

IBM Takes an End-to-End Approach to Web Services

February 2002

“IBM and Microsoft are running neck and neck in their embrace and evangelism of Web services, but IBM is the best positioned of the Java-community vendors to capitalize on the Web-services trend.”

—Dwight B. Davis

Vendor Strategy Report

Web
Services
Software



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Web services stand to benefit IBM in two ways. Internally, the company can use the standards-based services to provide better interoperability and integration among the many diverse products in its software portfolio. Externally, IBM believes its sweeping embrace of Web services will catalyze stronger sales of its products, as well as its professional services. Chances are good that the vendor will also offer hosted Web services of its own, in its search for new, high-growth revenue streams. Over time, Web services could prove more strategically important to IBM than two other core technologies it has thrown its weight behind: Java and Linux.

Providing a solid foundation for IBM's efforts—and for the evolution of Web services themselves—is the company's pervasive participation in standards efforts associated with this emerging model of computing. The company's extensive knowledge of these specifications plays to its favor, both in creating compliant products and in promoting its stance as a leading supporter of open standards. By helping to create and promulgate specifications that allow compliant applications to interoperate with one another, IBM hopes to address both the enterprise-application-integration realm as well as the outward-facing world of business-to-business integration.

IBM and Microsoft have managed to work together to establish the basic Web-services standards of SOAP, WSDL and UDDI. But the gloves come off when it comes to selling products based on those standards. The first field of combat is that of development tools, in which Microsoft has recently launched its comprehensive Visual Studio .NET suite. IBM is countering with its WebSphere Studio suite, which offers one major advantage over Microsoft's tools: the IBM tools—like IBM's full range of middleware—are firmly ensconced in the Java world.

Beyond its tools suite, IBM has made great progress in courting developers via its developerWorks portal. When IBM launched developerWorks as a beta site in mid-1999, it (and the rest of the industry) was years behind Microsoft and its developer site, Microsoft Developer Network (MSDN). By the end of 2001, two years after its official launch, developerWorks had evolved into one of the best developer sites on the Web. It is also one of the best online resources of any type for Web-services information and assistance.

If development of Web services is step one, deploying them is step two. IBM's main deployment platform for these services is its WebSphere application server and the many middleware components associated with that

platform. In mid-2001, IBM shipped a version of WebSphere that, for the first time, included facilities for building services to the SOAP, UDDI and WSDL specifications. Then, in late December, it announced that WebSphere had been certified as compliant with the latest version of the Java2 Enterprise Edition specification, J2EE version 1.3. That compliance keeps IBM in synch with the evolving Java standard, and provides additional capabilities for integrating Web services within the broader J2EE framework.

Beyond WebSphere, IBM's three other software units—Lotus, Tivoli and DB2—have also taken up the Web-services flag. All are looking either to “componentize” their existing software into groups of Web services, or are moving to support standards-compliant services in some fashion. Meanwhile, IBM Global Services is starting to offer practices aimed at Web-services development and deployment, starting with the emerging technology jStart (for “jump start”) program.

Unlike the situation with both Java and Linux, when it comes to Web services, IBM can rightfully claim an almost uncontested leadership role. If any part of IBM's Web-services strategy remains hazy, it's the vendor's plans to host Web services of its own to outside subscribers. If IBM becomes aggressive on that front, it's difficult to know how it will play out among IBM's service-provider customers, which may want to host similar services themselves. Even with that uncertainty, there are plenty of benefits to go around as Web-services-based computing takes hold. IBM can't monopolize those benefits, but it is well positioned to capture more than its fair share of the business that Web services will drive.

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The report summarized here was written as part of Summit Strategies' Web Services Software Practice Area. For more information, contact us at 617-266-9050 or visit us online at www.summitstrat.com.

