper monitoring and control capabilities of all Web services platforms that comply with the standard. It would even be possible to provide some or

all of this manageability across administrative domains; this would be of value in many scenarios such as B2B relationships between trusted partners.

The Web services community has long been aware of the advantages such a standard could offer. Work was begun in the Management Task Force subcommittee of the W3C Web Services Architecture Working Group, but as the importance and extent of the work required became better understood, that work was moved to a new technical committee (TC) formed under the OASIS organization in March of 2003. That TC, OASIS WSDM (Web Services Distributed Management), is composed of a diverse group of companies interested in management issues, including leading management software vendors such as CA, HP, and IBM. The TC charter could be summarized as carrying on with the initial work of the Management Task Force with wider scope, working towards precise requirements definitions and specifications.

It is interesting to note that in addition to the management of Web services, referred to in the TC as MOWS, the TC is pursuing the requirements definition and specification of the management of IT resources, such as disk drives, operating systems, and routers using Web services. This effort is referred to in the TC as Management Using Web Services, or MUWS. While such an effort might be surprising, given that management of these types of IT resources is already possible using other standards, such as CIM, there is little doubt that the effort is worthwhile. Since Web services technology could potentially offer the same benefits to management software vendors as it does to business, it could be used to create more manageable and interoperable IT resources that would work better across multiple management software vendors, topologies, networks, and platforms. MUWS also forms the common ground for much of the work on MOWS, which is simply the more specific case with additional Web services specifics. The requirements definition for both MUWS and MOWS is essentially complete, and I believe we will see a finished specification from the TC by the end of the first calendar quarter of 2004.

Composition and Web Services Management

The final specification of the OASIS WSDM TC is almost certain to support the concept of composition discussed above. The formal WSDM specification was not available at this writing. So, in order to illustrate how composition can be used to extend Web services management, we will use WS-Manageability, a key Web services management specification that was donated to the OASIS WSDM TC by management software vendors CA, IBM, and Talking Blocks (recently acquired by HP).

Although a detailed description of WS-Manageability is beyond the scope of this article, the beauty of this specification is that it already represents a nonproprietary view of Web services management since it is the result of collaboration and compromise between three major vendors. It is a simple and easy-to-understand specification that adheres very strongly to the philosophy of Web services and SOA by limiting itself to the definition of the management capability of a manageable Web service and the specification of its management interfaces. In other words, WS-Manageability does not dictate the implementation of management software. It simply specifies additional Web services interfaces and their semantics that can be composed into a Web service's description to add management capability to that Web service.

This pure service-oriented approach to Web services management allows manageability to be expressed using virtually any service description standard. In Web services, service description is typically the province of WSDL (Web Services Description Language), but other important technologies use other standards. For example, grid computing is a technology based on Web services that is just starting to bloom. It provides many exciting potential benefits in areas of business computing especially those tasks that require large- scale computation. The Global Grid Forum (GGF) leads the standardization efforts in this area. Subgroups within GGF have defined an extended version of WSDL called GWSDL for expressing the capabilities of services in a grid environment. WS-Manageability's neutral and flexible approach to Web services management allowed the authors to easily provide descriptions of Web services management interfaces in both WSDL and GWSDL. Similarly, it should be possible to express WS-Manageability to many other models, and to express additional management information in WSDL using specifications such as WS-Policy.

Composability also applies to the actual SOAP messages that will be sent back and forth from management services. Clearly, Web services specifications that are already available or currently in development could be used to extend the management capabilities of SOAs built with Web services by providing a wide variety of functionality beyond the OASIS WSDM specification itself, such as reliable messaging, asynchronous message delivery, security, transactions, and more. Composition would allow Web services platform vendors and management software vendors to provide more advanced management architectures, as needed, while still supporting simpler management solutions.

Conclusion

An important but less obvious benefit of Web services is composability – a benefit that is derived from XML and carefully nurtured by the Web services community. This ability of Web services to incrementally enable additional independent functionality, as needed, maximizes the usefulness of Web services in building an SOA, which is an important goal for many enterprises.

Web services management standards like OASIS WSDM are absolutely crucial to the long-term success of Web services, especially given the clear trend toward more complex B2B and electronic marketplaces based on a service-oriented architecture. The donation of WS-Manageability by CA, IBM, and Talking Blocks to the OASIS WSDM TC is an excellent example of the continued awareness and dedication on the part of major management software vendors toward supporting composable, open Web services specifications as the cornerstone of a manageable SOA.

The Web services community, although sometimes filled with discordant notes, nonetheless is successfully composing a set of standards and solutions of symphonic stature. Although the progress of Web services standards often feels closer to the clashing rhythms of pyrotechnical 20th-century works like Stravinsky's "Rite of Spring" than to peaceful and bucolic works such as Beethoven's 6th symphony, the Web services community is methodically and successfully composing a useful and intriguing work of distributed technology that will have enduring value.

Resources

- *Web Services Manageability 1.0 Documents:* www3.ca.com/Solutions/Collateral.asp?CID=50247&ID=3339
- *OASIS Web Services Distributed Management TC:* www.oasis-open.org/ committees/tc_home.php?wg_abbrev=wsdm
- *OASIS Web Services Reliable Messaging TC:* www.oasisopen.org/committees/tc_home.php?wg_abbrev=wsrm
- *OASIS Web Services Security TC:* www.oasis-open.org/committees/tc_home. php?wg_abbrev=wss
- *Management and Security in the World of Web Services White Paper:* www3.ca.com/Solutions/Collateral.asp?CID=47494&ID=3339

About the Author

Paul Lipton is a senior architect and technology strategist in the Office of the CTO at Computer Associates (CA). He has been an architect and developer of enterprise systems for more than 20 years, and has worked closely with key CA customers to solve important business challenges through the creation of mission-critical distributed solutions. Paul has represented CA in numerous standards organizations, such as the W3C, OASIS and the Java Community Process, and is currently serving on standards committees involved in the definition of new Web Services standards for management,orchestration, and choreography. He is also a highly sought-after author and conference speaker on a wide range of topics.

paul.lipton@ca.com

Listing 1: Simplified example of WS-Security and draft WS-RM composed into a SOAP message

```
<env:Envelope … >
<env:Header>
<!-- Security composed inside of SOAP message -->
<sec:Security>
<sec:BinarySecurityToken ValueType="sec:X509v3" …>
BEwOMTBlc…..wMTfdsSF
</sec:BinarySecurityToken>
</sec:Security>

<!—Reliable messaging composed inside of SOAP message -->
<rm:MessageHeader …>
...
< rm:MessageId>20020907-12-34@anyuri.com</rm:MessageId>
< rm:Timestamp>2002-09-07T10:19:07</rm:Timestamp>
</rm:MessageHeader>
<rm:ReliableMessage …>
…
<rm:DuplicateElimination/>
</rm:ReliableMessage>
<rm:MessageOrder ...>
…
<rm:SequenceNumber>12</rm:SequenceNumber>
</rm:MessageOrder>
</env:Header>
<env:Body>
<app:getQuote xmlns:app=“http://myinsure.com/quote”>
<cust>123456</cust><amt>50000</amt>
</app:getQuote>
</env:Body>
</env:Envelope>
```

Deploy Web Services – Double Your Servers?

XML processing hardware in the enterprise data center

The recent explosive growth of transactional information and applications over the Web has led to a very real concern for IT managers – how to address the processing bottleneck in Web and application servers. For service-oriented architectures (SOAs) that use XML to bridge the transfer of information across disparate technologies, this processing bottleneck may hinder the deployment and adoption of XML standards and Web services.

WRITTEN BY
JOHN DERRICK

The fundamental basis for Web services starts at the lowest level, standardization of protocols and data formats. The XML standard is the chosen data standard for many good reasons including being human readable, hierarchical, and extensible, but because of it's verbosity it is inefficient for machine-to-machine interaction. In many cases, the computer resources needed to process XML datasets in an enterprise can consume as much as 80% of the available host CPU cycles. As the amount of XML traffic increases so does the demand on the available CPU processing capability. Some models project that IT departments may have to double the number of application servers because of the impact of XML/XSLT processing. Today, IT managers are faced with a difficult choice, to delay or slow the development of Web services or spend scarce IT capital dollars to increase the number of application or Web servers in the data center.

An alternative solution is to integrate specialized hardware platforms in the datacenter to offload the XML processing necessary to keep up with demand. While this approach offers an immediate benefit in terms of performance, it is imperative that the solutions considered satisfy the strict requirements for datacenter systems. These include specific requirements for ease of integration, scalability, robustness, and remote management. Once these requirements are addressed, the price and performance advantages of true hardware-based platforms can be realized.

Performance, Performance, Performance

Custom XML processing devices allow the separation of XML data processing from the business logic on application servers. It is anticipated that devices on the market in 2004 will accelerate the processing of XML up to 20x that of standard general purpose server devices.

Although traditional Intel-based server architectures can be used to address this problem (when combined with software algorithms for XML processing), this approach will not offer the performance density and price performance of an XML hardware device that includes XML-specific processors.

Purpose-built, XML hardware platforms achieve the highest levels of performance by combining a full range of technologies including:

- Parallel processing hardware and the associated software compiler technology to exploit it. This hardware could involve multiprocessors that independently parse, validate, and transform (parallel processing engines); the support of multiple threads; the creation of highly efficiently parse data structures, and the ability to couple the parse to portions of the transformation stylesheet to exploit the parallelism of the template match patterns and Spath expressions.
- Caching of static documents and instructions and structures for fast retrieval.
- Segmented functional units in a highly pipelined network architecture to extract, process, and distribute data to achieve maximum performance (such as SSL, TCP offload).

It is anticipated that devices built on such an architecture will offer XML/XSLT processing at more than 1Gbps throughput in 2004. An example of the data processing flow in such a device is shown in Figure 1.

Act Like an Enterprise System

Performance is not the only criteria in delivering enterprise-class Web services acceleration platforms. Enterprise datacenters demand adherence to standards, seamless integration into the existing environment, ease of deployment and management, and the highest availability.

Ease of Integration and Deployment

Integration with standard Web services, data from databases, and data from other applications that run on other platforms are all critical in today's data center environment. This integration is best done using standard APIs that are being supported in the marketplace. Hardware-based platforms will be required to interface to these APIs and provide key features and functions to take advantage of the price performance advantages offered by hardware that includes configurable parsing, validation with schemas or DTDs, and transformation using XSLTs. All functions should be available using standard APIs.

Configurations for applications residing on the hardware-based platform interface through standard APIs such as the Java API for XML Processing (JAXP) that allows applications to parse and transform XML documents using an API that is independent of any particular XML processor implementation.

Another integration approach in the enterprise environment is via the proxy mode. The processing of the data is initiated when a message is sent

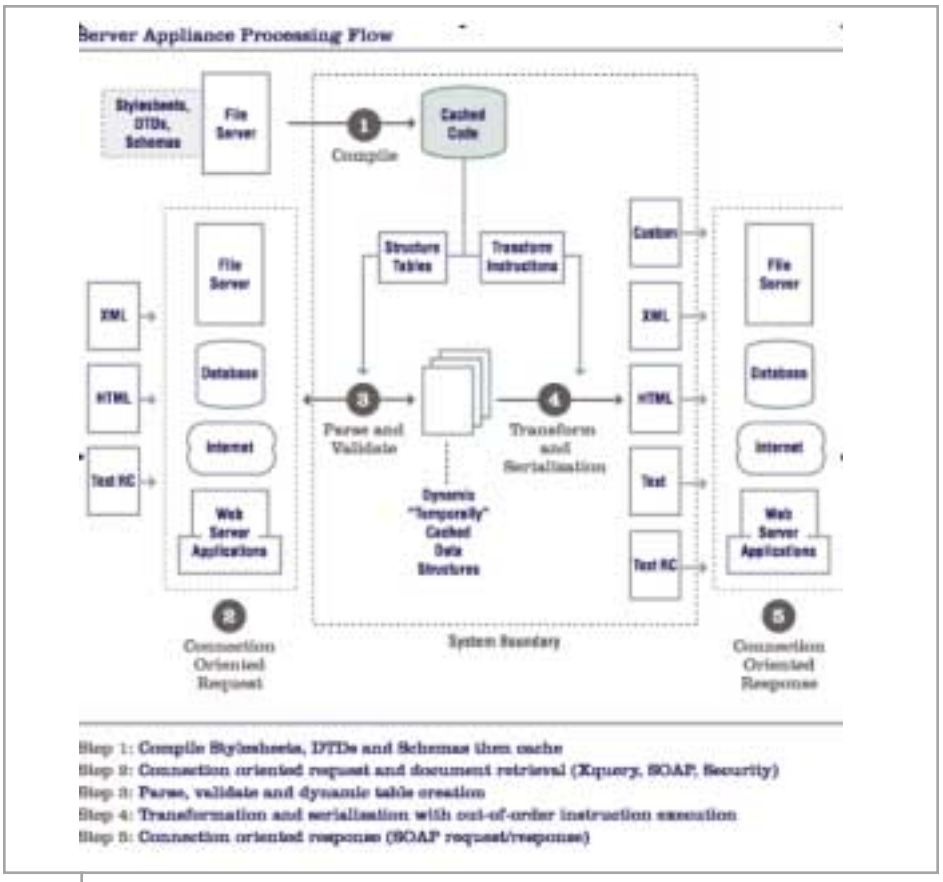


FIGURE 1 | **Data flow for the processing of XML on a hardware platform**

Conformative Systems <CSXi>

Conformative Systems' <CSXi> server appliance is one example of a hardware-based processing device specifically designed to process XML transactions. Each appliance can deliver the throughput of up to 20x that of equivalent of software-based solutions running on general-purpose servers. Custom ASICs and parallel processing technologies built into the appliance perform the parsing, validation and data transformation on all XML data at greater than wire speeds. Each Conformative Systems CSXi server appliance is built on a fully redundant architecture offering the highest single-device availability for business-critical enterprise applications.

over the network via a messaging service such as SOAP over HTTP.

Control and Management

The deployment of "black box" machines within a data center is a daunting task to a network administrator who must maintain, manage, and configure each device to ensure high availability during periods of peak processing. The reality is that a specialized hardware platform must provide the network administrator with the means to remotely monitor and configure any system within the datacenter. This network management port should be a secure and nonintrusive entry used to retrieve log files, error reports, usage modes, and statistical analysis. A management information base (MIB) is required and available over SNMP so that network administrators can monitor and manage the device to check for statistics such as bytes sent/received, fragment packets, dropped packets, and other statistical information.

As a high-availability, high-performance platform, the XML hardware device should provide the highest levels of robustness possible. The data path, Web services, and documents being processed should therefore be kept separate from the control path, configuration information, monitoring processes, and device logging.

The separate data path and management ports should include:

- Non-intrusive secure management port to retrieve log files, error reports, statistical analysis, etc.
- Separate processor subsystems for data and control paths
- Encryption support for both paths

Robustness

In addition to being able to observe system behavior, error logging, and even predictive error heuristics, the system should be able to operate with transitory faults or even with failing hardware with degraded, but reasonable performance. Important hardware system attributes here include:

- ECC protected memory for detecting and correcting errors
- Fail-over mechanisms to detect when a memory module(s) fails with an ability to redirect data to another memory module and run with limited number memory banks
- Redundant architecture that upon failure allows de-rated performance and/or fail-over mechanism to redirect the data to another network port to keep processing data
- Software monitor to determine health of server and report or alert of hard failures and soft failure trends that suggest impending hard failures

Conclusion

A well-architected, hardware-based XML processing device must offer the flexibility of deployment required by the APIs established in the industry, and it must provide all the expected quality of service and reliability features of high-end server systems. These features and qualities enable enterprise adoption and integration that fulfills the promise and potential of high-performance, low-cost Web services and XML message processing.

About the Author

As CEO of Conformative Systems, John Derrick is dedicated to driving the adoption of Web Services using XML and building industry-leading solutions that allow enterprises to drive down the cost of implementing high-performance XML-based applications. John's most recent venture was as founder and CEO of Chicory Systems, a semiconductor IP startup. John has been issued 19 patents in various fields including data processing, processor architecture, and systems optimization. He has a similar number that have been filed and are under review.

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Enterprise Web Services SECURITY: A Reference Architecture

Meeting the challenges of security and management

Web services are past the initial marketing hype. Early Web services were part of experimental one-off projects within a single enterprise department. Now, larger Web services deployments are moving outside of the enterprise firewall to better leverage existing business partnerships and value chains.

WRITTEN BY
PRATEEK MISHRA &

MARC CHANLIAU

Larger Web services projects come with a price, however. They are more complicated to implement and more costly to manage. They require careful deployment planning throughout the enterprise based on well-established business processes.

The emerging proliferation of Web services networks presents challenges in terms of security and management. Enterprise deployments of Web services can only be successful if business and information technology (IT) managers are convinced they can systematically control access to Web services, meet customer service requirements, and monitor and meter Web services use.

Need for a Reference Architecture

A large number of vendors have entered the Web services market with products that address one or the other aspect of security and management. However, in the absence of a global view or "big picture," there is a danger that enterprises following opportunistic, product-based implementations may create security architectures that do not scale with the anticipated growth of Web services deployments.

Furthermore, Web services are only one of many resources that need to be managed and secured in the enterprise. A one-off approach will lead to an isolated Web services "island of security" and will require future deployment refactoring and integration with the overall enterprise security system. Using a Web services reference architecture as a guideline, organizations can develop a road map for Web services security and management meeting current enterprise needs and supporting future large-scale deployments of Web services networks.

Web services deployments use various components such as containers, network security, management, and identity platforms that feature complementary, and sometimes overlapping, functionality.

Not surprisingly, all of these components provide some security and management features and they must all work together to provide an efficient and reliable solution. The Web services reference architecture analyzes the role of each component and suggests appropriate integration points between them.

Purpose and Scope

This article discusses an architecture for deploying enterprise Web services focusing on the role of security. Web services security is presented in the context of an overall Web services architecture, with emphasis on manageability and scalability. This article is intended for several audiences.

