



# The new buzz

*“Web services” try to rise above high-tech din*

By Wylie Wong, Margaret Kane, and Mike Ricciuti  
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## Is it the next big thing or the next big hype?

Just about every software maker has embraced “Web services” as its new mantra in the past year, claiming that the trend will revolutionize business and the use of the Internet. Although it was initially met with skepticism, the idea has gained credibility with the support of such industry leaders as Microsoft, IBM and Sun Microsystems.

The stakes are particularly high for the software industry, which is trying to revitalize sales in a punishing economy. But before the concept can take off, companies face an uphill battle in convincing customers that they need Web services—and in explaining what they are.

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Proponents say these services—run on Web servers instead of PCs—can connect the operations of many companies and partners simultaneously, allowing them to do business through any Net device, with real-time updates.

### Page 5 **Players: Start-ups may get window to fill gaps**

The prospect of new opportunities has many small software companies salivating, but they will need to act quickly to find a niche before getting squeezed out by large rivals with more resources and influence.

### Page 9 **Rules: Leaders avert standards battle—for now**

Led by Microsoft and IBM, longtime enemies have engaged in extraordinary cooperation to create technological standards for Web services, underscoring the need to pump new life into the industry.

### Page 12 **Star: XML could become new lingua franca**

If Web services live up to their full potential, a once obscure technology known as Extensible Markup Language may become a major success story as the linchpin that holds the entire concept together.

## Historical hype

**Many technologies have been touted as the next big thing, only to fall well short of expectations—or fade away altogether. Here are some of the more memorable trends in recent years, with dates that roughly correspond with their heydays.**

### Portals (circa 1996)

Originally search engines, “portals” sought to exploit their enormous traffic numbers and become one-stop uber sites that would provide everything from personal services such as e-mail to information such as news and map directions. Yahoo and other portals are still among the most-used sites on the Web. But all have scaled back their ambitions as their basic revenue strategy—selling ads on their many directory pages but providing little original or exclusive content—has proven difficult to sustain.

### Push (circa 1996)

This technology was the Internet’s equivalent of broadcasting. Banking on the idea that people would grow weary of seeking information on their own, companies such as PointCast Network devised ways to “push” content automatically to people who designated certain interests and Web sites. The idea never took hold among consumers.

### Network computing (circa 1997)

Championed by Oracle founder Larry Ellison, this concept revived an old idea of “dumb terminals”—sold at a price much lower than fully loaded PCs—that would perform basic functions such as Web surfing and word processing. Interest in the network computing devices, also

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## Pitch: Why Web services make business sense

By Wylie Wong  
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**Only a few years ago, the high-tech industry was afire with talk of “network computing” and “push technology.” Then “PC-TV convergence” came into vogue, only to give way to “B2B” and “ASPs,” which in turn were trumped by promises of “P2P” communities that would change the world.**

After enduring a steady diet of next big things that have failed to live up to promises, technology companies can hardly blame businesses and consumers if they are skeptical. Yet software executives and industry analysts insist that the latest trend—dubbed “Web services”—has the staying power to fundamentally change the way software companies do business and how people use the Internet.

“It’s already happening,” said Dan Bricklin, founder of Web software maker Trellix, who has seen many generations of high technology come and go since he helped to create the first PC spreadsheet, VisiCalc, in 1979. “This particular architecture, everyone knows, is very fertile. But all of the business models have not been worked out yet. There is a lot of wishful thinking going on in this area, just like there was on the Web initially.”

Regardless of its prospects, the Web services concept deserves examination if only because its most vocal evangelist is Microsoft, whose marketing prowess alone can turn an obscure idea into an entire industry. Although the notion of Web services has been bandied about for years, the software giant has given the idea new popularity with its grand .Net strategy, which is taking its first steps in the marketplace with the release of the Windows XP operating system. Microsoft is selling software that companies can use to build services while also offering a set of hosted services to businesses and consumers for a fee.

At first glance, Web services appears to be just the latest turn for an industry that has been historically dependent on aggressive marketing strategies to generate interest

in products that are only at the drawing-board stage. But the burgeoning business has taken on particular urgency as the entire high-tech sector struggles for ways to survive the dot-com bust and a global economy that is on the verge of recession.

Before the idea can succeed, however, the industry must explain what exactly it is—and how companies can make money on it.

“The problem with new technology is the people selling it don’t know what people who use it want to do,” said analyst Mike Gilpin of Giga Information Group. “After the people buy the stuff and use it, the people who sell it begin to learn what they actually want to do with it. And then they morph their marketing message to meet reality.”