IBM Takes an End-to-End Approach to Web Services

IBM is second to none in its enthusiasm for XML-based Web services, which the company says will greatly benefit both computing users and service providers (xSPs). Closer to home, Big Blue believes Web services could be the solution it has been looking for to unify its own diverse set of software products. That diversity—or, to critics, complexity—is a point of vulnerability that competitors such as Sun Microsystems, Microsoft and Oracle continually attack. If Web services can provide a mechanism for applications to interoperate across systems and across networks, IBM

figures, the standards-based services can do the same for its own software portfolio. In this sense, Web services are the latest technology (following Java and Linux) that IBM has embraced to increase consistency and integration across its stable of software products.

While IBM stands to benefit more than most vendors from internally applying Web services, it also sees vast new business opportunities that it can build upon this emerging computing model. By adding native support for Web services across its software line, IBM expects to drive sales of everything from its development tools to its middleware to its management systems. The company is also gearing up to exploit the professional-services revenue potential associated with Web-services development, deployment and management, with IBM Global Services (IGS) already scoping out new opportunities in this hot sector. Finally, IBM is almost certain to become an active provider of hosted Web services itself, with an emphasis on addressing the needs of its core enterprise constituency.

In these efforts, IBM is challenged to mount a coordinated and cohesive strategy that keeps all of its

Key Findings

- Web services could become more strategically important to IBM than either Java or Linux, thanks to the integration they provide for IBM's own software portfolio and the business opportunities they present.
- IBM's efforts to establish and expand Web-services standards will pay big dividends to the company as it builds Web-services-compliant products and professional services.
- IBM's unparalleled scope of influence—from development tools, to middleware, to professional services—will aid its Web-services agenda; but the company could run afoul of service-provider customers if it becomes too aggressive in hosting its own subscription-based Web services.

troops marching toward the same objectives. Unlike Microsoft, with its Microsoft .NET strategy, or Sun, with its Sun Open Network Environment (Sun ONE) architecture, IBM hasn't really come up with a catchy label to encompass its Web-services/software-as-services initiatives. The vendor does talk about the ability of Web services to deliver "dynamic e-business," playing on the e-business theme that IBM brought to popularity in the late 1990s. But it hasn't done as good a job as some of its competitors in developing and explaining its broad vision for computing's future. That's not necessarily all bad, given the difficulty both Microsoft and Sun have had in explaining their respective visions. By contrast, IBM can argue that it has spent its time building products that will deliver the promise of Web services, without wasting cycles trying to explain abstract visions to dubious customers.

IBM has also played a significant role in creating core Web-services specifications, and continues to push hard on this front. The company's extensive knowledge of these specifications plays to its favor, both in creating compliant products and in promoting its stance as a leading supporter of open standards. As with all vendors in the business today, however, IBM is struggling with the central question associated with an embrace of standards: How can it differentiate its products from others that support the same standards?

In this report, we start with a quick review of Web services and IBM's role in the standards-setting process. Next, we look at IBM's efforts to attract Web-services developers, much as we did in a recent report about Microsoft's initiatives in the .NET development realm (see Summit Strategies' December 2001 report, *Microsoft Leads Industry Charge to Drive Web-Services Creation*). After that, we examine how IBM is adding Web-services elements to its WebSphere, Lotus, Tivoli and DB2 product lines, and how it is gearing up to offer related professional services in IGS. We finish with our thoughts about IBM's prospects to capitalize on this next stage in the evolution of computing and communications.

Section 1 Standout on Standards

As we noted in our earlier report on Microsoft's .NET developer strategy, Web services have emerged as something of an industry Holy Grail during the past year. At present, these services make use of three XML-based specifications: the Simple Object Access Protocol (SOAP), the Web Services Description Language (WSDL), and Universal Description, Discovery and Integration (UDDI). IBM was a lead actor—in cooperation with Microsoft and a few other vendors—in shepherding these specifications to market.