- ***IT management staff:***
  - –Provide guidance on the types of security relevant to the enterprise
  - –Provide high-level requirements that a scalable security architecture should meet
  - –Provide a logical model for Web services security deployment
- ***Security architects:***
  - –Describe the relationships between security and the key components of a Web services architecture
  - –Provide security deployment models that address a range of enterprise architectures and meet the proposed scalability requirements
- ***Independent software vendors (ISV)***
  - –Describe interface and integration points between the various products in a Web services architecture

Reference Architecture Components

The reference architecture includes the following components:

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- A logical framework describing the concepts and product categories required for a complete Web services solution
- Architectural guidelines for Web services security
- Deployment models for a family of enterprise Web services security architectures

Logical Architecture Model

The logical model of the reference architecture describes the various layers of functionality required in terms of:

- P***rotection and threat prevention:*** (network security)
- ***Access enablement:*** Identity and Access Management – IAM
- ***Business policy enforcement:*** Web services management – WSM

Figure 1 shows the Simple Object Access Protocol (SOAP) message flow going in the enterprise to the Web services provider, and the SOAP message flow coming out of the enterprise from the Web services consumer to outside partners.

Traditional network firewalls and security appliances make up the protection and threat prevention layer (network security). Identity and access management (IAM) is the access enablement layer, Web services management is the business policy enforcement layer, and Web services are deployed to and hosted by a container or a group of containers.

Several logical architecture layers may be implemented in a single product. For example, security appliances combine network security with some identity services (e.g., authentication). Xontainers often include some components of the WSM and IAM layers. The logical model is consistent with these and other possible implementation realizations.

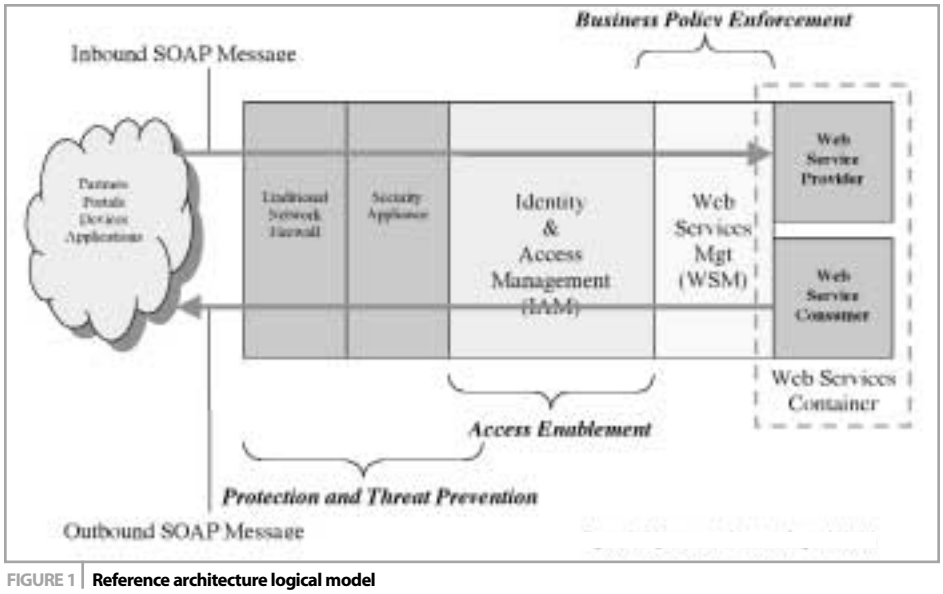

FIGURE 1 | **Reference architecture logical model**

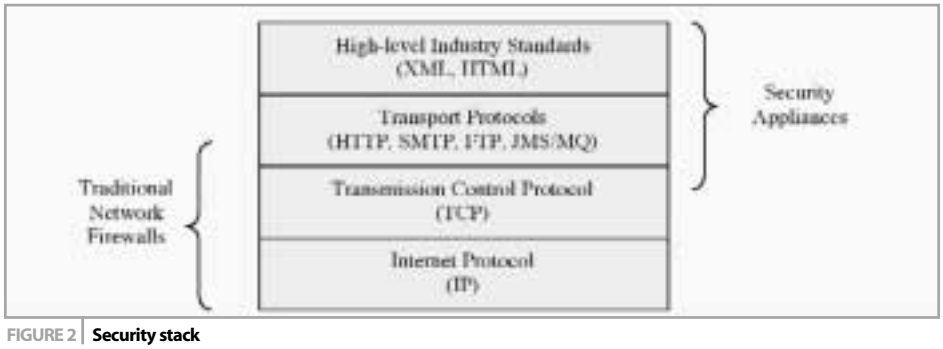

FIGURE 2 | **Security stack**

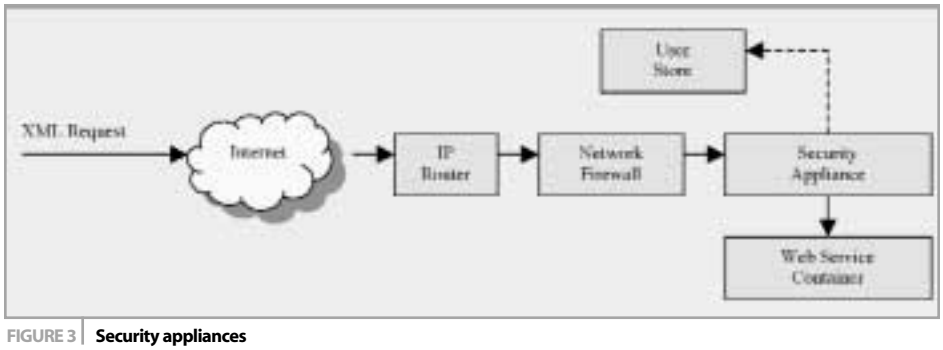

FIGURE 3 | **Security appliances**

Protection and Threat Prevention Layer

The protection and threat prevention layer is implemented by traditional network firewalls and network security appliances operating at different levels of the security stack, as shown in Figure 2.

Both traditional network firewalls and security appliances may include support for intrusion detection, thus protecting Web resources against HTTP-based threats such as denial of service (sending more requests to a Web service than the system that hosts it can handle), buffer overflow (trying to store a larger amount of data than a temporary storage [or buffer[can handle), replay attacks (copying a valid message and resending it repeatedly to a Web service to clog its hosting environment), and malicious SQL or JavaScript tampering in business payloads (HTML forms or XML documents).

Traditional Network Firewalls

Traditional network firewalls are devices that enforce access rights between two networks, for example, the Internet and the enterprise. One side of the wall (the enterprise) is protected from the other side of the wall (the Internet) by filtering out undesirable data packets. For example, simple packet-filtering devices check Internet Protocol (IP) addresses and port numbers to allow the authorized data packets to pass through the firewall.

Security Appliances

Security appliances come in various form factors and support analysis of network flows at the upper layers of the security stack. They can be available as software products (also known as XML firewalls), and hardware devices (also

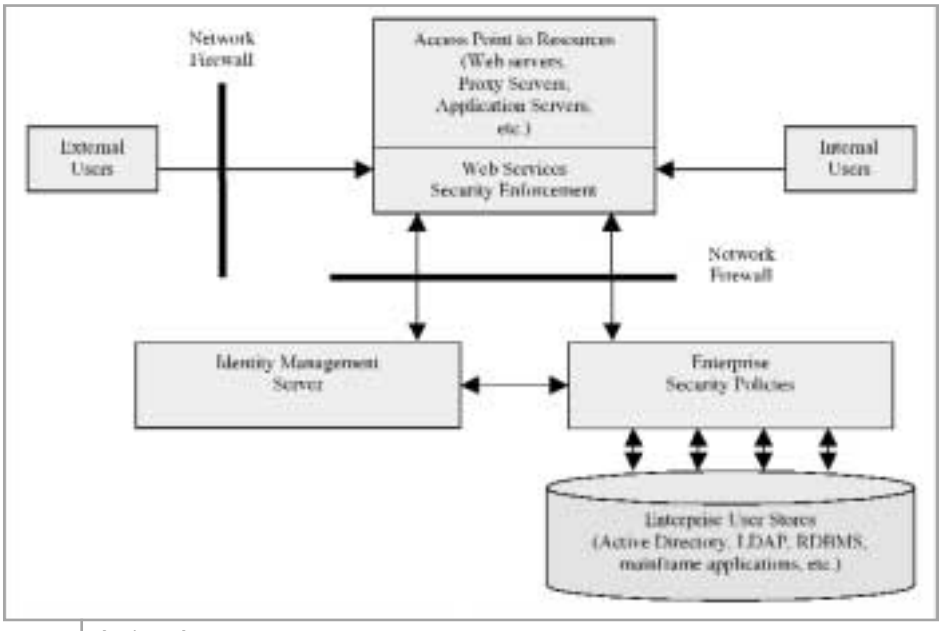

FIGURE 4 | **Identity and access management (IAM)**

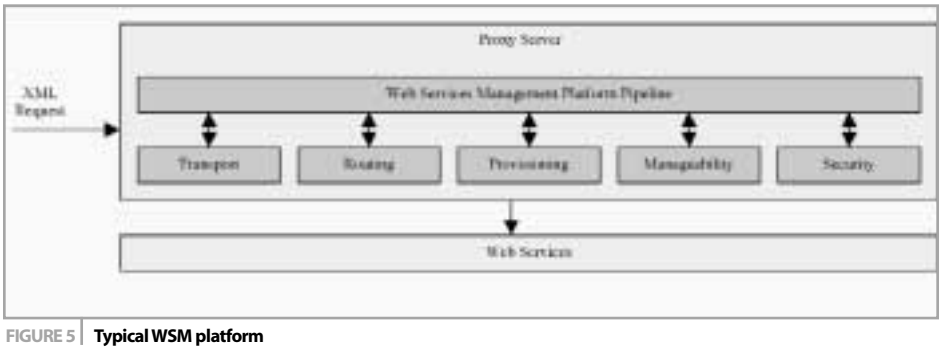

FIGURE 5 | **Typical WSM platform**

known as XML or network appliances).

XML appliances scan the incoming byte streams for specific XML tags. XML appliances originated as XML traffic accelerators providing high-speed XML processing such as parsing of an XML document for well-formedness, validation of an XML document against an XML Schema, format transformation (e.g., between two XML dialects or from XML to HTML).

Over time, XML appliances have added standards-based security features, in particular XML encryption and XML signature, as well as high-level security frameworks such as the Security Assertion Markup Language (SAML). These capabilities provide in the domain of XML the equivalent of what Secure Socket Layer (SSL) concentrators provide for transport-level security.

Some security appliances interface with user stores provided by Lightweight Directory Access Protocol (LDAP) implementations or Relational Database Management Systems (RDBMS), as shown in Figure 3

Access Enablement Layer

The protection and threat prevention layer and the enablement layer are distinct. To cover all aspects of security management, an enterprise architecture needs to incorporate both layers as they serve different purposes.

The enablement layer includes identity and access management (IAM).

- ***Identity management:*** The process of capturing and maintaining key security and profile attributes used to recognize users throughout an enterprise's organizational groups and lines of business. Identity management also involves the ability to establish, maintain, and terminate privileges and policies within the access management infrastructure.
- ***Access management:*** The process of authentication (verifying a user's identity based on submitted credentials), authorization (granting access to specific resources based on an authenticated user's entitlements or access rights), audit (examining accesses to protected resources), and sessioning (propagating identities across lines of business or between trusted business partners).

An IAM platform allows the enterprise to manage a single set of identities (user names and profiles or attributes) and maintain an enterprise-wide logical user repository (user information can actually be stored in several user directories using a mix of different technologies, such as Microsoft's Active Directory [AD], LDAP implementations, RDBMS, or mainframe applications).

The IAM platform secures access to corporate resources using centralized access policies based on identities and roles. For example, an access policy may state that users must have certain roles in order to be authorized to access an application.

Unlike the protection and threat prevention layer, an IAM platform knows both identities and Web services. As a result, a wide range of identity-based services can be provided by the enablement layer, in particular access control and management of user attributes for authorization decisions.

IAM platforms can be delivered in different ways. Figure 4 shows an example of an IAM platform that includes an identity management application residing on an application server, and enterprise security policies stored in a policy server that interfaces with the enterprise's multiple user directories (information about a single user may be contained in several user stores that need to be queried to extract relevant user data).

In Figure 4, security enforcement is provided by agents that intercept requests to corporate resources. Users can be authenticated against a specific user store and authorized against another user store configured with the policy server, thus leveraging existing user information wherever it is available across the enterprise.

Business Policy Enforcement Layer

The business policy enforcement layer is embodied by Web services management (WSM) systems. Figure 5 shows an example of a typical WSM platform. Various implementations are available from diverse WSM vendors.

WSM systems help companies manage the services provided by the applications that enable service-oriented architectures. For example, WSM systems can help the IT department manage the availability of a Web service based

on corporate business rules.

Typically, WSM systems support binding of business-level management policies to Web services. Policies may address service-level agreements (SLA) such as:

- Availability (making sure the application supporting a Web service is up and running)
- Metering and billing
- Quality of service (ensuring that certain performance metrics are met by a Web service)

An example of a business policy defined by the WSM platform could be, "No more than 10 purchase orders should be accepted from Partner A during any 10-day period."

WSM systems provide runtime enforcement of such policies via a Web service management pipeline or interception point. Identity is an essential prerequisite for the enforcement of business-level policies.

Advanced WSM platforms support a broader range of policies including policies relating to identity and access management. A key proposal in this reference architecture is for the WSM platform to rely on the IAM layer to integrate with the enterprise security infrastructure, thus benefiting from enterprise-wide, identity-bound security services.

Web Services Containers

Web services containers host Web services on industry-standard platforms such as Microsoft .NET and the Java 2 Platform, Enterprise Edition (J2EE). Typically, Web services containers include Web servers, application servers, business-to-business servers, messaging servers, enterprise resource planning (ERP) systems, etc.

Web services containers support Web services development and deployment based on industry standards such as the Extensible Markup Language (XML) Schema, SOAP, the Web Services Definition Language (WSDL), Universal Description, and Discovery Integration (UDDI), and other emerging specifications.

Web services containers include a security layer specific to each vendor's platform, resulting in multiple points of security administration if the enterprise uses multiple Web services container platforms. Most Web services containers interface with the IAM platform by exchanging security information included in standard headers defined by the Web Services Security (WS-Security) specification. WS-Security defines profiles for various security tokens, for example, SAML. In this way, heterogeneous platforms can use standard security credentials to support cross-platform security.

Reference Architecture Guidelines

This section presents the general security properties that should not be overlooked when deploying networks of Web services in the enterprise.

- Abstracting security from Web services development
- Complying with Web services standards
- Relying on centralized, policy-based security management
- Delivering the IAM layer as a set of shared services
- Integrating with existing enterprise security systems

Abstracting Security from Web Services Development

A Web service is a program that can be developed in any language, the most prevalent ones being Java and .NET-supported languages, for example, C# or Visual Basic.NET. Most Web services development environments generate the XML document (a WSDL file) that describes how the Web service functions can be accessed by the requesting parties (Web services consumers).

Once developed, a Web service needs to be deployed to its container. Most Web services vendors provide integrated development environments (IDE) or tool kits that allow you to automatically broadcast Web services through SOAP messages, including UDDI requests for publication.

Early attempts to secure access to Web services were achieved programmatically by requiring the Web service consumer to provide a key with each request. Logic in the Web service would process the key and give access to the requester if the appropriate value was passed. This approach did not meet with much success because it was unwieldy and not scalable, but its premises and basic principles are still used by platform vendors to implement security in Web services, with the following drawbacks:

- The onus is on the developer/deployer to implement security in the Web services environment
- The security-specific code needs to be duplicated in each Web service implementation, leading to "silos" of application-level security

It is recommended that security logic be externalized outside applications and implemented by security services.

Complying with Web Services Security Standards

Over the past year, a standards-based security model for Web services has been defined and widely endorsed by the industry. In addition to existing transport-level standards such as SSL, the basis for the security model is provided by XML Encryption, XML Signature, WS-Security, and SAML.

XML Content Confidentiality, Integrity, and Authenticity

- ***XML Encryption:*** Represents the encrypted content of XML data, the information that enables a recipient to decrypt it, and a mechanism for conveying encryption-key information to the recipient.
- ***XML Signature:*** Defines the representation of signatures on digital content, and procedures for processing those signatures. XML Signature provides detailed elements supporting data integrity, signature assurance, and non-repudiation for Web services data.

Message Structure

- ***WS-Security:*** Defines how to attach signature and encryption headers to SOAP messages. It also provides profiles that specify how to insert different types of security tokens in WS-Security headers
  - –*Username/Password digest:* Defines how a Web services consumer can supply a username as a credential for authentication. The username can be accompanied by an encrypted password.
  - –*X.509 certificate:* Defines a binding between a public key and a set of attributes used for authentication, e.g., username, certificate issuer, etc.
  - –*Kerberos ticket:* A security token used for authentication.
  - –*SAML assertion:* A security token that can include authentication, attributes, and authorization-decision statements. SAML assertions communicate security information between heterogeneous applications or Web services, within the enterprise or between the enterprise and its trusted partners.
  - –*XrML document:* The Right Expression Language (REL) license tokens inserted in WS-Security headers are used for authorization and are based on the Extensible Rights Markup Language (XrML).
  - –*XCBF document:* Defines how to use the XML Common Biometric Format (XCBF) with the WS-Security specification.

Emerging specifications are based on WS-Security and purport to provide higher-level service interfaces such as authentication, sessioning, and syntax for security metadata. It will take some time before these specifications are adopted as industry standards, but vendors should participate in their definitions and implement them as they mature.

Support for standards such as WS-Security and SAML are key requirements of the reference architecture. However, support for standards alone does not address the need for a scalable and manageable enterprise security infrastructure.

Relying on Centralized, Policy-Based Security Management

Security services enforce and implement security policies uniformly across the enterprise. Security policies apply to both the protection and threat prevention layer (network security) and the access enablement layer (IAM).

Identities should be bound to security policies in the IAM platform. Security policies describe a broad range of identity-based security services such as passwords, credentials, authentication, attributes, and authorization-decision information. For example, a security policy may state that "Only Preferred Partners can use the Inventory Control Web service. Authentication based on WS-Security Digital Signature or WS-Security User Name and Password are acceptable."

Relying on a centralized, policy-based security management approach provides many advantages:

- ***Single point of access:*** All the security information can be concentrated in a centralized point of control, such as a policy server.
- ***Scalability:*** A single set of policies can be managed by delegated administrators. For example, the corporate security administrator can assign administration roles to separate departments or sub-groups.
- ***Manageability:*** Every time a policy needs to be changed, modifications apply to all the applications and Web services that use it, thus minimizing the complexity of propagating and managing the security information of the enterprise.
- ***Conformance:*** Policy-based security management facilitates compliance with established company policies and business processes, as well as industry regulations.