Details vary, but the most basic Web services link servers over the Internet to exchange data and combine information in new ways. These services run on Web-based servers instead of on individual PCs, allowing people to use them through any device that has Internet access, including cellular phones and handheld computing gadgets, as well as desktop and notebook computers. Some services like this, of course, already exist in simple form: Yahoo, Lycos and all the other major portals have long offered features such as free e-mail accounts and personal calendars that use software maintained on Web servers. But others envision far more complex functions for use by large companies as well as consumers—services valuable enough to charge subscriptions for.

known as “thin clients,” waned as the price of personal computers dropped dramatically.

### Convergence (circa 1998)

The basis for this concept—the merging of the PC and the TV—had begun several years earlier with proposals for “interactive television.” The “convergence” trend gained momentum as the Internet became a mainstream medium that many companies thought would finally provide the incentive for combined PC-TV boxes. The idea is still alive but has not taken off for many reasons, including limited bandwidth and resistance from the TV industry.

### ASPs (circa 1998)

“Application service providers,” which promised to take over the daily grind of running business software, saw a meteoric rise in the late 1990s and then quickly plummeted to Earth amid the dot-com carnage. Many ASPs, such as Red Gorilla, Agillion and Intel-SAP venture Pandesic, ceased operations as revenue dried up; others, such as FutureLink, have been relegated to Chapter 11 bankruptcy. But economic changes, new technology and a desire by big companies to safeguard data since the Sept. 11 terrorist attacks may bring new business to the remaining players in the market.

### B2B (circa 1999)

“Business-to-business” exchanges promised to revolutionize commerce by moving the bulk of transactions between companies online. Proponents claimed that B2B exchanges would be cheaper, faster and more efficient than old-fashioned commerce done through a hodgepodge of interconnected but proprietary computer systems. But unclear advantages, high initial costs, mistrust among partners, and a reluctance to abandon phone calls and face-to-face meetings have derailed much of the trend. Although smaller-scale B2B systems abound, the mega-exchanges and full-fledged revolution once predicted have never materialized.

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## Pitch: Why Web services make business sense

### Doing real business online

Most technology executives and analysts describe Web services as a way for companies to communicate online and conduct e-business. For example, they could allow patients to go to a single Web site for their health care needs, such as viewing medical histories, paying doctor bills and ordering drugs from the pharmacy.

CareTouch, a spinoff from health care provider Kaiser Permanente, plans to use software from IBM to build Web services to connect with its partners and suppliers so that patients can wirelessly order products or schedule appointments—such as a doctor's visit or a grocery delivery—through any type of computing device, Chief Technology Officer Prasuna Dornadula said. Through its Web site, CareTouch provides patients with low-cost health care products and services not covered by their insurance policies.

"Someone discharged from the hospital after hip surgery may have mobility issues, so they can use their PDAs to communicate with our server to do all their product buying and scheduling with a wireless connection," Dornadula said. "We can save money on call-center time and phone charges."

The most optimistic analysts say Web services will eventually become prevalent to the point that a mom-and-pop fish store might sense a potential customer walking down the street and send an alert about a 20 percent sale by pager or cell phone. But so far, most of the businesses interested in Web services have been large companies in the financial and travel industries, and technology departments looking for a cheaper way to connect disparate computing systems.

Dollar Rent A Car Systems built a Web service to connect its reservation system with Southwest Airlines, allowing passengers to reserve a car through the airline's Web site. The operation, which can be duplicated for other airline partners, took only two months—well

short of the estimated eight months it would have taken before today's Web service technologies were available.

"It's simple to build. I find complex systems are prone to failure, and I tend toward simple solutions. It's not that complex to code," said Peter Osbourne, manager for Dollar's advanced technology group. "The downside is that for some developers, this is a leap of understanding. Not everyone is onboard with the idea. Many are now sitting on the fence and figuring out how to use it."

Customers like Osbourne are the reason so many companies see a potential gold rush in Web services.

Software makers big and small are competing to sell businesses their Internet products, which those business can use to build the underlying plumbing necessary to run and manage complicated operations. Key products include development tools used by programmers to write and test their applications, and integration software that allows companies to link computing systems to exchange data and conduct business over the Web.

The idea for Internet-based software is not a new one. For years, Sun Microsystems and Oracle have advocated this technology model, in which individual terminals have limited computing power and central servers store and deliver the software over a network.