The promise of Web services is best summed up with the phrase "application interoperability." Web-based applications or software components that adhere to the Web-services specifications are designed to interoperate with one another via their common SOAP interfaces. Meanwhile, they can use WSDL to describe their functionality and the ways in which other

programs can interact with them, and can make themselves accessible to other programs by posting their WSDL descriptions in UDDI registries. These registries can be private Web-services directories maintained by companies behind their firewalls, or public registries available over the open Internet. By building on these common specifications, Web services will help expand the Internet from its current dominant model—one of people interacting with content and software sites via their browsers—to a model in which applications can interact directly with one another, often without any human intervention.

By providing a base level of application interoperability, Web services will directly affect two realms that have been functioning in a somewhat independent fashion: enterprise application integration (EAI) and business-to-business (B2B) integration. IBM and other proponents believe that Web services will dissolve the largely artificial distinctions that currently exist in the interoperability realm, depending on whether the applications being integrated are within a single company's data center or spread among communities of partners, suppliers or customers. Web services can address both EAI and B2B interoperability issues, and provide commonality across both sectors in the process.

The catch is that SOAP, WSDL and UDDI, on their own, only begin to scratch the surface of the requirements necessary to deliver robust interoperability among applications. IBM and Microsoft have been particularly aggressive in developing and promoting new Web-services specifications to address security, routing, workflow and other functional requirements. Among the specifications IBM is backing are:

- *WS-Inspection*, developed jointly by IBM and Microsoft. It specifies where to look for Web services on Websites, to allow the discovery of Web services that aren't registered in UDDI directories;
- *Web Services Experience Language (WSXL)*, designed to help developers create interactive services accessed by people, rather than by other software programs. IBM submitted WSXL to the Organization for the Advancement of Structured Information Standards (OASIS), which has a Web Services for Interactive Applications technical committee that IBM chairs, for consideration;
- *Web Services Standard for Remote Portals (WSRP)*, also underway within OASIS and chaired by IBM, which aims to provide a mechanism by which content and applications can be represented in portals without any custom coding required; and
- *Web Services Flow Language (WSFL)*, a workflow language intended to help link business processes into aggregate workflows, and also to allow individual business processes to "advertise" themselves as Web services. In this case, IBM is at odds with Microsoft, which is proposing its own workflow language, called XLANG.

These proposed specifications form just part of the wide-ranging standards activity underway under the Web-services umbrella. The scope of this activity helps drive home the point that—contrary to some vendor suggestions—SOAP, WSDL and UDDI on their own aren't the be-all and end-all when it comes to addressing application interoperability. IBM understands this situation as well as any vendor, and has taken a leadership role in the Web-services efforts of several industry consortia. These groups include, but aren't limited to, the World Wide Web Consortium (W3C), OASIS, the Object Management Group, The Open Group and the Java Community Process. If there's a Web-services effort underway in any industry organization, the odds are very high that IBM is either chairing the effort or actively participating in it.

The very breadth of current Web-services standards development caused IBM in February to join with Microsoft, Intel, Oracle, BEA Systems and several other firms to establish a new group, the Web Services Interoperability Organization (WS-I). One of the main objectives of the WS-I will be to coordinate the range of standards activity underway in different organizations and companies (look for our upcoming March 2002 *SummitVision* newsletter article, "New Industry Consortium Aims to Shepherd Web-Services Advancement.") Without this coordination, IBM and its peers fear that the promise of Web services could be lost beneath a growing pile of competing and conflicting specifications.

Through these efforts, IBM is not only shaping the direction of Web-services evolution, but is also gaining deep technical understanding that it can transfer to its own products and services. Its unparalleled presence as a driver of Web-services specifications isn't necessarily visible to the broader market. But these efforts are likely to pay big dividends to IBM when it comes to building products that offer the best compliance with evolving Web-services standards.