Delivering the IAM Layer as a Set of Shared Services

The IAM layer is used to define rules applicable to services that can be shared throughout the enterprise, such as authentication, user attributes, authorization decision, sessioning, and federation (describing user identities to partners).

IAM gives the enterprise the ability to extend existing authorization models. The IAM layer can map organizational structures and functional responsibilities to create and manage roles. The IAM platform can then bind policies to roles for access control.

When IAM is used as a shared service, other areas of activities can concentrate on their specific functions. For example, providing a shared security service allows applications and Web services developers to concentrate on business logic, thus reducing the complexity of applications and avoiding "silos" of security.

Integrating with Existing Enterprise Security Systems

Very often, companies have to deal with many diverse and heterogeneous systems, each requiring its own administrative interface. Adding security to each of these systems increases cost of ownership and administration complexity.

Summary

Web services are only one of many resources that need to be secured. They should not be dependent on specific security environments and rules but should be managed as part of all of an enterprise's corporate data assets such as Web applications, ERP systems, and in-house applications.

Companies that rely on specific tools or security models to protect access to Web services will later need to integrate their Web services security solution to their overall enterprise infrastructure to both increase security and lower administration costs.

It is recommended that Web services security be integrated with the overall enterprise security infrastructure at the very beginning of the Web services deployment phase.

About the Authors

Prateek Mishra, PhD, has more than 10 years experience with enterprise-class distributed systems. He is director of technology at Netegrity and works on strategy and standards. He was an editor of the SAML 1.0 specification, co-chair of the SSTC (SAML) Committee, and participates in the WSS (WS-Security) Committee.

Marc Chanliau has been in the software industry for more than 20 years and is currently the product manager for Netegrity where he is responsible for the company's XML technologies. Marc is heavily involved in security and XML standards groups including serving as the first chair person of the OASIS Security Services Technical Committee (SSTC), which culminated in the adoption of SAML as an official OASIS standard, participating on the WS-Security Technical Committee, helping to define the Liberty Alliance 2.0 specifications, and participating in the Java Specification Request (JSR) committee.

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–Continued from page 7

30-day time period of an order, now ready for shipment, would be in jeopardy by using a particular shipper. Let's suppose that the primary shipper's tracking system has malfunctioned and has effected the ability to guarantee delivery by a certain date. This IT event is sent to the manufacturer who in turn uses an alternate shipper. This comes at an increased cost, but allows the manufacturer to fulfill the customer guarantee. Once the primary shipper returns to a state supporting the manufacturers business objectives, an additional WSDM event can be sent allowing the manufacturer to resume normal operation.

While WSDM defines how we can expose management information in a standards based way, it will formulate the basis for interoperability of management information. In the example above, you can see that WSDM can be used to monitor a business process and correlate that process with an IT event. Using WSDM for these types of correlations will formulate the basis for organizations to align IT and business bringing the enterprise to a new level of efficiency.

About the Author

As senior software engineer/architect for Hewlett-Packard's OpenView Division, Jeffrey Tuck works closely with developers and development teams to communicate emerging technologies being developed in the area of Web Services Management. Prior to joining Hewlett-Packard, Jeffrey was development manager for Bluestone Software, Inc.

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PolarLake JIntegrator 3.2

A powerful visual metaphor

The adage, "A picture is worth a thousand words," is almost self referential. To me it immediately conjures an image in my mind of a person carefully examining a painting in a museum. I tend to be a visual thinker. I draw pictures as I work out problems and refine system designs, and I use pictures when I communicate complex ideas to colleagues. The drudgery starts when it's time to transform the concepts depicted into actual systems. So you may imagine how my interest was sparked when our product review editor, Brian Barbash, asked me to take a look at an Enterprise XML Server product that allows diagrammatic control to "build and deploy systems that receive, create, validate, enrich, transform, route, and process XML and Web services." The product is JIntegrator 3.2 from PolarLake.

The Circuitry

WRITTEN BY
PAUL MAURER

At the core of JIntegrator is an XML-centric component assembly approach called "XML Circuits." XML Circuits is a diagrammatic language for expressing how XML documents are to be processed. Developers use the PolarLake Designer utility to describe how documents enter the system, what processing steps to follow, and finally where the document should go once all processing is finished. The designer is a drag-and-drop interface for describing the flow of XML through a set of event handlers. Basically, SAX events are channeled through a sequence when they match a specified XPath expression.

Figure 1 shows a simple Web services client circuit. Actually, this is only a piece of a circuit, called a View. A View contains a table with one or more sequences (a linear set of event processors). The "reorder sequence" shown simply prints a message, calls a Web service and checks the result. This sequence executes when an invoice is received with an "Out of Stock" status. This is indicated by the XPath expression

```
/invoice/item[(@status="Out of
  Stock")]
```

Any number of XPath expressions and sequences can be stacked in a circuit to allow complex, content-based processing. Processing exceptions can also be trapped via XPath expressions, allowing custom exception handling.

Initially, creating a circuit for a very complex process would seem daunting. Experienced users of visual language systems may know that overly complex diagrams quickly become counterproductive. PolarLake addresses this issue by allowing circuits to communicate with each other by using any supported transport. Circuits can also be used as an event processor in a sequence inside another enclosing circuit, thereby allowing very complex processes to be decomposed into a set of modular and reusable circuits.

JIntegrator comes with a large assortment of event processors. Event processors can invoke EJB/Java method calls and map the return values to outgoing XML documents or process variables. There is even an event processor that allows a developer to embed a BeanShell or XSL script into the circuit path.

The Mapper

The most important event processor is called the Mapper. The Mapper transforms the content and structure of XML documents. It can also insert XML content into databases or BeanShell expressions and take database result sets and map these to XML documents.

The Mapper also comes with a very nice visual tool. Figure 2 shows how the tool maps an Invoice Item to a wholesaler's book order Web service. The Mapper loaded both the input document's schema and the WSDL for the targeted Web service dynamically. The simplest mapping transfers elements from one document format to another, but the Mapper is much more powerful. It allows the developer to insert functions to transform content in a variety of ways. Custom functions can also be added by the developer using BeanShell.

The Core

After I designed a simple circuit as a test, I was pleasantly surprised to see how easy it was

PolarLake

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E-mail:info@polarlake.com

Download Information

JIntegrator:
www.polarlake.com/products/jintegrator/download.shtml

Licensing Information

Developer License: JIntegrator Developer Seat $5,000
Runtime License: JIntegrator (Per CPU) $15,000

Testing Environment

OS: Windows XP Professional (Service Pack 1)
Hardware: Intel Pentium III – 996 MHz – 512 MB RAM

to get it running. PolarLake supplies an easy-to-use management console – a graphical user interface that allows the developer to create and run instances of servers and deploy circuits.

Operators can also inspect and modify installed circuits, transports and other server properties.

Transports are basically the I/O ports for installed circuits. If I install a circuit that receives and processes Web service requests, the Web service port specification will appear in the transport section of the management console. Nice!

The management console allows the operator to peek inside the running server with a process inspector and also supplies runtime statistics for circuits running in the server.

Cracking the Code

The hard-core code jockeys will be glad to note that they can bypass the designer altogether and develop circuits using the PolarLake pipe system. The pipe system is the underlying architecture to circuits and is PolarLake's method of tracking and managing sets of event processors that act on XML documents at any point in time.

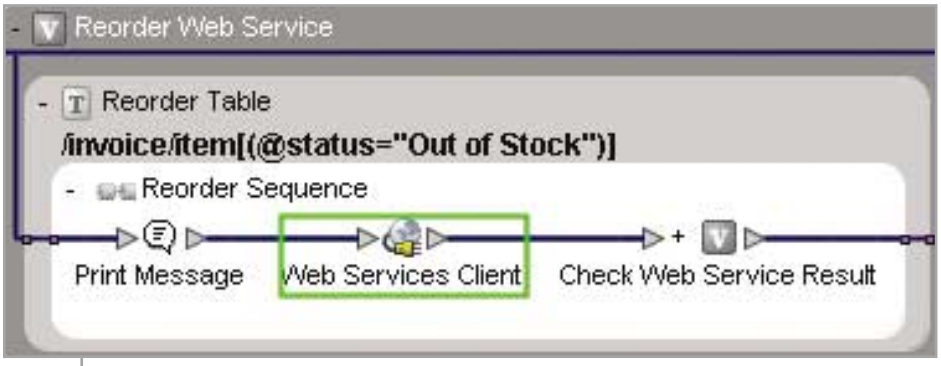

FIGURE 1 **A simple Web services client circuit**

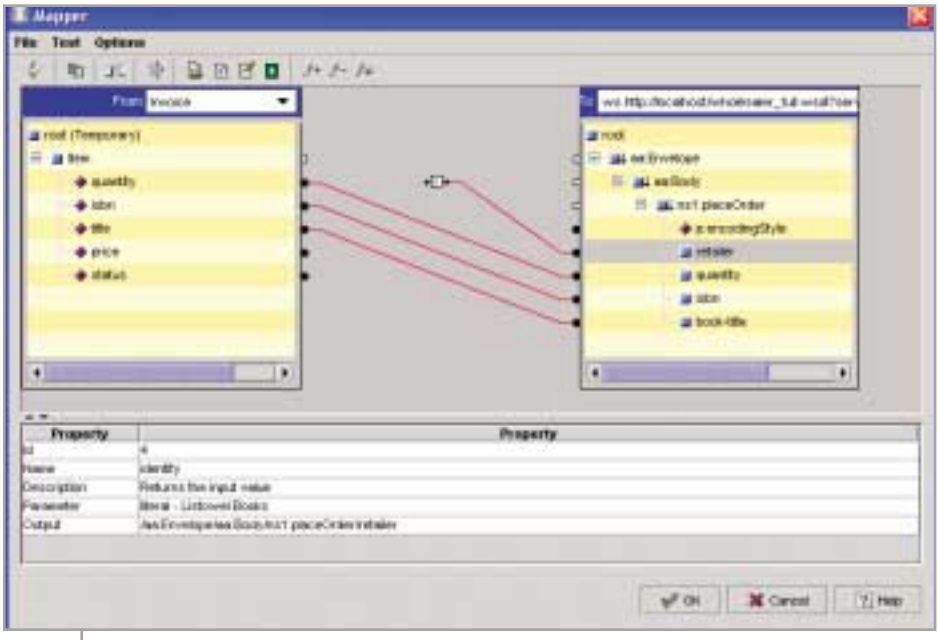

FIGURE 2 **Mapping an Invoice Item to a wholesaler's book order Web service**

The pipe system is accessed through the PolarLake Platform API.

The product is distributed with plug-ins for the Eclipse, JBuilder, and Sun ONE Studio IDEs. These plug-ins generate all the PolarLake application container and component template code, so developers can concentrate on writing the business logic encapsulated in event processors.

Getting Started

The JIntegrator product supports the development of Java, J2EE-based XML, and Web service systems and is bundled with the PolarLake Database Integrator and PolarLake Messaging Integrator.

The Database Integrator provides code-free mapping of XML to/from a supported database system and the Messaging Integrator supports mapping of XML to/from JMS-compatible messaging systems. All three products are built on a common technology base and together form the PolarLake Platform. (*Note:* Each product requires its own license.)

The installation is very straightforward. It installs the PolarLake Management Console and links to its documentation in the system application menu. The documentation is very complete and contains the following:

- Getting Started
- Installation Guide
- PMC Guide
- Designer Guide
- Database Module Guide
- JMS Module Guide
- PolarLake Mapper Guide
- Library Module Guide
- Web Services Module Guide
- PolarLake HTTP Module Guide
- PolarLake Statistics Guide
- Console Guide
- Distributed Transactions Guide
- JDOM Dispatch Module Guide
- Programming Guide
- Advanced Programming Guide
- PolarLake Patrol User Guide
- Secure XML User Guide
- PolarLake Demo & Tutorial Documentation
- PolarLake API

The "Getting Started" guide should be the first document you read and provides a good introduction to PolarLake and all its components. It actually describes the steps required to build a book purchasing system. All the completed circuits are provided and described in detail.

Conclusion

PolarLake's JIntegrator product provides a powerful visual metaphor enabled by a drag-and-drop utility for describing the manipulation and movement of XML documents. This visual interface is backed up with an equally powerful XML Runtime engine with good operational support.

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Web Services – They're Here, but We're Not There (Yet)

We've crossed the first hurdles, and will quickly face the next

Web services have been touted as a really "big thing" in the software industry the last couple of years, and that is for good reason: they promise technical interoperability between platforms from different vendors, an hitherto unheard-of thing in an industry plagued by proprietary non-compatible solutions.

WRITTEN BY
KAJ VAN DE LOO &

PRAVIN KUMAR

But does anybody really care about platform interoperability? Isn't it something else we are after? In this article, we'll explain what Web services are and what they are not, and take a look at what we need beyond Web services to get to where we want to be.

The first time I heard of Web services I was excited. Imagine being able to link your application to any other application out there. You could build really nice, light-weight "apps-on-apps" – i.e., applications that do exactly what they are supposed to do and reuse data and functionality from existing applications. And there could be specialized service providers for certain services that are hard to implement or manage. And, and, and… Endless possibilities! Brave new world! I envisioned service-oriented system landscapes, where our customers would choose the optimal deployment models for each application, where they could choose the right technology for each task, and so on – without sacrificing integration!

Where Are We Now?

So where are we now, four years later? Well, we have achieved a lot, but we are far from done. Web services are here to stay, but they have not taken us to where we want to be. Those who look to Web services as a solution to any problem we have ever had will be disappointed; those who understand the big picture and see that we have taken important first steps will see the possibilities. With the standards for platform interoperability we have created an alphabet, to make it a language for communication we now have to add words and grammar. We have passed one major inflection point, the creation of the alphabet, and now have to prepare for the next one, adding words and grammar.

Web services are standards for technical interoperability between software platforms. This means that one application built on one platform can send a message to another application built on another platform, and that the receiving platform will be able to process that message. We have high ambitions for the Web services standards stack, in that we do not only cover simple messaging, but also advanced messaging features such as security and reliability. We also want to make it easier for application developers to use services offered by other applications through sophisticated machine-readable ways of describing services and how they work, enabling us to create development environments that actually do a lot of the more technical work for us. This has already had an effect on the system landscapes of our customers, where Web services now is the technology of choice for integration projects.

But did you notice the catch in the previous paragraph? *"…the receiving platform will be able to process that message."* This is precisely what Web services ensure, not that the receiving application actually understands the message and knows what to do with it. Of course the latter is what most people would expect from application interoperability, and of course it was this vision that got me excited four years ago. To get there, we have to add the words and grammar to our alphabet. The words are business objects and the grammar is a set of patterns describing interactions. And we have to teach everybody who wants to communicate this new language. As business applications are the ones who should communicate, they are the ones who need to learn the language. This will be the second inflection point: Adoption of business applications that are based on Web services technology and use and expose business objects and interaction patterns.

The Next Inflection Point

The previous and current generations of business applications, such as SAP R/3 and the mySAP Business Suite, have been successful because of their integration based on a common database or tightly coupled databases, i.e. they have internally spoken one language, with one set of business objects and interaction patterns. Interfaces for integration with other applications exist. However, the proprietary object models and pattern catalogs have not been explicit and could not be shared with applications from other vendors. SAP and others are now rapidly "Web services enabling" their applications by making existing and new interfaces available as Web services, eliminating the need for adaptors when integrating applications from different vendors and thus lowering the cost of ownership. This means that these applications learn to

use the alphabet when communicating with others.

We can teach our current applications some words and grammar by adding new interfaces and metadata repositories, but this is tedious work and hard to get right. The next generation of business applications will be designed to speak the language from the ground up. They will make their object models and pattern catalogs explicit and shareable with other applications, and we will see integration platforms emerge that can use objects and patterns to enable communication between independently designed applications. Why do we need this? How will it work?

Let's first look at the business objects. If one application wants to tell another one to do something or wants to ask it for information about something, they have to talk about the same things. These "things" are the business objects. Both applications need to have the same understanding of the structure of the object they are communicating about and in most cases they need to have the same understanding of how this object is related to other objects. Not all applications will be built on the same object model; that is neither practical nor makes much sense. Instead, the applications need to make their object models explicit, so that an enterprise architect can implement an enterprise object model in an integration platform and map the various application object models to it. The integration platform then can provide runtime translation between the application models. In addition to this information about an object type, the applications will have to share information about specific object instances. Again, it is not practical to have all applications use the same object IDs, so we need a mapping between the IDs of the various applications in an integration platform.

Now that we have an alphabet and words, let's look at the grammar. In our case this is the patterns catalog. A pattern tells us what kind of communication around one or more objects is allowed. It tells us what services exist and in what sequence they can be called, and what the result of such a sequence of calls is. As with the objects, we cannot expect all applications to be based on the same set of patterns, so they need to make them explicit. These patterns are then used by the integration platform to orchestrate a business process across applications.

If the next generation of business applications are built on services internally, and therefore use an explicit object model and pattern catalog, it will be easy to fit them into a service-oriented system landscape. Once these applications become prevalent, and once the corresponding integration platforms become available, we will experience the next major shift in how our customers architect their system landscapes. Business processes spanning multiple applications and enterprises can be configured and reconfigured as necessary. Innovative business practices can be implemented and supported by new applications that are integrated into the overall system landscape through services.

> "Enterprises will now have enough application services available out-of-the-box and the platform tools at hand to base their whole IT landscapes on services"

For example, high-tech OEMs of all sizes are rapidly shedding their manufacturing capabilities and many of them are outsourcing their logistics. If they do not own the warehouses, the transportation, or the manufacturing how are they going to manufacture the right product and manage to get it at the right time to the customer? The answer is to integrate their suppliers and partners into their business processes. This is a perfect opportunity for Web services.

By giving their contract manufacturer, strategic suppliers, and third-party logistics providers visibility into their demand and coordinating the manufacture and delivery of goods through Web services they are becoming more agile and flexible. These manufacturers are narrowing their focus on design, marketing, and sales. They are outsourcing practically everything else. However, they still have to integrate all these partners into their demand and supply chain processes, and these partners change, depending on the product, the geography, or even the customer. How can they possibly be so flexible and still deliver to their customer? Many of them are turning to Web service infrastructures.