Hewlett-Packard was the first to champion Web services with its E-speak technology in mid-1999, but it went nowhere. Today, even though most personal computers are connected to a network of some sort, they are still largely self-contained, with most of the data and software they need stored on local hard drives.

### A technical reality, at least

In recent months, the necessary standards have been put in place—leading to some general agreement among technology makers on how Web services will function and thereby making the concept at

### Broadband (circa 1999)

As its name suggests, "broadband" refers to high-capacity and therefore high-speed Internet connections that can provide television-quality graphical transmissions and drastically reduce the time it takes to download all kinds of data. Although the demand for such technology is still high, the infrastructure required to provide it on a large scale has been difficult to build—thwarting companies that were created to deliver services at high speeds, such as Excite@Home.

### P2P (circa 2000)

Fueled largely by the popularity of Napster, "peer-to-peer" technologies promised to revolutionize the computing industry by reducing the need for central servers and networks. Cyberlibertarians touted the model as a way to empower individuals on the Web by allowing them to trade files directly among themselves with no oversight—an idea that in practice translated into widespread music and movie piracy. Napster's legal troubles have driven millions of people to other file-swapping networks, but the free-content communities are under siege by Hollywood and record labels. The idea is now being adopted for lower-profile business uses, as Intel, Sun, Microsoft, Yahoo and others add peer-to-peer capabilities to their software or invest in peer-to-peer start-ups. But there have been few tangible commercial results from this experimentation.

—Mike Yamamoto

least a technical reality. Standards like Extensible Markup Language (XML), Simple Object Access Protocol (SOAP), Web Services Description Language (WSDL) and Universal Description, Discovery and Integration (UDDI) are beginning to win large-scale acceptance as Web services underpinnings.

Yet much remains undefined, such as proper security, privacy and, above all, commercial potential. "We need clarity," Illuminata analyst James Governor said. "Less huff and puff, and more meat and potatoes."

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## Pitch: Why Web services make business sense

That is easier said than done. As Bricklin notes, the next step will be even more complicated: "We don't know where we will commonly put the interfaces. Do you put the screen door on the front of the house or the side? We know it goes on the outside of the house, but we don't know what the rooms look like yet."

Also uncertain is the commercial potential for Web services. Technology makers like Microsoft, IBM and Sun plan to make money selling tools and server software for building services. But as profit-starved technology companies increasingly see Web services as their savior, buyers are warming up to the Web services concept as a way to cut technology spending. Nearly half of roughly 300 IT managers surveyed by research firm Jupiter Media Metrix earlier this year said they see Web services technology mainly as a way to cut software integration costs.

Further complicating the quest for profits is the debate over how and when Web services providers will collect payment for services. "The complicated thing is going to be where I use a service and I have to pay, or if I use a service and I want my customer to pay for it; then it gets complicated because you have all of these separate relationships," Bricklin said.

It also is unclear how responsibility will be divided for fixing Web services when they break. Since Web services by definition are not locally hosted, it's not immediately clear who controls the source code, how the service works, or even where the service is hosted. With those questions in mind, analysts see opportunities for hosting companies and application service providers in a future Web services market.

In an indication of their commitment to the nascent business—and in acknowledgement of the industrywide cooperation needed to make it work—archrivals Microsoft and IBM have taken extraordinary measures to cooperate on

industry standards for development of Web services. Followed recently by Sun, the two computing powerhouses have announced detailed product plans and are already spending millions of dollars to hype them.

### The importance of Microsoft

Of all the leaders in this field, Microsoft may be most important to the future of Web services. Facing saturation of the PC market with its Windows operating systems, the software giant is looking to services as a necessary avenue for growth in its software sales. As a showcase for the concept, Microsoft is building and hosting its own services and will charge consumers and the businesses that want to reach them.

"Microsoft is nine to 12 months ahead of most vendors," Gartner analyst Mark Driver said. "IBM is close, about three to four months behind Microsoft, and the other Java vendors like Oracle will catch up by next year."

Analysts say other competitors, such as HP and BEA Systems, have potential but have yet to come out with products to turn their marketing rhetoric into reality. Nevertheless, analysts believe that these companies may still find opportunities, because many more technologies are needed for Web services to take off, especially in the areas of security and quality assurance.