Section 2 Winning the Developer Sweepstakes

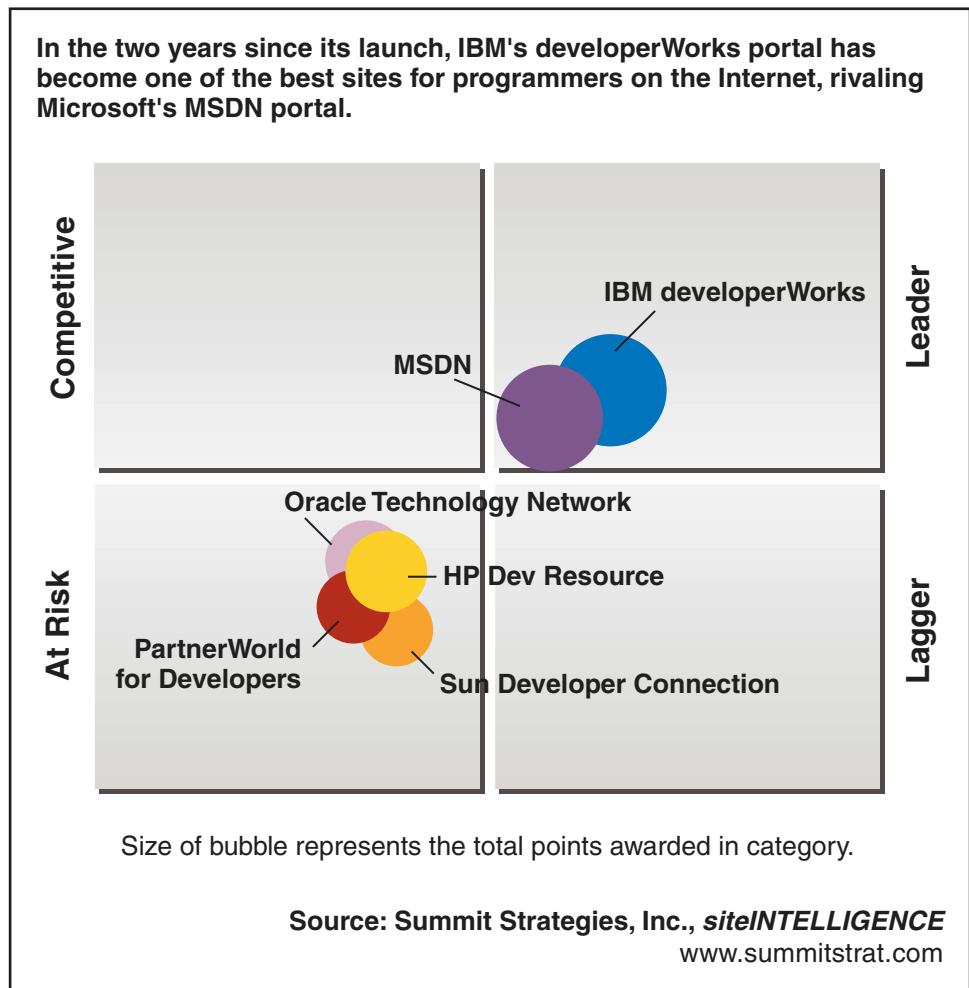
Even with the SOAP, WSDL and UDDI standards broadly accepted, the success of Web services relies on persuading developers to create software that complies with these specifications. Microsoft clearly understands this fact, which is why it has mounted an all-out campaign to bring developers into its .NET sphere. With the mid-February launch of its Visual Studio .NET tools suite, Microsoft is well positioned to coax much of the Windows development community into becoming Web-services creators.

But Microsoft's tools have only marginal appeal to the 2 million-3 million developers now coding with Java. Arguably, IBM is the best positioned of the Java-compliant vendors to capture Web-services developers in the Java community, although Sun, BEA Systems, Borland Software, Web-Gain, Progress Software and others are vying for these programmers as well. Its relatively strong suite of development tools isn't IBM's only advantage. The vendor has made great progress in courting developers with a range of products and programs during the past two years.