They use a set of customer-facing services for their sales channel to configure, place, and track orders, and they use a set of supplier- and partner-facing services to communicate demand and order information. They also have services facing their third-party logistics provider so that when the order is picked up, they can give the customer information about where the shipment is and when it is going to be delivered.

This allows them to be very flexible. They can rapidly switch suppliers if the current one doesn't meet standards. Alternatively, if they want to expand into a new geography through a new channel partner, they can connect to the partner through Web services and get them up and running quickly. Furthermore, they can attain this level of agility at a very reasonable cost. Web services infrastructures have already proven to lower integration costs.

What Can You Do Today?

Although we have a way to go in designing and developing the next generation of business applications, there is a lot a customer can do today in order to be well positioned to take advantage of the opportunities that lie ahead. To wait for the next release is not necessarily an option! So given your current applications, what can you do?

First of all, every enterprise should formulate their vision for an enterprise architecture. Industry consortia can be important discussion forums for this, as can contacts with vendors. Select one or two of your strategic vendors, invite them to discuss vision and strategy with you, and work with those whose vision is closely aligned with yours. Develop a strategy for how to approach new projects so that the vision will become real.

Make sure to exploit existing Web services technology as far as possible. Use a service-oriented approach for your next application development or integration project. If your applications don't offer the services you need, consider building them as part of your project.

Align all new projects with your strategy. A combination of platform work, such as developing an enterprise object model, and tactical projects, such as building a custom application for a new business practice, can get you closer to where you want to be, step by step.

The evolution of Web services can be viewed on three levels: the standards themselves, the software products built around these standards, and the way enterprises deploy these products to support their business. Of course it is the last aspect that is driving the evolution. The ultimate goal is to create adaptive business networks that allow enterprise to drive business innovation and rapidly adapt to changes in the environment. To support this, software products will ultimately be service oriented business platforms built on a complete set of interoperability standards.

Behind us we have the first inflection point in this evolution: the first set of interoperability standards triggered activity both within software companies and their enterprise customers. Enterprises are today using Web services for various integration scenarios, but not yet in a coordinated way. Software companies are designing and building products based on the standards and architected in a new, service oriented way.

When these new products are adopted, we will have reached the second inflection point: Enterprises will now have enough application services available out-of-the-box and the platform tools at hand to base their whole IT landscapes on services. This is what will get us to the adaptive business networks we envision.

About the Authors

Kaj van de Loo is the director of the product strategy for SAP's Global Web services strategy. His responsibility includes taking into account the impact of Web services upon business strategy coupled with implications to technology and applications. Kaj previously served as director of Application Development, leading one of the first major Java development teams within SAP.

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With over 18 years of experience in delivering enterprise software solutions, Pravin Kumar is a member of the SAP Global Marketing team, and is responsible for developing the market strategy for Enterprise Services Architecture in the Application Platform & Architecture organization. Prior to joining SAP, Pravin held several development management positions at CrossWorlds, Manugistics, Marcam, and Sun Microsystems.

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Wrapping the Perfect Web Services Package

Third-party tools can make it easy

Web services have been touted as a really "big thing" in the software industry the last couple of years, and for good reason: they promise technical interoperability between platforms from different vendors, an hitherto unheard-of thing in an industry plagued by proprietary non-compatible solutions.

WRITTEN BY
BOB CROSLEY

Packaging Web services seems so straightforward until the phone begins to ring. Here is the usual scenario: you proceed through the development process, copying new versions and files to the development servers. Once everything is tested, debugged, and ready to deploy, you hand it over to the production server administrators. They deploy the new service, and almost immediately your phone rings. It doesn't work.

You spend the rest of your day (or week) running between your desk and the server tweaking and testing until you finally get things running successfully.

What happened? Everything was working perfectly on the development servers. How did months of development and testing lead to a point where everything failed in production? It could be differences in configuration between the development and production servers, but those situations can be easily corrected by keeping the two servers in sync. The fundamental problem behind this common situation isn't technical at all, it's a communications problem.

In the development environment, most developers administer their own servers. But in production, those servers are managed by the server administrators. Moving a new application or service from development to production requires successful communications of the configuration, database, and security steps necessary for a functioning application. It is in the communications process that the errors occur. Some steps are not properly documented, and some are missed by the administrator. The problem is big enough with one server. Deploy to a server farm and the problem compounds.

In this article, I will examine the essential configuration steps and how to address them with existing deployment tools, and look at some new tools that eliminate the communication errors and improve deployment reliability for one server or an entire server farm. (*Note:* the concepts in this article can pertain to any server platform, but the procedures and tools discussed apply only to Microsoft Windows-based servers.)

Configuring the Server

For most Web applications and services, there are three major areas that must be configured: a virtual directory, user account security, and databases.

Virtual Directory

A *virtual directory* is a directory on a Web server that can contain the application code or act as a pointer to the directory containing the code for the Web service. The virtual directory tells the Web server that the code in the directory is executable, how to manage resources for the application, and whether anonymous access to the code is permissible, or if the user must be authenticated first. For Microsoft Internet Information Server (IIS) the relevant portions are executable permissions, application protection, and directory security. The actual settings depend on the requirements of your application, but they must be configured for your application to operate at all.

Program Security

Managing overall server security is the subject of entire books and well beyond the scope of this article. Server security is also properly the role of the server administrator. Web services developers preparing to deploy applications must be concerned with vulnerabilities that do not threaten the entire server if a hacker finds a weakness in their application code. The easiest way to ensure this is by running the code not as administrator or system, but as a user with very limited privileges. If the application is breached, the hacker has no access to the server itself. Configuring the application to run as a limited user can be handled in two ways. If the application is running as a service, you set the username and password in the services control panel under Windows 2000 Server. If it is running as an application, you control access to it by setting the account to that which operates as anonymous access. With this setting, anyone accessing your service is doing so as that limited user. This setting is controlled in the IIS Directory Security tab.

Database Setup and Configuration

Any nontrivial Web service will likely have a database operating as the back-end storage and retrieval system. Deploying a new service will require setting up a new database or changing an existing one. To do this, the administrator must connect to a database server like Microsoft SQL Server and execute a series of SQL statements against it to configure the database. Database configuration is one of the most error-prone parts of this process since many services can have multiple SQL scripts to execute in a specific order. Miss a script, or get them out of order, and you're in for a lot of troubleshooting.

Deployment Options

There are three common deployment methods for Web applications. The most common one is what I call "copy and configure."

The second approach is to use the free Setup and Deployment Projects that are included with Microsoft Visual Studio .NET, which allows the developer to automate some of the configuration steps. The third approach is to use a third-party installation tool, such as Wise for Windows Installer, which allows developers to manage all configuration options automatically.

Copy and Configure

Copy and configure is the most common and most error-prone method of deploying Web applications and Web services. With copy and configure, the developer provides the administrator with a set of files, SQL scripts, and instructions. The administrator then copies the files to the right location on the Web server and uses the instructions to set up the server properly. Looking at a list of requirements the administrator must perform in this process makes it easy to see why it is so error prone.

The administrator begins by using the IIS control panel to set up the virtual directory, and set execute permissions and application protection levels. If the application is going to manage security by managing anonymous access, the administrator sets this on the Directory Security tab in IIS. He then copies the files into the appropriate directory of the server. If the application will run as a system process, the administrator must enter the services control panel and set the username and password for the account the main executable will use. The next step is to connect to Microsoft SQL Server and execute the SQL scripts in the proper order. Finally, he will often have to restart the IIS service, or even reboot the machine.

Using copy and configure requires the developer to accurately and completely document every configuration step, and the administrator to accurately follow every step. If the application is being deployed to a server farm, this process must be repeated on every server. With all of these manual steps, it is very easy to see how copy and configure is the most error prone of the three deployment methods. Any step the developer can take to automate these tasks significantly increases the reliability.

Setup and Deployment Projects

The setup and deployment projects in Microsoft Visual Studio .NET and third-party tools use Microsoft Windows Installer technology to manage many deployment processes.

Windows Installer is a relatively new installation technology that made its debut with the release of Microsoft Office 2000. There are two portions to a Windows Installer installation: the package (called an MSI package) and the Windows Installer service (msiexec.exe). The Windows Installer service became a standard part of the operating system beginning with Windows 2000 and Windows ME. The MSI package contains all of the program resources and the instructions for installing them. Unlike traditional install scripts, the MSI package is a relational database with resources and installation actions contained in database tables. Standard actions consist of the common installation tasks: checking for available space, updating the registry, and copying files for example. Custom actions are developer-defined tasks that can manage custom events such as downloading information from the Web, configuring a database, or checking the version number of critical files. Windows Installer allows the use of special variables, called properties, to enable the developer to make use of information gathered from the machine or the installing user. For example, the MSI package can be set up to use a property for the server name. The user can be prompted during installation to enter the server name, that value is stored in the property, and the MSI uses that value to set the server name in the application.

For setup and deployment projects, most Windows Installer tools insulate developers from the actual database tables by providing an easier way to enter the information. The setup and deployment projects use a series of editors for adding files, registry keys, file associations, launch conditions, dialogs, and custom actions.

To deploy a Web application, use the Web Setup Project. This project enables the developer to create and configure a virtual directory during the installation. This allows the developer to automate the first of the three tasks necessary for a successful deployment. Configuring the database can be done by writing a custom DLL that executes the SQL scripts and then calling that DLL with the Custom Actions editor. This leaves the administrator with only the task of configuring the security settings. Automating the two most complex processes can eliminate the majority of deployment errors. The biggest drawbacks for developers using the setup and deployment projects are that they are not particularly easy to use, and they require the developer to write custom DLLs for many tasks.

Third Party Approach

Third-party tools make it easy for developers to automate every aspect of Web services deployment and significantly improve reliability. While assessing these tools, it is important to ensure that the tool provides a simple GUI editor that allows developers to easily create virtual directories, manage security, configure SQL server databases, and customize every machine in a server farm environment.

> “Moving a new application or service from development to production requires successful communications”

Microsoft has recently announced it will release a new deployment technology called ClickOnce, which will simplify deployment by allowing developers to specify all the requirements in an XML manifest file. This will be available in the next major release of Windows, codename Longhorn, expected to be released in late 2005 or early 2006. For more information go to: http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnwinforms/html/clickonce.asp.

About the Author

Bob Crosley is a technical product manager for Wise Solutions, Inc. He approaches the challenges of improving Web services deployment reliability with a 10-year background as a project manager, support specialist, software developer, program manager, and software product manager. This broad base of experience lets him see software from the perspective of those who design it, write it, and support it. For the past year Bob has been working with companies designing and deploying Web applications and Web services, focusing on improving the deployment of these new services.

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Building the Foundation for a New Breed of Enterprise Applications

Web services technology brings true business agility to the midmarket

More than ever, midsized businesses face the challenge of operating in a global economy, where nothing stands still. Product life cycles that once might have been measured in terms of years, are now measured in months or even weeks. From development to service, successful companies are leveraging process improvement and technology to continually reduce time to market and improve operating efficiencies. In order to be competitive, midmarket enterprises must be prepared to adapt their systems and business processes quickly to reflect changing market trends and demands. To support these requirements, the company must have business technologies that are intuitive, compliant, and adaptive – and particularly for midmarket companies, the technology has to be accessible, at an affordable price.

WRITTEN BY
JOHN HIRAOKA

Today, Web services deliver an affordable, adaptable technology framework that over time can produce a significantly lower total cost of ownership for the midmarket enterprise. Web services allow for dynamic integration between applications without costly and time-consuming programming. This reduces implementation times and simplifies installations, ultimately accelerating the overall return on software investment.

With Web services, integration is no longer limited to within the four walls of the enterprise. Now businesses can more easily and affordably integrate processes beyond the firewall, with customers, partners, and suppliers, up and down their entire value chain and improve interenterprise collaborative capabilities. Through Web services, this integration can be achieved much more easily, without requiring a detailed understanding of how the suppliers, partners, and customers have built their IT systems. For example, a distributor could streamline its supply chain management by outsourcing inventory fulfillment simply by authorizing a partner's system to use the distributor's Web services over the Internet.

In developing their overall technology strategy, enterprise software vendors have to determine which Web services technology best meets the requirements of their customers and markets. In the midmarket, businesses typically have the same feature and functionality requirements of larger, global organizations, while at the same time facing significantly more constrained budgets and resources than large enterprises.

Why Microsoft .NET Fits the Midmarket

Web services technology can be the catalyst for deploying a host of rich solutions available using any device, at any time, in any place – turning the dream of the real-time global enterprise into a reality. And, for the midmarket, the most cost-effective way to get there is via Microsoft .NET, which can provide an underlying technology fabric and development framework that is uniquely suited to building and integrating Web services.

When Epicor Software Corporation set out to meet the challenge of creating its next generation of enterprise applications, Microsoft .NET was the clear choice to achieve an agile, pure Web services architecture for the global midmarket. With it we could build the foundation for our next generation of enterprise applications faster and more affordably, delivering the following key benefits to our customers:

- Rich user experience
- Agile, reliable technology
- New levels of interoperability and extensibility
- Portable, flexible, scalable, and secure
- Lower total cost of ownership

From a development standpoint, utilizing Microsoft .NET technology to develop our Web services–based enterprise applications enables us to bring the solutions to market much more quickly. Rapid application development is a huge benefit to using .NET. Using the Microsoft C# programming language, the Microsoft .NET Framework, and Visual Studio .NET development tools, our distributed development teams are able to generate self-describing Web services extremely efficiently. For example, we can build a thin-client form, plug it into a Web service, and develop the appropriate business logic in about two days – a task that used to take as long as two weeks.

A significant benefit of implementing a Web services architecture is the ability to have multiple user interfaces interact with a single Web service. Microsoft .NET further

extends this by allowing you to build both rich client and browser-based interfaces in the same development environment via Visual Studio .NET. The new tools and framework that Microsoft .NET provides makes building Web services much easier. With Web services development, the application logic or functionality itself doesn't change, but rather its behavior – how the applications expose functionality as a set of Web services to end users and/or developers. Essentially, you're able to break applications down into very small, granular software components and make them available everywhere using the Internet.

What this means to customers is powerful, fast, and low-cost personalization. They will have the ability to bring together aspects of applications from anywhere – front or back office, supplier or customer's systems – to suit their individual requirements. For instance, if you like Epicor's integrated financials solution but you want a third party's tax service module, you'll simply drag and drop it into your workspace: no middleware, no compatibility issues, no integration cost.

> "With Web services, integration is no longer limited to within the four walls of the enterprise"

If you want your courier company's real-time scheduler to be available to your customers through your Web site, it won't be a problem. The technical barriers to e-business have gradually fallen away, enabling companies to make strategic, rather than technologically driven, decisions about supply chains and partnerships. Web services not only deliver faster return on investment, they also substantially reduce the cost of ownership and maintenance to end users.

First Pure Web Services CRM Solution Delivered

Epicor delivered the first customer relationship management (CRM) application built from the ground up utilizing Microsoft .NET technology in mid-2002, the Clientele CRM.NET Suite – a complete, CRM solution for small and medium enterprises and small to medium-sized divisions of larger organizations. Employing native Web services and XML throughout, the Clientele CRM.NET Suite makes integration to external applications easier and faster, allowing midmarket companies better interaction with partners, customers, and suppliers.

Epicor chose to build a rich client, or smart client, using Visual Studio .NET in the development of Clientele CRM.NET. For customers looking for advanced functionality with intuitive workflow and navigation, this approach was the ideal fit. Using a smart client enabled Epicor to leverage client-side processing and thereby reduce the number of server "round trips" – more efficiently using bandwidth, which improves performance and the user experience.

Web Services in Action at TruServ

TruServ Corporation, an organization formed in 1997 by the merger of Cotter & Company and ServiStar Coast to Coast, recently moved to the Clientele CRM.NET suite. The $2.2 billion Chicago-based cooperative supports over 6,400 independent retailers worldwide working under identities like True Value, Taylor Rental Center, and Home & Garden Showplace.

To ensure that those 6,400 entities get the expedient, high-quality customer service they require, TruServ has relied on Epicor's Clientele Customer Support for nearly seven years. In 2003 they migrated to Clientele Customer Support 8.1, part of the Clientele CRM.NET Suite. TruServ saw the value of Clientele's strong customer-focused functionality leveraged through the Microsoft .NET Framework for enhanced stability, portability, and flexibility.

According to Sherry Fascia, TruServ's financial manager, Customer Support 8.1 assists TruServ's field organization to gain efficiencies while on the road by allowing easier connectivity to the home company's system. In the past, they would rarely connect to the Clientele system because of the time it took to get them logged into the TruServ network. Under the new system's .NET environment, they're using a Virtual Private Network (VPN) to connect, with complete security and gain access to Clientele instantly.

Customer Support 8.1 also accelerated the rate at which TruServ's Chicago and Butler, PA call centers share information and reports. In the past, Fascia says it often took up to 30 minutes to print a report shared between the two because the company's multiple geographic locations required all of the information to be brought over from one call center, filtered into the software, and then printed out.

"It was an inefficient way to work," says Fascia. "Now with the real-time Web connectivity enabled by Clientele's .NET architecture, Butler, Chicago, and anyone else who dials in from the field can print reports and information quickly."

Web Services ESA Solution for the Midmarket

Epicor was at the forefront of .NET development again in June 2003, delivering the first XML Web service enterprise service automation (ESA) solution for mid-sized, project-based businesses – Epicor for Service Enterprises. The solution is part of a series of industry-specific Epicor solutions built using Microsoft .NET technology and enabled by Epicor's new Internet Component Environment (ICE) platform for rapid development of Web service applications – built from the ground up in just 24 months.

Epicor ICE is an application framework for the next generation of enterprise solutions leveraging pure, granular XML Web services. These next-generation "solution assemblies," like Epicor for Service Enterprises, deliver greater control, choice, and flexibility to customers. The ICE platform, built using Microsoft Visual Studio .NET and running on top of the Microsoft .NET Framework, extends the unique value proposition of Web services technology to

midmarket businesses. ICE brings extensive flexibility and ease of use through integrated yet granular components that allow straightforward, low-cost interaction with existing IT infrastructure and also with suppliers, partners, and customers. While offering high connectivity and portability, ICE leverages Secure Socket Layer (SSL) technology and Microsoft Windows security protocols, including Active Directory LDAP, to ensure that only authorized users and components with requisite permissions can access the system.