The most notable example is IBM's developer portal, developerWorks, and the associated alphaWorks portal. When IBM launched developerWorks as a beta site in mid-1999, the company (and the rest of the industry) was years behind Microsoft and its developer site, Microsoft Developer Network (MSDN). But, from the start, IBM used its own extensive development expertise to craft a site that was well suited to the content and services needs of the programming class. (For details of IBM's initial entry into the developer portal scene, see Summit Strategies' September 1999 report, *Developer Portals Portend the Future of Vertical Community Sites.*)

By the end of 2001, two years after its official launch, developerWorks had evolved into one of the best developer sites on the Web. As indicated by Figure 1, which shows a best-practices benchmark rating conducted by Summit Strategies' *siteINTELLIGENCE* service, developerWorks edged out MSDN as the site offering the best resources for developers in the fourth quarter of 2001. Given Microsoft's lead, following years of cultivating the

Figure 1 Developer Portal Best-Practices Benchmark



Windows developer community, few would have bet that IBM or any other vendor could have so rapidly closed the developer-site gap.

IBM's developerWorks is also one of the best sites on the Web for information about, and assistance with, Web services. The site is organized into six "Technology Zones," and Web services comprise one of those zones. (The other zones are Java Technology, Linux, Open Source Projects, Wireless and XML.) Developers clicking into the Web-services zone can find a wealth of information about products and tools; education options; online forums; FAQs; white papers; and news articles, not to mention downloadable code. The zone is impressively complete and nonpartisan; under Web-services development tools, for instance, is a long list of products including Microsoft's Visual Studio .NET, with a link to that suite's home page on the Microsoft site. (In what may be taking nonpartisanship to the extreme, however, the list of Web-services development tools—at least, when we last checked—failed to mention one notable tools contender: IBM's own WebSphere Studio development suite.)

IBM also continues to make good use of its alphaWorks site, where it previews new technologies and concepts and also releases beta code of products and tools. One of the most popular downloads of late from alphaWorks has been the Web Services Toolkit, which provides an architectural blueprint for designing Web services, along with sample programs, a runtime environment and tools for creating services that comply with the latest iterations of the relevant specifications. IBM intends to update the toolkit quarterly, and uses it to get the latest Web-services technology into the hands of developers as quickly as possible. This not only helps the developers stay current, but also provides IBM with invaluable feedback from the development community about what works and what doesn't in the pre-release code. Eventually, the tools and services previewed in the toolkit migrate into IBM's production-development tools.

Those production tools are collectively marketed within the WebSphere Studio suite of products—IBM's answer to Microsoft's Visual Studio .NET. In November 2001, IBM shipped a series of WebSphere Studio packages that support Web-services development. Among the products IBM announced:

- *WebSphere Studio Site Developer*, which provides full Web-services support for Website developers, and includes a built-in private UDDI repository;
- *WebSphere Studio Application Developer*, for developers that require integrated Web-services support when building Java and Java2 Enterprise Edition (J2EE) applications; and
- *WebSphere Studio Enterprise Developer*, for developers and integrators of Web services and advanced Java applications that extend beyond J2EE.

IBM has designed them all to work seamlessly with Web-services standards. For example, they can automatically generate WSDL services descriptions for Enterprise Java Bean components created with the tools.

Also in November, IBM launched a bid to establish a common development platform for the industry, releasing source code for the WebSphere Studio Workbench to form the foundation of an open-source development platform called Eclipse. The Workbench code on which Eclipse is based is the same platform on which IBM's WebSphere Studio tools are built. Eclipse.org has already as much, or more, industry support as has another Java-based open-source-development initiative called NetBeans, which Sun had launched well ahead of IBM's Eclipse effort. Given IBM's competition with Sun for the hearts and minds of Java developers, it's easy to guess how the "Eclipse" name materialized.

It has become common knowledge that capturing developers is crucial for a software-platform vendor's ultimate success. Microsoft's cultivation of the developer community, after all, was one of the critical elements to its phenomenal success. Even in a world gravitating toward standards, a vendor that can attract programmers to its development tools and programs can reap great benefits. As they move from program creation to program deployment, developers often remain loyal to the vendors of the tools they use.

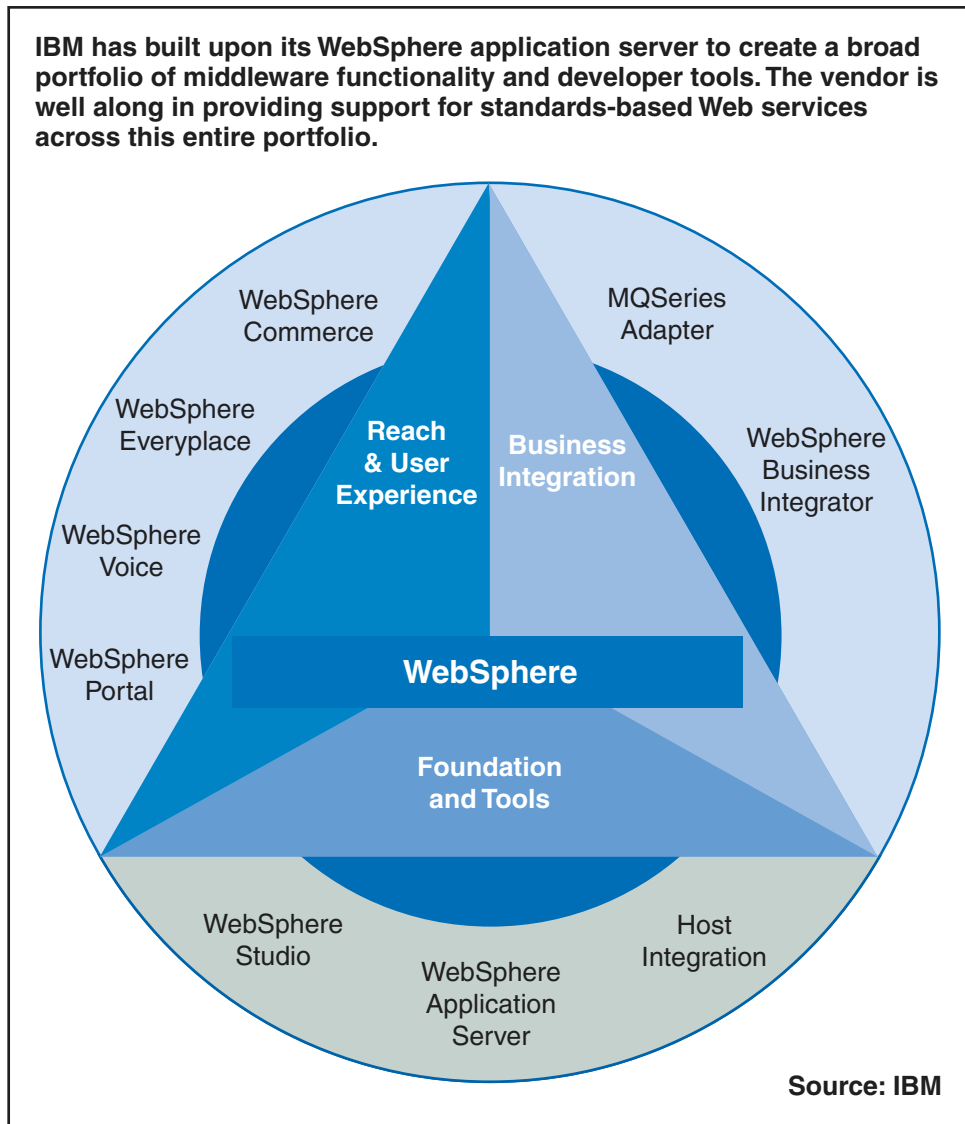
Section 3 From Software Platforms to Services

To the degree that people associate a Web-services strategy with IBM, the connection is almost always with the vendor's WebSphere application server and its middleware components. As of late 2001, IBM claimed to have more than 35,000 WebSphere customers; by most estimates, IBM is the closest challenger to application-server-market pacesetter BEA in this critical platform sector. (For a description of the trends and strategies underway in the application-server market, see our June 2001 report, *Will Systems Vendors Become Spoilers in the Application-Server Market?*) Following the trend of all the major software-platform vendors, IBM continues to expand the scope of its application server with everything from wireless and portal servers to integration and business-intelligence capabilities (see Figure 2).