What makes Epicor for Service Enterprises unique is that it is not built on the complex, monolithic, highly duplicative code sets found in other enterprise applications. Instead, it uses Web applications to call Web services that invoke functionality such as opportunity management, project planning, resource management, and financial analysis. Epicor for Service Enterprises uses more than 60 Web services to manage essential business processes more effectively – from resource and project planning to travel, expenses, and invoicing. Because of how the solution is architected, a full range of functionality can be delivered on a thin-client basis.

StreamServe Streamlines Professional Services Organization with Web Services

StreamServe Inc, a leading business communication solution provider, was the first company to implement Epicor for Service Enterprises. StreamServe wanted to improve operational efficiency across its consulting operations by implementing a central mechanism for resource and project planning, logging of consultants' time, and generating customer invoices.

As a growing organization, StreamServe understood the need to establish efficient business processes throughout the company. Rod Kilgour, vice president of Services for StreamServe, says, "Previously, we had 11 service managers double keying in the same information for resource planning and invoicing expenses manually. Not only was this approach very inefficient in terms of people's time, it was also prone to human error."

StreamServe selected the Web services–based Epicor for Service Enterprises to address these issues across its Nordic consulting division. The open nature of Web services enabled StreamServe to integrate the Epicor for Service Enterprises solution with its existing systems. The company connected its existing CRM platform, accounting system, and Epicor for Service Enterprises using their own StreamServe Business Communication Platform (BCP).

The first information on StreamServe consultants' time and expenses was entered into the Epicor application and customer invoices were generated successfully just one week after going live. Concurrently running the legacy business systems that previously supported these functions in tandem with the new solution has verified the accuracy of all information generated from the new application.

Access to timely management information was critical to StreamServe. Previously, reports had to be produced by professional services managers and were often not available until 10 to 15 days after information was collected. As a result of the Epicor for Service Enterprises .NET-powered solution, StreamServe can access timely management information from across its services enterprise.

Affordable Web Services for the Midmarket

According to Gartner Group, one of the best strategies for accessing Web services is to turn to vendors with whom you have solid working relationships. These vendors will have Web services capabilities in their products (for example, servers and application development tools). You can use these capabilities to bolster your own Web services strategies without having to buy new products.

For the midmarket it's especially important that Web services strategies are focused on business benefits, and not just a move to new technology for technology's sake. One of the key benefits of Web services technology is the ability to evolve and extend traditional systems, preserving existing investments in IT while providing a platform for growth and agile business connectivity. When looking at implementing Web services, midmarket companies should first conduct an analysis of their business's requirements, and then evaluate how to best leverage existing enterprise systems. Midmarket companies can reap many benefits from implementing Web services technology, enabling them to rapidly respond to change, adjust for growth, and maintain competitive advantage, while achieving a low total cost of ownership.

About the Author

John Hiraoka is senior vice president of corporate development for Epicor Software Corporation, and has over 20 years of enterprise applications design, development, sales, marketing, and operations experience. Epicor builds world-class enterprise applications, architected to utilize leading Microsoft platforms and technologies. Prior to joining Epicor, John held a variety of senior management positions with DataWorks, including vice president of advanced product development.

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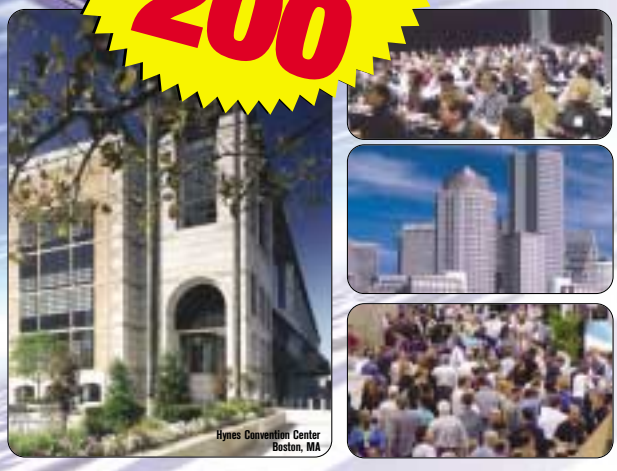

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Keynotes

Chris Hjelm

CHIEF TECHNOLOGY OFFICER, ORBITZ

Tuesday, February 24, 2004 – 10:00 a.m.

Chris Hjelm is chief technology officer for Orbitz and leads the company's technology strategies, engineering, site architecture, and operations. In this role, he is responsible for all aspects of technology, ensuring that Orbitz continues its industry-leading role in providing the lowest cost and most consumer-friendly technology platform in online travel. Before joining Orbitz, Hjelm served as SVP for technology at eBay Inc., overseeing all aspects of its technology. Under his leadership, eBay achieved record levels of site quality and reliability during a period of accelerating global business growth and new product introductions. Chris is also known for his work in creating and advancing world-class technology platforms at high-growth Internet companies as well as in Fortune 500 environments.

David Mendels

GENERAL MANAGER, MACROMEDIA

Wednesday, February 25, 2004 – 10:00 a.m.

SOA+RIA=ROI

Service-oriented architectures are imperative to drive systems and data integration, but for the integration to matter it needs to reach users in meaningful ways. Rich Internet applications (RIAs) combine the richness of the desktop with the reach of the web. Bringing web services and rich Internet applications together fulfills the promise and value proposition of service-oriented architectures, as users benefit from actionable, intuitive, and effective data and information. This next generation enterprise application architecture will deliver solutions that capitalize on existing systems and increase return on investment.

David Mendels is general manager for designer and developer products for Macromedia. Since joining Macromedia in 1992 he's played a major role in the development of Macromedia's product and business strategies and in his current role supervises the gamut of Macromedia's designer and developer products, including Flex, Flash, Dreamweaver, and ColdFusion. In that capacity, he has overall responsibility for the business unit and directly manages product marketing, product management, and product development. Mendels began his career at Macromedia in the international department, moving to Japan to lead the company's field operations, sales, and marketing there. After returning to the United States in 1995, Mendels held positions running business development, alliances and, general management of a number of Macromedia product groups.

Dr. Robert Sutor

DIRECTOR OF WEBSPHERE INFRASTRUCTURE SOFTWARE, IBM

Thursday, February 26, 2004 – 10:00 a.m.

Web Services: Surviving the Mid-Life Crisis

Mid-life can be tough on those who had fast-paced, high-profile youths but suddenly find themselves with dependents and responsibilities put upon them by others. So it is with Web services as it enters the middle phase of its standardization process and moves from being a favorite of the early adopter crowd to being a dependable citizen for the IT mainstream. How is it adapting to the challenge? Have companies like IBM delivered on the early promises of Web services? Do we need to adjust expectations now for Web services so we're not faced with major disappointments later? Dr. Sutor will discuss these and other issues, as well as explain how Web services is a critical part of how companies can become on-demand e-businesses.

Dr. Bob Sutor is IBM's director of WebSphere Infrastructure Software. He is responsible for business and product leadership for the WebSphere Application Server and WebSphere Studio software offerings. Previously, Bob was IBM's director of Web Services Technology, responsible for driving the cross-IBM Web services initiative to continue and advance IBM's leadership in providing Web services solutions, products, and services.

DAY 1 FEBRUARY 24

	Java	.NET	Web Services
8:00	Registration		
9:00	Empowering Java and RSS for Blogging	NET Compact Framework Performance Tips and Tricks	WS-CAF: Standardized Web Services Transactions and Composite Applications
10:00	Opening Keynote – Chris Hjelm, CTO, Orbitz		
11:00	**EXPO OPEN**		
1:00	Keynote Panel Discussion - 21st Century Computing: Is IT Fulfilling its Promise - or Breaking It?		
2:00	Enterprise Architecture & Open Source	Using the Enterprise Instrumentation Framework	Web Services Orchestration, Management, and Security - Will They Play Together?
3:00	Squeezing Java	J2EE/.NET Interoperability	Session TBA
4:00	Opening Night Reception		

DAY 2 FEBRUARY 25

	Java	.NET	Web Services
8:00	Registration		
9:00	Desktop Java	Best Practices and Techniques for Building Secure ASP.NET Applications	Building Interoperable Web Services
10:00	Keynote Presentation - David Mendels, General Manager of Products, Macromedia		
11:00	**EXPO OPEN**		
1:00	Keynote Panel Discussion - The Open Source Debate		
2:30	Next Phase in Evolution of J2EE	Microsoft Office 2003: A Solutions Platform	Service-Oriented Integration: Making the Right Choices To Support The Next-Generation of Integration
4:00	Aspect Oriented Programming & Java	.NET Framework: Exploring What's New in the Base Class Library for "Whidbey"	Impress the Boss: Roll Your Own Web Services Initiative

DAY 3 FEBRUARY 26

	Java	.NET	Web Services
8:00	Registration		
9:00	Simplifying J2EE Applications	Session TBA	Government Real-Time Fraud Detection Using Web Services
10:00	Keynote Presentation - "Web Services: Surviving the Mid-Life Crisis", Dr. Robert Sutor, IBM		
11:00	Apache Axis	Introduction to BizTalk Server 2004 and Web Services	Exploring the Dark Side
12:00	**BREAK**		
1:00	ANT/JUnit	BizTalk Server 2004 Technical Drilldown	ID, Please. The Case for Giving Web Services an Identity
3:00	Session TBA	Moving your Architecture to .NET	Session TBA

XML	MX
XML Security Integration Challenges	Enterprise Infrastructure for Rich Internet Applications with Macromedia Flex
SOA Foundation Components: Building an XML Content Router	Code Base RIA's
Real Best Practices for XML Web Services Management and Security	Using Flash with Web Services

Microsoft

Full Day .NET Tutorial Presented by Microsoft

The Smart Client Perspective

XML	MX
XForms - Simplifying the Development of Transactional Web Forms	Using Web Services with ColdFusion
Session TBA	ColdFusion Components
Using XML Schemas Effectively in WSDL Design	Rapidly Build Web Services Applications with ColdFusion and Studio

westbridge

Full Day Security Tutorial Presented by Westbridge Technology

Strategies for Web Services Security Success

XML	MX
What's New in XSLT 2.0?	Leveraging Web Services
Rich Internet Applications: An XML-Based Approach	Session TBA
Cutting the Crap: Using Rules to Clean Up XML	Code-based Rich Internet Applications with Macromedia Flex
Session TBA	Session TBA

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JAVA SESSIONS

Aspect-Oriented Programming & Java

RON BODKIN, NEW ASPECTS OF SOFTWARE

Aspect-Oriented Programming (AOP) has become a hot topic of discussion for enterprise development, with the recent news of support by IBM, JBoss, BEA, Eclipse, and IntelliJ.

- What's real?
- What is AOP?
- What problems can it solve today?
- How can you make an informed decision about using AOP?
- What is the best adoption strategy?
- What are the long-term possibilities for AOP?

This session answers these questions and gives an introduction to AOP for enterprise Java development. AspectJ is a seamless AOP extension to Java. It allows the consistent and flexible implementation of crosscutting concerns such as security, exception handling, testing, logging, caching, and business rules. This is a major improvement on scattered and tangled traditional implementations.

This tutorial introduces AOP and shows how to use AspectJ effectively in an enterprise context, including examples of tools support. Attendees should have experience with OO design and Java development. AspectJ is an open source project available from the Eclipse consortium.

BIO: Ron Bodkin is the founder of New Aspects of Software, which consults and trains on enterprise Java applications with an emphasis on Aspect-Oriented Programming. Ron is also a member of AspectMentor, a consortium of AOP experts. Ron previously worked for the AspectJ group at Xerox PARC, where he led the first AOP implementation projects and training for customers. Prior to that, Ron was founder and CTO at C-bridge, a consultancy that delivered enterprise applications using Java and XML frameworks.

Squeezing Java

ALAN WILLIAMSON, JAVA DEVELOPER'S JOURNAL

Java is a very powerful language, and while it offers the developer a rich array of tools, the fundamentals mustn't be overlooked. Improving your code at the core layer will result in great improvements in efficiency and produce (hopefully) 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 SYS-CON Media's technical director, and editor-at-large of *Java Developer's Journal*. In addition, he holds the CTO office at n-ary (consulting) Ltd, one of the first companies in the UK to specialize in Java at the server side.

Enterprise Architecture & Open Source

JAMES MCGOVERN, THE HARTFORD FINANCIAL SERVICES GROUP, INC.

Use of open source software within the enterprise is gaining momentum. The vast majority of organizations use some form of open source software, such as Linux, Apache, and JBoss, in production environments. The enterprise architecture, however, needs to incorporate the best thinking of the industry that not only includes using open source but contributing to it. The model in which open source software gets developed has practices that could assist an organization in becoming agile in their software development practices and allow them to develop software faster, with lower costs and better quality. In this session you will learn:

- Two models of development: the cathedral and the bazaar
- Value proposition of using open source
- Harnessing the power of the mob: the value proposition of contributing to open source
- Making the build versus buy decision: additional thoughts

BIO: James McGovern is an industry thought leader and the author of the best-selling book, *A Practical Guide to Enterprise Architecture* (Prentice Hall). He is working on two upcoming books entitled *Agile Enterprise Architecture* and *Enterprise SOA*. He is employed as an enterprise architect for The Hartford Financial Services Group, Inc. He holds industry certifications from Microsoft, Cisco, and Sun. He is member of the Java Community Process and of the Worldwide Institute of Software Architects.

J2EE v1.4

BILL ROTH, E.PIPHANY

Day-to-day work with deadlines makes it difficult to keep abreast of the rapidly evolving landscape of J2EE, especially given the numerous constituent J2EE technologies. J2EE v1.4 is chockfull of new services that affect and benefit a wide range of enterprise development tasks. This talk will extract core material from the speaker's new *J2EE Developer's Handbook* and describe what's embodied by J2EE v1.4. The new Web services features provided by J2EE v1.4 in particular will be highlighted. The talk will also briefly address those services missing from the current J2EE standards but still needed when building enterprise applications.

BIO: Bill Roth is senior technical evangelist for E.piphany. With over 15 years in this industry, he has played numerous roles in engineering and product marketing including program manager for Java IDL, and managing product marketing and product management for J2EE 1.2 at Sun.

Apache Axis

CHRIS HADDAD, BURTON GROUP

Apache Axis is the very popular SOAP engine, which includes everything you need to start producing Web services. Discover just what Axis is and how you can utilize the power of this free engine to kick-start your Web services.

BIO: Chris Haddad has 13 years experience in Web services, protocols and standards (SOAP, UDDI, WSDL), application framework, development tools, key development languages (Java, C++, Perl, JavaScript), and enterprise application integration. His background includes Grand Central, Flamenco Networks, Adjoin, Securant, Employease, Jamcracker, TRX, and Raygun.

Empowering Java and RSS for Blogging

JASON BELL

One of the fastest growing areas over the last few years is that of the blogging community. The ease at which you can post and publish information has enabled everyone to become his or her own publisher. One power of blogs has been the syndication of data via the RSS (XML) protocol. Discover how you can easily produce and consume RSS feeds within your Java applications for wider appeal and hook into the likes of JavaBlogs.

BIO: Jason Bell is a Java developer and IT development manager for a B2B portal in the UK. He also contributed to a number of open source projects and is an advocate of everyone reading the API docs.

Ant/JUnit

KYLE GABHART

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.

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.

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. In addition, it is compatible with any IDE or operating system.

BIO: Kyle Gabhart is an independent consultant, mentor, and published author, specializing in J2EE, XML, and Web services technologies. He is a prolific writer, with his most recent work displayed on IBM's developerWorks Web site in the J2EE Pathfinder column. You can find him on the Web at www.Gabhart.com.

Desktop Java

JOE WINCHESTER, IBM

Java is enjoying a renaissance on the desktop, and there are several reasons for this:

- The issues that plagued early client/server projects or Java desktop applications have largely been solved. Swing 1.4.2 delivered great performance improvements, good fidelity XP, and GTK look-and-feel classes. Java Web Start now exists as a way to deploy to a client PC the programs that run in a local JRE and enjoy the benefits of local caching, lazy update, and execution within Java's security model
- Java is becoming part of the default installation setup for many PC vendors such as Dell, HP, and Gateway.
- SWT provides a set of rich native controls over and above those offered by AWT, and many Java developers are finding that it's a useful GUI toolkit to use in their end-user applications.
- HTML is no longer being viewed as the only viable client for application development. A number of hybrid technologies that combine the benefits of server-side computing with a client GUI have arisen, including Ultra Lightweight Client, Droplets, JFlash, Macromedia Royale, Asperon, and Thinlets.

This session will look at the Java desktop space and discuss the issues and technologies, as well as what is at stake if Java can or can't recapture its lost pride as a client platform.

BIO: Joe Winchester is a software developer working on WebSphere development tools for IBM in Hursley, UK. Joe was part of the expert group for JSR 57.

FULL DAY JAVA TRAINING

CREATE SERVER-BASED SOLUTIONS USING JAVA 2 ENTERPRISE EDITION

Developing J2EE Applications Using WebSphere Studio Application Developer*

February 25th & February 26th

J2EE is a standard coherent Java API for creating server-based applications, and WebSphere is an industry-leading enterprise application server. Students learn the steps necessary to develop J2EE applications (built using database, servlets, JavaServer Pages, and Enterprise JavaBeans) using WebSphere Studio Application Developer. Hands-on labs reinforce the lecture topics while providing practical experience.

BIO: Ken Greenlee is the chief technology officer of Kenetiks, Inc., a Java-WebSphere training and consulting company he founded in 1997. He has written many courses covering J2SE, J2EE, WebSphere Studio Application Developer, WebSphere Application Server, and WebSphere Portal Server. Prior to founding Kenetiks, he worked for IBM in North Carolina where he worked on development teams responsible for such products as VisualAge Smalltalk and OS/2. He holds a BS degree in computer science from Indiana University along with numerous professional certifications in Java and WebSphere.

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.NET SESSIONS

.NET Compact Framework Performance Tips and Tricks

JIM WILSON, JW HEDGEHOG, INC.

Learn the techniques that can be used to increase the responsiveness of user interface and network operations for users of applications built on the .NET Compact Framework. Look under the covers at advances and changes in the "Whidbey" release that significantly improve performance. Get a general overview of how the .NET Compact Framework works under the hood at runtime, with specific focus on performance implications. Next, we cover general user interface tips to increase performance. Explore how asynchronous infrastructure, such as threading, in the .NET Compact Framework can be leveraged to optimize both user interface and network operations. Learn about the architectural guidelines for creating applications that perform well under frequently changing network conditions.