In its recent upgrades to the WebSphere platform, IBM has emphasized WebSphere's growing support for Web services. In mid-2001, IBM shipped a version of WebSphere that, for the first time, included facilities for building services to the SOAP, UDDI and WSDL specifications. Then, in late December, it announced that WebSphere had been certified as compliant with the latest version of the Java2 Enterprise Edition specification, J2EE version 1.3. That compliance keeps IBM in synch with the evolving Java standard, and provides additional capabilities for integrating Web services within the broader J2EE framework. It won't be until the next iteration of Java, version 1.4, however, that explicit support for the core Web-services specifications is built into the Java standard.

Figure 2

IBM's WebSphere Platform



While the WebSphere family serves as the flagship for IBM's push into Web services, the vendor's other software groups will also play integral roles in IBM's strategy. Those groups are:

- *Lotus*, which released a Web Services Enablement Kit last year. Designed to provide a blueprint for enabling Web services within Domino, Sametime, Knowledge Discovery Server and other Lotus products, the toolkit is available on the alphaWorks site. More important, at its Lotusphere conference in January, Lotus laid out a plan to adhere closely to the J2EE platform specification going forward, and to gradually convert its software into modules that comply with the core Web-services specifications. That strategy will result in Lotus compo-

nents that integrate more easily with IBM's other software platforms, as well as with other vendors' J2EE and Web-services-enabled software. It will also create a library of Web services that IBM itself could offer directly as hosted services (for details on the Lotus plan, see our February 2002 *SummitVision* article, "Lotus Strategy Meshes With IBM's on Web Services, Hosting");

- *DB2*, for which IBM released the DB2/XML extender in mid-2001. This enables Web-services applications to access data stored in DB2 and other databases. IBM bundled the extender in DB2 version 7.2. DB2, along with WebSphere, has also been certified as a J2EE 1.3-compliant platform, and will adopt the Web-services-friendly J2EE 1.4 when it emerges from the Java Community Process; and
- *Tivoli*, IBM's systems-management software has two products—Web Services Manager and Web Services Analyzer—that have names suggesting they're part of IBM's standards-based Web-services push. These two products use the term "Web services" in a more generic fashion, however, with the first product monitoring availability and performance of any Web-based services, and the second analyzing various Web-server statistics. It's a good bet that these products and other Tivoli offerings will be expanded to track and manage XML-based Web services as part of their functionality.

Beyond its core software groups and their platforms, IBM, as noted earlier, also previews new Web-services technologies via its alphaWorks site. In January, the company unveiled two such technologies. One, the Web Services Gateway, acts as a bridge between service providers and service requestors, and provides a secure environment for connecting Web services across firewalls. The second, Web Services Hosting Technology, represents IBM's initial foray into the potentially lucrative world of Web-services provisioning and metering systems. Creating Web services is relatively simple, compared to the complexity of managing vast repositories of Web services and monitoring their use for performance and billing purposes. With its Web Services Hosting Technology preview, IBM is serving notice that it intends to be an end-to-end provider of Web-services products, from development tools through delivery platforms to management and provisioning systems.

For IBM, of course, where there's a product strategy, there's a services strategy close behind. At this early stage of the Web-services era, professional-services opportunities are still limited. In fact, IBM's Emerging Technologies group, which has taken the lead in driving Web-services adoption throughout the company, also takes the lead in working with early adopters of the technology. As those early adopters graduate from trials to broader deployments, the Emerging Technologies group's experts will disengage and pass the customers over to IBM Global Services for continued support.

At present, IGS has only one program to help customers traverse the Web-services route. The program, called jStart (for “jump start”), focuses on emerging technologies, and is aided by IBM’s Emerging Technologies group in crafting its practice areas. In addition to doing work in such areas as Java development and pervasive computing, jStart offers services to help clients understand the potential of Web services in their organizations, and to start creating Web-services solutions to realize that potential. In the coming years, IGS’ Web-services practices are certain to multiply, as IBM seeks to capitalize on every possible revenue angle presented by this new mode of development and computing.