BIO: Jim Wilson is president and cofounder of JW Hedgehog, Inc., a consulting firm specializing in the integration of smart devices as part of enterprise solutions with a focus on the .NET Compact Framework, .NET Framework, Web services, and other XML-related technologies. He develops and teaches DevelopMentor's Mobility training course, was one of Microsoft's original five MVPs for the .NET Compact Framework, has written articles for numerous publications, and has spoken at a myriad of events, including Microsoft's Tech-Ed and Mobility Developers conferences.

Best Practices and Techniques for Building Secure ASP.NET Applications

PATRICK HYNDS, CRITICALSITES

When the enterprise depends on your application, careful attention to security is essential. This session provides specific recommendations to follow when developing secure ASP.NET Web applications and services, and focuses on the details of configuring IIS for security. Understand how to use authentication, authorization, threat modeling, configuration settings, and secure database access to create secure systems, plus learn common coding techniques for storing secrets, error handling, data validation, and code access security.

BIO: Patrick Hynds, MCSD, MCSE+I, MCDBA, MCSA, MCP+Site Builder, MCT, is the Microsoft Regional Director for Boston and the CTO for CriticalSites. Named by Microsoft as the Regional Director for Boston, he has been recognized as a leader in the technology field. An expert on Microsoft technology (with at last count 54 Microsoft certifications) and experienced with other technologies as well (WebSphere, Sybase, Perl, Java, Unix, Netware, C++, etc.), Patrick previously taught freelance software development and network architecture. He has been a successful contractor who enjoyed mastering difficult troubleshooting assignments. A graduate of West Point and a Gulf War veteran, Patrick brings an uncommon level of dedication to his leadership role at CriticalSites. He has experience in addressing business challenges with blended IT solutions involving leading-edge database, Web, and hardware systems. In spite of the demands of his management role at CriticalSites, Patrick stays technical and in the trenches, acting as project manager and/or developer/engineer on selected projects throughout the year.

Using the Enterprise Instrumentation Framework

DEREK FERGUSON, EXPAND BEYOND CORPORATION

The Microsoft .NET Framework 1.1 and Windows Server 2003 offer a number of new features to help developers instrument their code. In this session, you'll learn about the challenges facing application management in today's distributed world. We will examine the new unified instrumentation API in the Enterprise Instrumentation Framework (EIF), including the new Windows Event Trace available in Windows Server 2003, configurable at-source event filtering, and how request-based event tracing using EIF allows you to put a request context around the trace messages that map to a business process flow in your application. We will also discuss the benefits to both the developer and the application administrator for using EIF in your application.

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 (Apress).

.NET Framework: Exploring What's New in the Base Class Library for "Whidbey"

JULIA LERMAN

The base classes serve as the essential libraries for any developer. Continued evolution of the base classes provides numerous benefits, including the ability to write more reliable, faster solutions, easier-to-write code, and more solutions entirely in managed code. Take a look at the many features that are a part of that evolution, including features in IO, event-logging, and various features in System.

BIO: Julia Lerman is the owner of Julia Lerman, Inc (dba The Data Farm). and has been developing software applications and consulting to businesses since 1984. Julia is the founder and leader of VTdotNet, Vermont's .NET user group (www.vtdotnet.org), as well as a member of the User Group Relations Committee for INETA (International .NET Association) www.ineta.org. She writes on Visual Studios and .NET and in her pre-Visual Basic days, FoxPro Advisor. Having spent many years as a FoxPro. Julia is working very hard to help bring the same community spirit to .NET that is so unique to FoxPro.

Microsoft Office 2003: A Solutions Platform

JOHN HOLLINGER, INTERNOSIS

For all developers who would like to integrate custom business solutions with Microsoft Office products, this session will introduce you to the expanded developer features that have been included in the newest version of Microsoft Office. Come explore new XML-based programmability in everything from Word 2003 and Excel 2003 to FrontPage 2003 and SharePoint. Build powerful, modular solutions with Web services. Learn about InfoPath 2003 support for XML standards. Discover how to use the Microsoft Visual Studio Tools for the Microsoft Office System to automate and extend Microsoft Office Word 2003 and Microsoft Office Excel 2003 using Visual Basic .NET and Visual C# .NET. More than ever, Office has a solution for you.

BIO: John V. Hollinger serves as CTO of Internosis clients are able to leverage the latest technologies while planning for tomorrow's challenges. Mr. Hollinger is responsible for the performance of the Northeast/Commercial business unit, including all aspects of business development, client care, marketing, resource management, and financial management. Prior to joining Internosis, he played an instrumental role in the creation of New Technology Partners (NTP) and then went on to run a highly successful division of Xpedior, where his team was a four-time Microsoft Solution Provider Partner of the Year in New England and the recipient of the award on a worldwide basis in 1997. Previously, John was vice president of Advanced Technologies at AIG.

Advanced BizTalk Server 2004

BRUCE BACKA, CRITICALSITES

BizTalk Server 2004 is designed to provide Enterprise Application Integration (EAI), Business Process Automation (BPA), and Information Worker Integration solutions. Come join us for a technical drilldown on the new features and toolsets available.

BIO: Bruce Backa is the founder of CriticalSites. A noted business leader and consultant in the IT industry, he has acted as chief architect, technologist, and project manager for assignments involving large-scale technology and implementation strategies. He has held the positions of director of Technology and Business Research for the American Stock Exchange (AMEX) and director of Technology for American International Group. Bruce has been responsible for the architecture, implementation, and management of a worldwide client/server networking infrastructure for a Fortune 10 company with a platform of over 600 servers connecting 10,000 users across 50 cities throughout North America and offshore. In 1994 he founded NTP Software, a provider of business solutions for Windows NT and Windows 2000. At the recent World Economic Forum in Switzerland, Bruce was recognized as a technology pioneer. This follows a similar award from the National Computer Conference in 1974, where he was honored as a part of the Dartmouth College team that invented computer timesharing.

Moving your Architecture to .NET

CARL FRANKLIN, FRANKLINS.NET

This session is focus on how to migrate existing business components from VB6 COM Objects to VB.NET assembly components. We'll spend time discovering how to best move different tiers of a multi-tiered application from COM to .NET, as well as effective strategies on how to wrap existing COM components for interoperability. We'll also examine best practices for moving your application from a COM-based architecture to a .NET-based architecture.

BIO: Carl Franklin has been a luminary in the VB community since the very early days. Since then he has written extensively on the subject of VB. He has authored two books for John Wiley & Sons on sockets programming in VB, and in 1994 he helped create the very first Web site for VB developers, Carl & Gary's VB Home Page. He now teaches hands-on VB.NET classes for his company, Franklins.NET. He has taught developers from Citigroup, Aetna, Fidelity Investments, Fleet Bank, Foxwoods Casino, UTC, Hubbell, Microsoft, Mohegan Sun Casino, and Northeast Utilities, to name a few. Carl is cohost of a weekly talk show on his Web site for .NET programmers, called ".NET Rocks!" Carl is MSDN Regional Director for Connecticut.

Introduction to BizTalk Server 2004

BRIAN LOESGEN, NEUDESIC

BizTalk Server 2004, the latest and third version of BizTalk, is an exciting tool that all .NET application developers should know about. BizTalk fills two key business needs: enterprise application integration and business process automation. The powerful messaging platform allows for easy integration between applications, and also between enterprises. The business process automation engine, based on the new BPEL XML specification, allows for automation of even the most complex business processes. Throw in InfoPath for a user interface into BizTalk, tight integration with Visual Studio, Sharepoint, and Office-based monitoring and reporting tools, and you get an incredibly powerful tool.

This session will be an overview of BizTalk Server 2004. Concepts and tools will be demonstrated by walking through several real-world, practical examples of BizTalk usage. Particular attention will be paid to Web service integration and orchestration, showing why BizTalk Server 2004 deserves consideration as the integration "glue" in a services-oriented architecture.

BIO: Based in San Diego, Brian Loesgen is a principal consultant with Neudesic, a premier southern California solution provider and system integrator. At Neudesic, Brian uses his expertise to architect and deliver advanced Microsoft technology solutions, and to translate new, leading-edge technologies into real-world value. He is a coauthor of the *Professional XML*, *Professional ASP/XML*, *Professional Windows DNA*, *Professional ASP.NET Web Services*, and *Professional VB.NET Web Services* books from Wrox, and is currently working on the *BizTalk Server 2004 Developers Guide*, due in 2004. In addition, Brian has written technical white papers for Intel, Microsoft, and others. Brian has spoken at numerous major technical conferences worldwide and is a cofounder and president of the International .NET Association (ineta.org). He coleads the San Diego .NET user group, and leads the San Diego Software Industry Council Web Services SIG.

In his spare moments, Brian enjoys outdoor activities such as cycling, hiking in the mountains, kayaking, camping in the desert, or going to the beach with his wife Miriam and children Steven and Melissa.
Brian can be reached at brian.loesgen@ineta.org.

WEB SERVICES SESSIONS

WS-CAF: Standardized Web Services Transactions and Composite Applications

ERIC NEWCOMER, IONA TECHNOLOGIES

The Web Services Composite Application Framework is a collection of three specifications – Web Service Context (WS-CTX), Web Service Coordination Framework (WS-CF), and Web Service Transaction Management (WS-TXM) – designed to solve problems that arise when multiple Web services are used in combination ("composite applications") to support information sharing and transaction processing. As coauthor of the specification, Eric will discuss how WS-CAF addresses the underlying issues of Web service context propagation and transaction management to expand the scope, usability, and reliability of Web services for business process automation.

BIO: In the role of chief technology officer at IONA, Eric is responsible for IONA's technology roadmap and the direction of IONA's e-Business Platforms as relates to standards adoption, architecture, and product design.

Government Real-Time Fraud Detection Using Web Services

NEIL MCGOVERN, SYBASE, INC.

Government agencies are faced with increasing amounts of data and are challenged to make sense of, and act on, that data in real time. Failure to interpret and execute on data can result in security threats and, potentially, loss of life. Government agencies are increasingly investing in Web services solutions to address their need for real-time access to information.

The Canadian Passport Office is an example of a government agency leveraging Web services to exchange information in real time to combat terrorism and other illicit uses of fraudulently obtained passports. The agency selected IT consulting firm Pentelar and Sybase, Inc., technologies to electronically authenticate identity document data through the use of Web services and ebXML. Identification tasks performed across 10 provinces and 3 territories previously handled by physical document inspection are now conducted in real time with absolute security and reliability.

In this session, Sybase and Pentelar will discuss this successful pilot project and highlight the ebXML capabilities that enable the Canadian Passport Office to address real-time information exchange.

BIO: Neil McGovern has over 15 years of experience in the software industry. Currently, he is responsible for platform strategy for Sybase's infrastructure product line, including its enterprise-class RDBMS; Sybase ASE; and integration, portal, and tools product lines. Prior to that, Neil was responsible for building the Sybase (New Era of Networks) Adapter suites, commonly recognized as one of the most advanced and complete sets of adapters in the EAI marketplace. Neil developed ERP package expertise as CTO of Convoy Corporation, which specialized in PeopleSoft integration. He led the Development and Professional Services teams for Convoy Corporation, which was purchased by Sybase (New Era of Networks) in 1999 after recording triple-digit growth for three consecutive years.

Service-Oriented Integration: Making the Right Choices To Support The Next-Generation of Integration

DAVID CHAPPELL, SONIC SOFTWARE

Applications are increasingly being developed "built-to-integrate," providing the ability to easily expose key functionality through commonly defined interfaces. Gartner calls this concept SODA, or service-oriented development of applications, fitting into its overall service-oriented architecture landscape. When applied to the ever-present integration challenge, SODA represents a transition to service-oriented integration.

But making the right architectural decisions is absolutely vital to ensuring success with service-oriented integration projects – whether applications were built to integrate or not. Choices at all levels – from application-interface style to overall system architecture – can seriously affect the long-term value derived from integration projects. Application infrastructure products on the market today embody architectural directions that should be carefully examined before making purchase decisions. Any two products that claim to support a "service-oriented architecture" may, in fact, promote radically different architectures.

This presentation will examine the leading choices for supporting service-oriented integration: enterprise service buses (ESBs), integration brokers, and application suite platforms.

BIO: Dave Chappell, VP and chief technology evangelist for Sonic Software, has over 18 years of experience in the software industry. Dave and Sonic Software are involved in many standards organizations, technical committees, and expert groups, including the W3C, OASIS, WS-I, and the Java Community Process. Dave is an active contributor to the Apache Axis project and SOAPBuilders.

Dave also has extensive experience in distributed computing, including message-oriented middleware, CORBA, COM, and Web application server infrastructure. In 2002, Dave received the "Most Outstanding Individual Contributor to the Java Community" award from the editors of JavaPro Magazine.

Securing the Web: What Can Be Done Today

MARK SECRIST, HEWLETT-PACKARD CO.

Security is considered one of the main barriers to the adoption of Web services today. With the proliferation of emerging security standards, there is a lot of confusion over which ones are mature enough to use and how they might fit together. This session will present cover current and emerging security standards for Web services and show how they can be fit together architecturally to address various security concerns. At the conclusion, the audience will have a better understanding of these standards and how to begin securing their own Web services.

BIO: Mark Secrist is a senior software consultant for HP's Developer Resources Organization, with over 15 years of experience working in the software development industry. He provides technical consulting to HP and its customers in the areas of J2EE and Web services development, as well as development strategies for "management-ready" applications. In this capacity, he has written a number of white papers and trade publication articles, presented at a number of industry events, and provided training and consulting to many of our enterprise customers.

Exploring the Dark Side

PETER VARHOL, COMPUWARE CORPORATION

The growing use of services-oriented architectures puts pressure on application developers relying on Web services for key features of their applications. Performance, scalability, and reliability of these components affect the ability of applications to meet service-level agreements, yet can't easily be analyzed as a part of the application when developers have a problem. In fact, the Web service may be on a different software platform than the rest of the application. This session describes how developers can shed light on memory use in Web services written in either .NET or Java, even if they didn't write the code and wrote their own applications on the other platform.

BIO: Peter Varhol is a product manager at Compuware Corporation, where he provides direction for developer tools targeting enterprise applications and Web services. He holds graduate degrees in computer science and mathematics.

Building Interoperable Web Services Using WS-I Basic Profile

KEVIN LIU, SAP LABS, LLC

The promise of Web services interoperability is based on a set of standards, including XSD, SOAP, WSDL, and UDDI. However, early interoperability experiments such as the SOAPBuilder activity has proven that making these technologies seamlessly work together, inter- or intra-enterprise, is a bigger challenge than most of us expected. Most of the Web services technologies are still in the standardization process, and Web services platforms have to be based on pre-standard draft specifications. The inconsistencies and ambiguities left in these initial drafts can easily lead to different interpretations for the same features and substantially compromise the promised interoperability. This presentation explains how WS-I Basic Profile addresses these challenges, and what are the key advises you can get from the profile that can make your Web services interoperable. It explains why the profile disallows SOAP encoding and why RPC style should give way to document style.

BIO: Kevin Liu is an architect of XML Web services technologies at SAP Labs, California. Kevin helps to drive the adoption of Web services technologies in SAP's strategic products, as well as representing SAP in various standards bodies. He has over 10 years of experience in software engineering and in financial industries and holds multiple master's degrees in information management, finance, and economics.

ID, Please. The Case for Giving Web Services an Identity

ASHISH LARIVEE, NOVELL

Without identity management, Web services can be consumed by anyone. The challenge for Web services developers is to provide appropriate access based on the user's identity. As identity management moves into the forefront of technology, directory services will evolve from simple LDAP repositories used for authentication and storage to robust engines that provide identity integration, access management, and policy enforcement. This presentation will discuss how identity management and directory services provide a robust solution for Web services authentication, authorization, and single sign-on.

BIO: With more than nine years of experience in the software industry, Ashish Larivee has designed and developed many enterprise applications across a variety of platforms, including Microsoft, Lotus Notes/Domino, and J2EE. In 1999, Ashish joined SilverStream Software, acquired by Novell in July 2002, and has served in various roles in consulting, development, and technical marketing. In her current role, she helps define the strategy and product direction across Novell's Web Application Development Products.

Web Services Orchestration, Management, and Security - Will They Play Together?

PAUL LIPTON, COMPUTER ASSOCIATES

Web Services orchestration, management, and security are among the principal challenges facing implementers of service-oriented architectures today. There is still much confusion in the IT community about the standards themselves, which are at various stages of maturity. Also, their relevance to enterprise IT and how they might someday be able to effectively work together is often unclear. This session provides a useful overview of standards in these three critical areas of Web services – orchestration/choreography, management, and security – and more importantly, how each affects the other. Attendees will gain practical knowledge and a deeper understanding of future trends and the need to address certain real-world issues in order to create a more cost-effective and agile IT infrastructure.

BIO: Paul Lipton is the Web services technology leader for the field services organization and a technology strategist in the Office of the CTO at Computer Associates. 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. Paul has represented CA in various standards organizations, and has participated in the Java Community Process. He has published magazine articles on many technologies including Web services, Java, .NET, EAI, wireless technology, and distributed systems.

Impress the Boss: Roll Your Own Web Services Initiative

BOB ZUREK, ASCENTIAL SOFTWARE

Some companies are leveraging open source software like Linux, JBoss, PHP, MySQL, and Apache SOAP to develop and deploy Web services. As this open source Web services stack continues to mature, companies will benefit beyond simply saving money on license fees; they will be able to assemble the stack and get a Web service up and running quickly as well.

Developers frustrated by their enterprise's lack of Web services interest can immediately master and build Web services at home with open source stack components with little investment except time and a broadband connection. Imagine impressing your company with a demo of wrapping that chunk of code as an open source Web service and calling it from a legacy Visual Basic application.

BIO: Bob Zurek, VP of Advanced Technology, Ascential Software, is responsible for Ascential's overall product strategy. He is instrumental in developing and driving its enterprise integration strategy, including its parallel processing framework, data quality, and Web services strategies. Previously, he was a senior analyst with Forrester Research; prior to Forrester, he held senior management positions at LumaPath, Centive Systems, and Sybase.

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XML SESSIONS

Real Best Practices for XML Web Services Management and Security

KERRY CHAMPION, WESTBRIDGE TECHNOLOGY

Companies deploying Web services in a meaningful way are increasingly finding they need to address Web services management and security early in the architectural phase. Basic Web services connections are easy to do, but managing the security, performance, scalability, and the inevitable changes to the production environment requires some knowledge, expertise, and planning. This session cuts through the hype and outlines real-world mistakes many companies make when deploying Web services and the real best practices from companies who have successfully captured the value of XML Web services. It provides practical advice on how to successfully manage and secure your XML Web service environment.

BIO: Kerry Champion is president and founder of Westbridge Technology, a leading provider of XML Web services management and security solutions. A frequent writer and speaker on XML Web services, Kerry is a renowned technologist who has served in various senior technical and product strategy roles at enterprise security and messaging companies.

SOA Foundation Components: Building an XML Content Router

DAN STIEGLITZ, TIAA-CREF

One of the fundamental components for any burgeoning SOA will be an XML content router. This session explores the concepts, patterns, and open source software available that facilitate building an XML content routing system. The system can be exposed as a Web service or simply as a stand-alone J2EE component for use in your enterprise. The "restaurant" pattern is introduced as the principal design pattern for building the service, and this pattern's applicability to building generic services is discussed. Applying the router as an XML data integration tool is also discussed, as well as its potential for acting as a service orchestrator.

BIO: Visit www.sys-con.com/edge for complete speaker information.

What's New in XSLT 2.0?

STEVE HECKLER, ACCELEBRATE

XSLT 2.0, which may achieve W3C Recommendation status by conference time, offers unparalleled power in conjunction with XPath 2.0 for transforming XML documents. In this engaging, example-rich seminar, Steve Heckler demonstrates the most important new features of XSLT 2.0, including sequences, new data types and XML Schema support, regular expressions, multiple document output, grouping, new control-flow operators, and much more. Current/future support for XSLT 2.0 on the Java and .NET platforms will also be discussed. Most examples will use Saxon, but .NET examples will be included if .NET supports XSLT 2.0 by conference time.

BIO: Steve Heckler has been a leading IT trainer and application developer for nearly a decade. Prior to founding Accelebrate in March 2002, he served nearly seven years as vice president and then president of WestLake Internet Training. He holds bachelor's and master's degrees from Stanford University.

Using XML Schemas Effectively in WSDL Design

CHRISTOPHER PELTZ, HP

Developers building Web services today are beginning to see the value of using the document-style approach over RPC. Recent experience shows that to take full advantage of document style Web services requires a strong knowledge of XML Schemas and related XML standards. This session presents a number of important tips and techniques for properly using XML Schemas in the design of a Web services interface, including important XML-based development tools, binding considerations between XML and underlying objects, WSDL reusability through XML Schemas, and XML Schema naming best practices.

BIO: Chris Peltz is a senior software consultant within HP's Developer Resources Organization. He provides technical and architectural consulting to enterprise customers in the areas of 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.

Using Rules to Clean Up XML

GARY BRUNELL, PARASOFT

Garbage in, garbage out – it's an axiom that applies to many aspects of enterprise development, but none more so than building reliable and robust Web applications and integration projects with XML. Since its inception, XML has been seen as the cure-all for problems related to Web applications and integration projects. However, poorly written XML can slow down an integration project, or worse, cause the integration project to collapse. The key to successfully using XML in an integration project is to first understand the inefficiencies that may cause poorly written XML, and then apply a rule-based system that establishes policies to follow.

BIO: Gary Brunell joined Parasoft in the fall of 2001 to develop and head the company's professional services division. He is responsible for spearheading delivery services, technical support, and training initiatives as well as establishing process-improvement infrastructure.

XML: Getting Started with Minimum Investment

KETAN PATEL, DATAWATCH

Many organizations are evaluating XML as an enabler for sharing and presenting information. Whether part of a portal strategy, an alternative to EDI for billing, or a data conduit to an information repository, XML is core to many future projects. As IT managers evaluate XML's potential, they should understand its capabilities and limitations. XML is not the panacea for all technology issues. However, as an enabler, XML can provide a common language for sharing information inside and outside your organization. The key is to use the technology in projects that have a clear return and minimize the investments required.

BIO: Datawatch director, Technical Strategy, Ketan Patel has over 15 years of experience developing and marketing technology products to customers who are cautious about technology adoption. During his career, Ketan has focused on bridging the gap between technology and business, and is passionate about bringing information technology solutions to market.

XForms - Simplifying the Development of Transactional Web Forms

ASHISH LARIVEE, NOVELL

XForms is a W3C specification that specifies a declarative language for solving a common requirement for advanced user interaction, data validation, and XML processing. XForms is designed to be integrated into XHTML, but is not restricted to being a part of that language alone. It can be integrated into any suitable markup language. This session gives an introduction to XForms and explains how XForms in the client tier of the J2EE application architecture. In addition, it will cover the benefits of XForms and why it is a perfect fit for interacting with J2EE and Web services. A demonstration of XForms in a J2EE environment using an XForms- compliant browser and a sample application further illustrates the advantages.

BIO: With more than nine years of experience in the software industry, Ashish Larivee has designed and developed many enterprise applications across a variety of platforms including Microsoft, Lotus Notes/Domino, and the J2EE platform. In 1999, Ashish joined SilverStream Software, acquired by Novell in July 2002, and has served in various roles in consulting, development, and technical marketing. In her current role, she helps define the strategy and product direction across Novell's Web application development products.

Rich Internet Applications: An XML-Based Approach

CHRISTOPHE COENRAETS, LASZLO SYSTEMS

Rich Internet applications deliver groundbreaking, highly interactive user interfaces that provide a user experience similar and often superior to desktop applications. In this session, we will discuss the benefits of rich Internet applications, review the market landscape, and explore an XML-centric approach for developing rich Internet applications that can be delivered to any browser today. As a practical example, we will demonstrate how to build a rich Internet application version of an Amazon store using an XML-based presentation server to deliver the rich user interface, and the Amazon Web services API to deliver the content.

BIO: Christophe Coenraets worked at Sybase/Powersoft from 1994 to 2000. He started working with Java in 1996 and became the technical evangelist for the company's Java and Internet Application Division. Christophe then joined Macromedia as the company's JRun and J2EE technical evangelist. He joined Laszlo Systems early in 2003.

XML Security Integration Challenges

PHIL STEITZ, AMERICAN EXPRESS

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. Phil 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. Phil holds a PhD in mathematics from the University of Maryland.

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Are you a developer, software architect, IT operator, or security administrator deploying or planning to deploy XML Web services? If so, this technical seminar is designed to arm you with the practical information and best practices you need to securely deploy XML Web services in your environment. Many questions will be addressed, such as: Why do Web services need special security? What standards are being created and what do they address? How do I leverage my existing environment to secure Web services? What are the different architectural and technical approaches to solving the problem? How can I centrally manage security in a decentralized environment?

Course Highlights/Benefits

- Overview of XML Web services security: Why is it important?
- Discussion of various standards (WS-security, SAML, XML-Enc, XML-Sig, XKMS)
- Architectural considerations
- Malicious Web services attacks
- Strategies for securing XML Web services today and in the future
- "Nuts and bolts" demonstrations of security solutions

As part of the tutorial, we will show you how to secure your entire XML environment without adding any additional code.

Course leaders

Dan Neiman is a Senior Systems Engineer at Westbridge Technology and is responsible for training and working with real world customers in solving their security and management needs for XML and Web Services. Previously, Dan worked for Tumbleweed Communications where he directed the field engineers in designing and implementing secure email transports. He has also held positions at CSC and the Department of Defense. Dan holds a BS degree in Management and Decision Systems from Carnegie Mellon University.

Peter Bostrom is a Federal Technology Director at Westbridge Technology and works closely with federal customers. Previously, Peter was VP of Product Management at Sequation, a security solutions provider and CTO and co-founder of ExactOne, an Internet-scale distributed search engine. Peter also worked in a variety of sales, consulting and product management roles at Legent Corporation. He was awarded Systems Engineer of the Year award in his first year there. Peter can be heard on National Public Radioís WAMU in Washington, DC as a regular guest on iPublic Interestî hosted by Kojo Nnamdi and is president of the DC Association of Internet Professionals. Peter holds a BA in International Affairs from The American University after spending three years as an Army Ranger.

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MX SESSIONS

Enterprise Infrastructure for Rich Internet Applications with Macromedia Flex

KEVIN HOYT, MACROMEDIA

Learn how Macromedia's technology initiative, Flex fits seamlessly into today's new service-oriented architectures (SOA). We'll cover design patterns for rich clients, accessing web services and securing your Flex application.

BIO: As a senior sales engineer for Macromedia, Kevin Hoyt plays a primary role in evangelizing the product line, educating the customer base, and supporting the sales organization. Kevin is also a regular speaker at various user group forums throughout the United States.

Leveraging Web Services

TOM JORDHAL, MACROMEDIA

Web Services technology is changing the way we think about designing and building applications. Come and learn what all the fuss is about, find out exactly which problems web services solve, see web services created and used, and even discover how web services expose the world of .NET.

BIO: Tom has been a Principal Engineer at Allaire/Macromedia for over 6 years and has spent the last 2 years on the front lines of Web Services. He is one of the implementers of Apache Axis and is the Macromedia representative on the W3C Web Service Description WSDL 1.2 working group. Before getting involved in Web Services, he was the technical lead for the ColdFusion on UNIX products. Tom is currently 'back home' working on ColdFusion.

ColdFusion Components

GLENDA VIGOREAUX, BUSINESS SYSTEMS CONSULTANTS, INC.

ColdFusion Components combine the power of objects with the simplicity of CFML. This is the way object-based development was intended to be, and in this session, you'll learn about this combination first hand. Starting with a simple data-driven application, you'll gradually convert it into a highly scalable and manageable multitier application, and in the process, will amaze yourself at just how easy ColdFusion makes this process.

BIO: Glenda Vigoreaux has been a Certified Macromedia Instructor and Developer for the last 5 years. She is currently heading the web development division for Business Systems Consultants, Inc. the most successful reseller and services provider of software for associations in the greater Chicago area.

Rapidly Build Web Services Applications with ColdFusion and Studio

SIMON HORWITH, ETRILOGY

The last year has shown that web services are not just another passing fad and their promise of platform-independent distributed applications has been realized. Compared to other application server platforms, ColdFusion makes creating web services easy. This session covers how to create a ColdFusion Component (CFC) in Dreamweaver, as well as how to expose that CFC as a web service by just toggling one attribute of the CFC. That's right: in ColdFusion, it is just that easy.

BIO: Simon Horwith is Chief Technology Officer of eTRILOGY Ltd., a software development company based in London, England. Simon has been using ColdFusion since version 1.5 and is a member of Team Macromedia. He is a Macromedia Certified Advanced ColdFusion and Flash D eveloper and is a Macromedia Certified I nstructor. In addition to administering the CFDJ-List mail list and presenting at CFUGs and conferences around the world, Simon has also been a contributing author of several books and technical papers.

Code-based Rich Internet Applications with Macromedia Flex

CHRISTOPHE COENRAETS, MACROMEDIA

Learn how to use Macromedia's technology initiative Flex to create rich internet applications. This session will cover using components, layouts, and managers to build user interfaces as well as using Flexs XML-based language to create and manipulate client-side data models.

BIO: Please visit www.sys-con.com/edge for a complete speaker bio.

Using Macromedia Flash with Web Services

Web services, a technology that allows developers to execute remote procedures, are emerging as a revolutionary tool for web application development. Macromedia Flash MX 2004 Professional is a powerful tool for building applications that consume web services built in any technology, including Macromedia ColdFusion, Java, ASP.NET and PHP. In this session you will explore the visionary computing model that web services represent as you use Macromedia Flash components to develop a web service based application. You will learn how to discover web services, work with data and UI components, perform data binding, examine security issues and aggregate multiple web services into a cutting edge web service consumer.

For a Complete List of MX Sessions please visit www.sys-con.com/edge

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4

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❑ Web Programmer
❑ CEO/COO/President/Chairman/Owner/Partner
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❑ 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 ❑	01 ❑
5,000 – 9,999	02 ❑	02 ❑
1,000 – 4,999	03 ❑	03 ❑
500 – 999	04 ❑	04 ❑
100 – 499	05 ❑	05 ❑
100 or less	06 ❑	06 ❑

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
❑ $1 million – $9.9 million
❑ $500,000 – $999,999
❑ $100,000 – $499,999
❑ $10,000 – $99,999
❑ Less than $10,000
❑ Don't know

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

❑ $10 billion or more
❑ $1 billion – $9.9 billion
❑ $100 million – $999 million
❑ $10 million – $99.9 million
❑ $1 million – $9.9 million
❑ Less than $1 million
❑ Don't know

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?

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❑ Web Servers
❑ Server-Side Hardware
❑ Client-Side Hardware
❑ Wireless Device Hardware
❑ Databases
❑ Java IDEs
❑ Class Libraries
❑ Software Testing Tools
❑ Web Testing Tools
❑ Modeling Tools
❑ Team Development Tools
❑ Installation Tools
❑ Frameworks
❑ Database Access Tools/JDBC Devices
❑ Application Integration Tools
❑ Enterprise Development Tool Suites
❑ Messaging Tools
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Novell helps customers dynamically access, provision, manage and deliver secure information services. Customers can flexibly integrate applications and data and ensure unified identity across systems. Novell's Web Services platform, exteNd, is a comprehensive, integrated approach to the visual development and deployment of services-oriented applications.

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

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Testing Web Services

Ensuring functionality, security, and interoperability

As more enterprises move toward an e-business strategy, the communication and integration of disparate, heterogeneous applications and systems is key. Businesses must be able to securely connect and communicate with customers and trading partners alike.

WRITTEN BY
ADAM KOLAWA

Using Web services, different businesses and customers can communicate by exchanging information through platform-independent protocols such as SOAP, XML, and HTTP.

However, the flexibility of Web services can prove to be a double-edged sword. While Web services allow businesses to connect to partners and customers, this same flexibility and connectivity provide increased opportunities for errors. Web services are complex systems that attempt to marry software, hardware, new code, legacy code, existing systems, systems in development, and who-knows-what on the client side. There are countless opportunities for things to go wrong – a slight mistake in any component or interface will cause problems that ripple throughout the system (see Figure 1).

Therefore testing, which is important for any software application, is even more crucial for Web services. As companies and consumers rely more on Web services, the importance of quality and reliability will continue to increase, thereby increasing the importance of Web services testing. This article explains the general testing practices required to ensure complete Web service functionality, interoperability, and security.

Server Functional Testing

Server functional testing is usually the first step in testing any Web service – be it a consumer-based Web service where thousands or even millions of clients can send requests to a large commercial server, or a B2B Web service in which business partners exchange information through common servers. In any case, if the server does not work correctly, its performance, security, interoperability, and so on, are essentially irrelevant. The goal of server functional testing, therefore, is to ensure that the server delivers the expected responses for any of a wide range of request types and parameters.

The simplest possible functional test involves sending a request and checking whether the server returns a response or an error message. The response can be analyzed either by inspection or by running the response through a tool or script that verifies conformance to a specification. The analysis can be as simple as performing a text comparison with the expected response, or as complex as extracting specific information from an XML document and performing application-specific checks. For example, if you have a Web service that handles bank transactions, you can perform a server functional test by sending a valid request (such as a transfer of money) to the server. You can then verify whether a response or an error message is returned from the server.

However, because of the complex nature of Web services, testing a server's functionality may be far from simple. With most Web services it is impossible to anticipate exactly what types of requests clients will send. Traffic may occur with extreme highs and lows, with users accessing the service using a variety of clients, connections, and platforms. With so many differing clients accessing a single Web service, the server is bound to encounter unexpected requests either as a result of mistakes (such as a bad WSDL) or from attempts to breach service security (hackers sometimes trick applications into behaving unexpectedly by sending it invalid inputs).

An effective way to prevent errors caused by unexpected inputs is to perform what some refer to as "monkey testing" – throwing the proverbial wrench into the Web services works by sending the service requests with illegal and/or unexpected parameters, then verifying the response with assertions, custom code, or other tool-specific verification methods. For example, how will the server react if a customer attempts to transfer more money than is available? Will it return a proper message to the client? Will it allow the transaction? Or will the server just crash and die?

By checking for the conditions and inputs that are not expected, you enable more thorough tests for what cannot be foreseen. By performing such testing at the unit and application level, you can quickly and easily identify and correct any weaknesses before security breaches can occur. Therefore, it is important to verify whether the server can handle a wide range of request types and parameters. In order to test the server functionality of a Web service, you must be able to emulate many of the types of clients that might access the server, and verify that the server will behave as expected in relation to any type of client request.

Regression Testing

After you have verified the server's functionality, you can rerun your functional tests as regression tests. Regression testing is the process of running all existing test cases and verifying that all test cases pass. The purpose of regression testing is to detect unexpected faults – especially those faults that occur because a developer did not fully understand the internal code correlations when he or she modified or

extended code that previously functioned correctly. Regression testing is the only reliable way to ensure that modifications did not introduce new errors into code or to check whether modifications successfully eliminated existing errors. Every time code is modified or used in a new environment, regression testing should be used to check the code's integrity. Ideally, you perform regression testing nightly (during automated nightly builds) to ensure that errors are detected and fixed as soon as possible.

Load Testing

After you have performed functional and regression testing on your server, you know that your Web service can handle at least one client. But can the server handle requests from 100, or even 1 million, clients? Since millions of clients can potentially have access to a Web service server, the server must be able to handle every request under extremely heavy load, or at best "fail gracefully." Therefore, the next step in the server testing process is load testing.

Load testing typically involves exercising your application with virtual users and measuring performance statistics to verify whether the application supports the anticipated traffic load as well as possible traffic surges, growth, and so on. To ensure that your virtual users' experiences effectively predict your actual users' experiences, you want your virtual users to simulate realistic scenarios. For example, the test could check functionality and response time under different degrees of load increases (sudden surges versus gradual ramp-ups) or different combinations of valid and invalid requests. If the load tests reveal unacceptable performance or function-ality under load, the next step is to diagnose and repair the source of the bottleneck.