Section 4 Going Deep and Wide With Web Services

IBM has made several technology bets in recent years, the most notable being its embrace of Java and, later, the open-source Linux operating system. Both of those bets have paid off for the company, and it remains committed to both technologies. But, over time, Web services may surpass both Java and Linux as a strategic technology for IBM. Web services offer IBM a means to integrate its diverse software line without rewriting everything in Java code (though much of that conversion has already been done), and without porting everything to a common operating system: Linux. Instead, Web services are meant to thrive in heterogeneous environments populated by any number of middleware and operating-system platforms. As such, Web services aren’t only compelling solutions for multi-vendor interoperability, they’re also a powerful solution that IBM can apply to integrate its own product line.

In addition, for all its enthusiasm about the technologies, IBM wasn’t in the driver’s seat when it came to either Java or Linux. The company has been an active participant in the enhancement and promulgation of both technologies, but ultimately has had to play second fiddle to Sun and to the open-source community in matters related, respectively, to Java and Linux. In the case of Web services, by contrast, IBM can rightfully claim an almost uncontested leadership role. Only Microsoft has been as active as IBM—and for as long—in driving the current generation of Web services, with the two companies collaborating on the core specifications that the entire industry has since adopted. IBM can live with sharing some of the Web-services glory with Microsoft; especially if it means IBM can claim Web-services leadership in the Java-technology quadrant of the computing universe.

IBM is willing to get down and dirty in the sometimes tedious world of standards development because it has a very solid grasp of the range of opportunities that Web services present. The company is promoting Web services as a transitional technology for both enterprise customers as well as for providers of hosted software services. While many vendors have focused more on the enterprise—or even the consumer—angle for Web services, IBM understands that this integration technology could also help struggling service providers build profitable and sustainable

hosting businesses. By leveraging Web services, for instance, service providers should be able to build semi-customized applications for customers cost effectively, by mixing and matching standards-compliant components. In other words, Web services may allow xSPs to play in the middle ground between non-deviating, templated services, and expensive, custom-crafted solutions. IBM is already leveraging its influence among enterprise customers and xSPs, evangelizing the business flexibility and efficiencies that can be gained by developing and deploying these standards-based services.

Still unclear is IBM's ultimate strategy when it comes to hosting Web services of its own. Some IBM executives, quoting chairman Lou Gerstner's promise that the company will never compete with its customers, suggest that any Web-services hosting IBM does will be limited. While IBM has scaled back its efforts in application software, however, the company seems to be gearing up e-Business Hosting Services, which is run by IGS. Indeed, one of the announcements out of Lotusphere was news that IBM will offer hosted "e-meeting" capabilities based on Lotus Sametime. In its first iteration, the e-meeting service may not be a strictly defined, SOAP-based Web service, but the second iteration almost certainly will be. Given the scope of software products it can mine for Web services, we'll be very surprised if IBM doesn't continue to expose more elements of its product line as hosted subscription services. If that trend occurs, it's difficult to know how it will play out among IBM's xSP customers, which may want to host similar services themselves.

As noted, it's always a challenge for companies to figure out how to differentiate themselves from their competitors if they all build upon the same core standards. Vendors can achieve differentiation, of course, through pricing, performance, scalability, reliability, standards compliance and other means. IBM aims to push all of those buttons as part of its Web-services strategy, but its biggest differentiator may be the very scope of its efforts. Those efforts range from standards creation, to product compliance, to Web-services provisioning, to Web-services hosting, to worldwide professional services. No other vendor can match this range of Web-services activity, and each element of IBM's initiative enhances the prospects for the other elements. There's plenty of benefit to go around as Web-services-based computing takes hold. IBM can't monopolize those benefits. Nor, for that matter, can Microsoft. But, IBM is well positioned to capture more than its fair share of the business that Web services will drive.

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