When problems surface under a reasonable load, they typically indicate fundamental design problems such as algorithmic problems, inefficient database-application interaction, and so on – not infrastructure issues that can be resolved by upgrading hardware or fine-tuning system configuration. As a result, it is recommended that you begin load testing as early in the development process as possible. Ideally, you want to begin performing load testing on a staging server as soon as you can exercise any segment of the application. This way you can expose and resolve problems before they become more deeply embedded in the application and fixing them requires increased time and effort.

Client Testing

SOAP-client developers are responsible for ensuring that the client sends requests correctly. If a client sends invalid or improperly formed requests, the server usually cannot deliver the expected results. The process of testing clients is a little different from testing services because clients are the initiators of Web service interactions. This means that from a testing standpoint there are two main things to verify: whether the client can correctly initiate an interaction by sending a request, and whether the client behaves as expected when it receives a response.

The best way to test a particular client depends on the nature of the application. If the client accesses a server that can accept "test" requests without any harmful side effects, it can directly access the live server during testing. However, you may need to test client functionality by emulating server-supplied responses. Emulating the server is especially useful when the server is still being implemented, has bugs, or should not be accessed during testing. For example, if you have a live system that performs credit card processing, you will not be able to access the server without disrupting ongoing business transactions.

No matter what type of server a client accesses, the same general principle applies: the client sends a request, the server responds, then client success or failure is determined by recording and verifying the request and/or by verifying the server response.

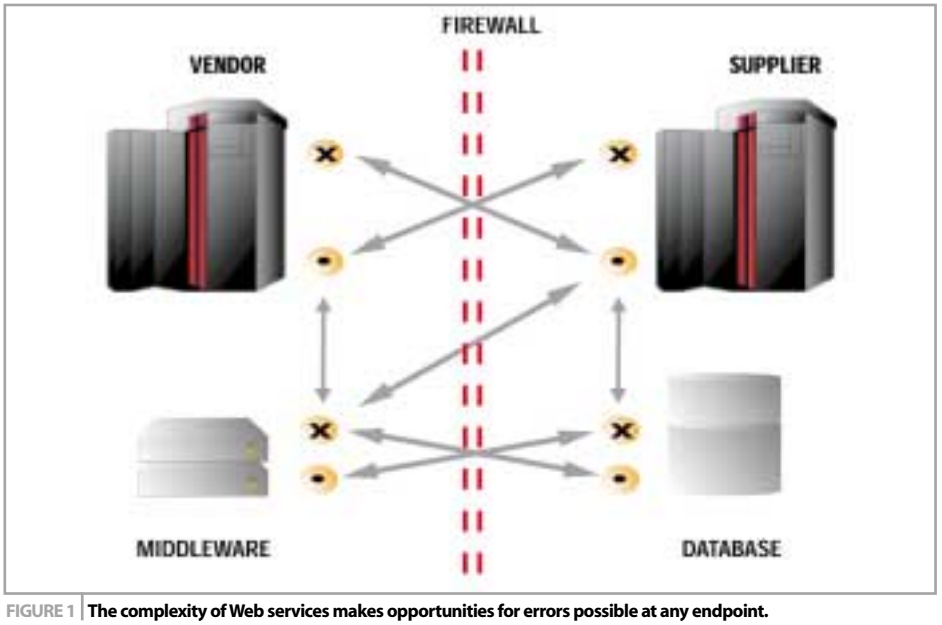

FIGURE 1 | **The complexity of Web services makes opportunities for errors possible at any endpoint.**

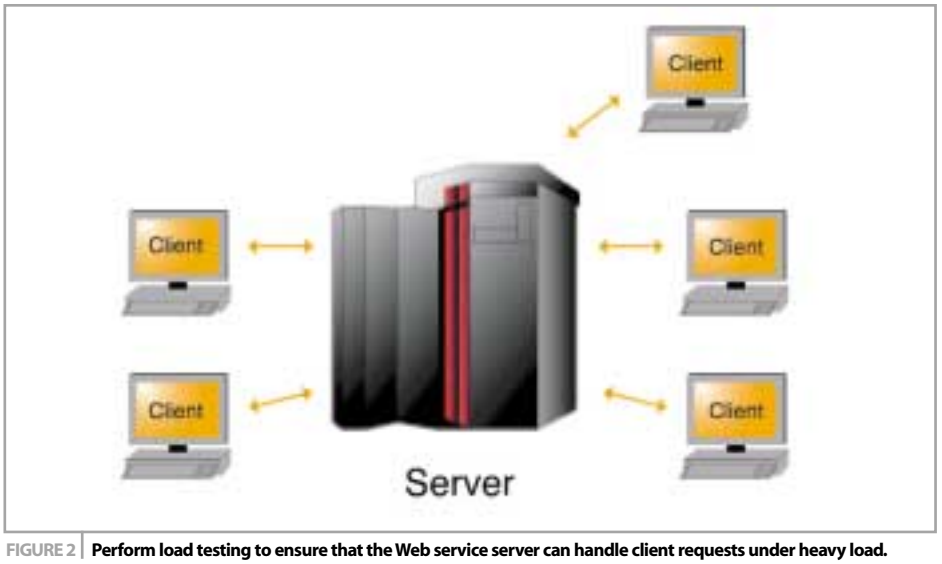

FIGURE 2 | **Perform load testing to ensure that the Web service server can handle client requests under heavy load.**

The same techniques and tools used to verify server functionality can be used for this purpose. However, server bugs could also be misleading: if the server is not operating correctly, correct client requests might result in incorrect responses, and incorrect requests might result in apparently correct responses. You can ensure that server functionality problems are not confusing your results by first verifying the request as well as the response, and then testing the simplest possible server implementations (server stubs) instead of – or in addition to – testing actual, complex servers.

After verifying that the client sends acceptable requests and can receive responses, you should shift your attention to testing exceptional cases. For example, test that the client behaves properly when the server goes offline by sending the response to an invalid URL. Or use server stubs to simulate the server sending the client invalid data.

Ensuring Web Service Interoperability and Security

Performing functional testing, load testing, and client testing will ensure that your Web service functions properly without error. However, as Web service development continues to mature, the issues of interoperability and security must also be addressed during the testing process. After all, interoperability is really the main reason to utilize Web services in the first place, since Web services allow for the integration of disparate entities. And because of the flexibility and connectivity provided by Web services, proper security measures must be taken as well to authenticate messages as well as prohibit outside parties from viewing private messages. Therefore, while being sure to practice the steps necessary for a Web service free of functional errors, developers must also practice the methods necessary to ensure interoperable and secure Web services.

Interoperability

The core technologies that comprise Web services (such as SOAP, WSDL, XML) are designed to ease interoperability and integration. However, the mere adoption of these technologies does not guarantee seamless interoperability. The main problem that developers face today is that they sometimes inadvertently introduce platform-specific features into the Web services that they develop. For example, a developer may expose only a Java solution without considering the effects on a .NET client.

Ideally, interoperability would be verified by checking that a service adheres to a comprehensive, universally implemented set of standards. With the recent announcement of Basic Profile 1.0 by the Web Services Interoperability (WS-I) organization, developers now have a set of standards to follow. Basic Profile 1.0 (BP 1.0) consists of implementation guidelines that define how core Web services specifications should be used together to develop interoperable Web services.

By restricting Web service development to technologies specified in WS-I Basic Profile 1.0, developers can increase the odds that their systems will interoperate with others' systems. In addition to BP 1.0, WS-I has also developed a set of test tools that automatically check conformance to BP 1.0. In the event of nonconformance, developers can pinpoint exactly what needs to be changed to ensure compliance to BP 1.0, and ultimately to ensure interoperability.

Security

Since Web services can be accessed across the open Internet, security risks become inherent in Web services development. Therefore, developers must know how to implement the proper security standards to ensure authentication, authorization, data integrity, data confidentiality, and proof of identity.

In addition to interoperability, WS-I has influence in Web services security as well with its WS-Security specification. The aim of this specification is to define the SOAP security headers and how they should be used. Developers should configure SOAP headers according to the following WS-Security specifications:

- ***Include security evidence from the client to the server through use of security tokens:*** Various tokens are available, each containing different types of security evidence in various formats to allow the target endpoint of the message to verify client identity. For example, the Username token contains the name of the initiating client and an optional password.
- ***Ensure that the message has not been modified through use of XML Signature:*** XML Signature is a standard that allows parts of an XML document to be digitally signed, thereby providing proof that the document has not been altered since the inclusion of the signature.
- ***Ensure that only the intended party can read the SOAP message through use of XML Encryption:*** XML Encryption is a standard that uses cryptography to encrypt the SOAP message to hide it from those not intended to view the message.

For example, to send a secure SOAP message a client would use WS-Security to create a SOAP security header that contains security evidence from the appropriate token, and then sign and encrypt parts of the message to assure integrity and confidentiality. By following the standards set forth by WS-Security, developers can create a more secure and reliable Web service, protecting the integrity and confidentiality of a message while also authenticating the sender.

Conclusion

The future of e-business undoubtedly lies in Web services. Organizations building and developing Web services will do well by moving forward in this direction while avoiding the pitfalls that will inevitably arise with Web services development. Developers must ensure that each part of the system is reliable, and that all of these parts interact flawlessly and securely.

By integrating server functional testing, load testing, and client testing throughout the full Web services development life cycle, you can ensure that a Web service server works well with the possible types and volumes of client requests, and that a Web service client correctly accesses and retrieves whatever data a service has to offer. By following specifications such as Basic Profile 1.0, and WS-Security, you can be sure that your Web service is interoperable and secure.

About the Author

Adam Kolawa is CEO, chairman, and a cofounder of Parasoft, a company that creates value-added products that significantly improve the software development process. Adam's years of experience with various software development processes has resulted in his unique insight into the high-tech industry and his uncanny ability to successfully identify technology trends. Adam is a well-known writer and speaker on industry issues and in 2001 was awarded the Los Angeles Ernst & Young Entrepreneur of the Year Award in the software category.

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AmberPoint Announces Java Versions of Web Services Management Software

(Oakland, CA) – AmberPoint, Inc., a provider of Web services management software, has announced a version of its no-cost developer's tool for monitoring, diagnosing, and debugging Java-based Web services. AmberPoint Express provides the monitoring and management capabilities IT organizations require to ensure that their Web services developments meet enterprise standards for performance and reliability.

The initial Java versions of AmberPoint Express are designed for Web services built on IBM WebSphere, BEA WebLogic, and Apache Axis. These versions will be generally available at no cost from the AmberPoint Web site in the first quarter of 2004. AmberPoint Express for the Microsoft .NET Framework is now available.
www.amberpoint.com

webMethods Fabric Ships to Customers

(Fairfax, VA) – webMethods, Inc., a Web services infrastructure company, is now shipping webMethods Fabric, a standards-based, vendor-neutral Web services application management environment that enables the creation, deployment, and management of Web services and the implementation of an enterprise service-oriented architecture (ESOA).

An ESOA provides enterprise-class quality-of-service capabilities such as load balancing, auto-discovery, distributed security, and failover that are currently lacking in traditional service-oriented architectures. webMethods Fabric enables enterprises to quickly go from small, static, brittle, ad hoc networks of unmanaged Web services to larger, dynamic, robust, coordinated networks of managed services.
www.webmethods.com

Cape Clear Announces Web Services–Based Real-Time Data Integration

(Waltham, MA) – Cape Clear Software has announced Cape Clear Data Interchange, a Web services–based approach to solving the problem of integrating data with enterprise applications. Cape Clear Data Interchange provides a unique visual environment for transforming diverse data sources, such as text files, spreadsheets, and zip files into XML Schema, as well as a powerful runtime capability that securely routes that data to the appropriate back-end application.

Cape Clear Data Interchange requires the Cape Clear Business Integration Suite, which includes the tools to design, develop, integrate, deploy, and manage Web services. It is available immediately on IBM AIX, Linux, Microsoft Windows, and Sun Solaris. Pricing starts at $75,000.
www.capeclear.com

Netegrity Acquires Business Layers; Adds Provisioning to Identity and Access Management Solution

(Waltham, MA) – Netegrity, Inc., a provider of identity and access management solutions, has acquired Business Layers, the eProvisioning company. With this acquisition, Netegrity gains a provisioning solution that helps organizations mitigate risk, comply with new regulations, and enhance user productivity by automating the process of managing access to valuable enterprise resources for employees, contractors, and partners.

Netegrity plans to further integrate the provisioning technology within the Netegrity identity and access management solution, and will also continue to invest in the provisioning technology as a stand-alone product.

The Netegrity identity and access management solution supports both IT and business flexibility with technology that fits today's heterogeneous IT environments and easily maps to existing business processes.

Netegrity will offer the Business Layers eProvision Solution and all of its components under the Netegrity IdentityMinder eProvision brand immediately. It will also continue to offer the integrated Netegrity IdentityMinder solution that includes Netegrity's identity administration, provisioning, and Web access management technology.
www.netegrity.com

Blue Titan Advances ESOA Fabric

(San Francisco) – Blue Titan Software, Inc., has announced the immediate availability of Network Director 2.5, an enterprise service-oriented architecture (ESOA) Fabric. Network Director 2.5 introduces significant improvements in scalability and extensibility validated directly from numerous real-world Fortune 500 customer deployments. It allows users to define, enforce, and adapt consistent enterprise-wide infrastructure policies in a distributed, non-invasive fashion.

Network Director 2.5 now delivers scalability up to 2,000 messages per second and beyond in a distributed deployment using only commodity-based Linux hardware; throughput throttled and increased with zero administrative effort in configuration or deployment; and deployment across multiple network topologies and line of business boundaries in a geographically transparent manner.
www.bluetitan.com

Web Services a Step Closer to Widespread Adoption in Enterprise-Scale Businesses

(Philadelphia) – SAP AG has announced support for the final release of the WS-I Sample Application 1.0, a set of applications scenarios agreed upon by the Web Services Interoperability Organization (WS-I; www.ws-i.org), of which SAP is a member. The sample application demonstrates the successful exchange of information among heterogeneous applications using Web services. It validates the business value of Web services by proving they can be used to transmit data and execute business processes across a set of discrete supply chain solutions. By following the guidelines set forth in the sample application, companies will be able to reduce integration complexities in their IT systems and leverage the interoperability benefits of Web services in enterprise-scale operations.

SAP NetWeaver, the integration and application platform designed to drive lower cost of ownership across heterogeneous IT landscapes, provides full support for the Basic Profile 1.0. With the final release of the WS-I Sample Application 1.0, SAP customers can start implementing their own Web services applications, which are conformant with the WS-I interoperability guidelines. SAP's continuous support of industry-ratified implementation guidelines for Web services through WS-I profiles significantly reduces integration challenges for customers, who can now focus on the design and implementation of Web services applications.
www.sap.com

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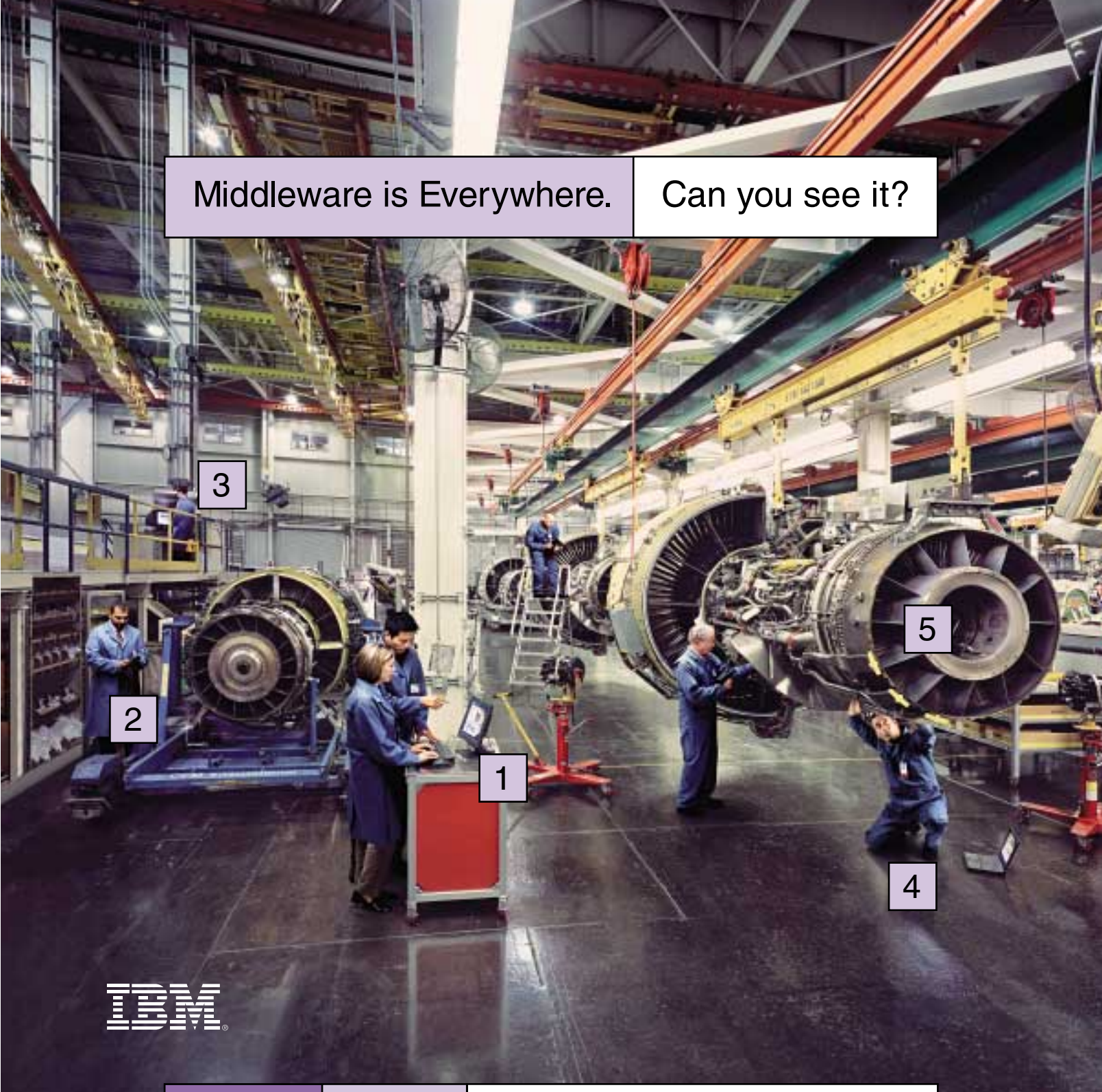

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