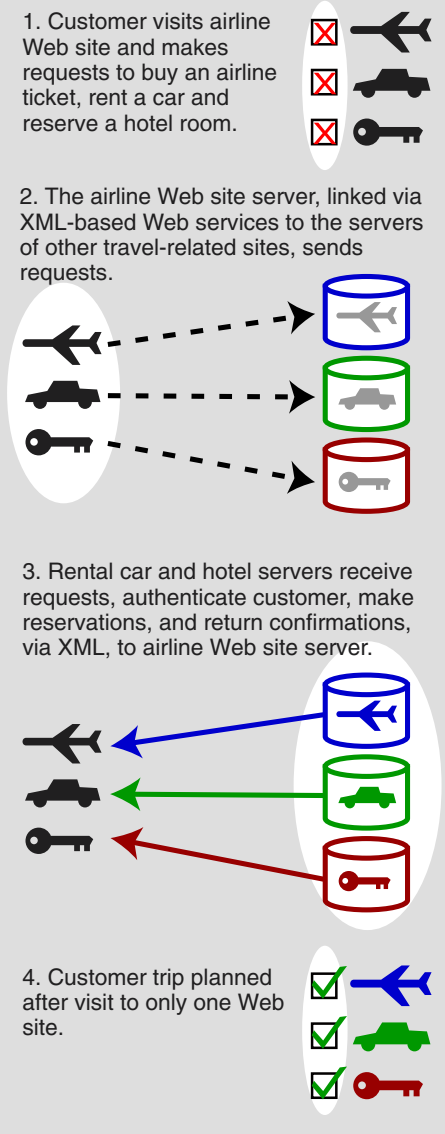
Gartner expects 75 percent of all corporations with more than \$100 million in yearly revenue to use Web services by mid-2002. But perhaps because of its dubious experience with other industry trends, the research group is tempering expectations for the market's maturation.

"We don't expect it to have mainstream impact until 2004," Driver said. "It's a fact of nature that it takes a couple of years for technology to thrive."

Bricklin sees the potential for Web services to catch on with the mainstream much sooner, regardless of what happens

## How Web services work

Web services, such as .Net My Services, work on servers to connect Net applications, devices and services. Consumers use the services by accessing Web sites for one-stop shopping through PCs, handhelds, cell phones and even cars.



to early high-profile examples such as Microsoft's .Net initiative.

"Even if the .Net My Services example doesn't work—if it never catches on—there is enough meat here," he said. "Companies realize that by exposing some functionality this way they make their products more useful." ■

## Players: Start-ups may get window to fill gaps

By Margaret Kane  
Staff Writer, CNET News.com

**If small start-ups want inspiration to take on industry giants in Web services, they need only look to BEA Systems.**

BEA began doing business at the height of the PC revolution in 1995, when the largest companies—IBM, Microsoft, Sun Microsystems and Oracle—were believed to have carved up most of the territory in high technology. Its ambitions seemed modest at the time: to fill in gaps left by major software manufacturers with products that allowed its customers to connect programs in various areas—linking sales to inventories, for example.

Last year, the upstart from San Jose, Calif., recorded more than \$800 million in revenue and is widely considered the leader in its field.

“The tech market evolves. It was the same question when BEA was a couple of guys and they were going to go take on the middleware market. They did it, and they did it well,” said Mark Atherton, vice president of worldwide marketing at Web services company Asera. “Each time there’s a big change in the market, there’s always one or two guys who make it through.”

Today, a new generation of start-ups is trying to follow the same path, this time using technologies to link Web services and software—including BEA’s products.

Although there is always room for new technology and innovation, the head start of so many major players in the industry may make it harder for new companies to break through. Microsoft, IBM and Sun are among the industry heavyweights touting ambitious plans in the emerging Web services field.

But true to the pioneering nature of high technology and the Internet, there is no shortage of start-ups planning to join the fray. Companies such as KnowNow, Kenamea, Oblix, OpenDesign, Grand Central, Avinon, VelociGen and Epicentric (*see chart, page 8*) are attempting to ride the industry’s latest wave by providing Web services development tools, secure networking and other related technologies. Even so-called open-source initiatives such as Ximian’s Mono are gathering momentum.

“Any major change in the information-technology landscape represents the opportunity for a new ecosystem to evolve,” said David Schatsky, research director at Jupiter Media Metrix.

That cycle will be fueled by the potential high stakes involved in Web services, which proponents promise will change the way software applications—and businesses themselves—communicate.

### A fistful of standards

From a technical standpoint, at the heart of Web services is a new set of protocols designed to help different software applications communicate with one another. Some refer to the process as “componentizing,” or breaking down complex pieces of software so that a developer who wants to perform individual steps can get access to those specific parts of an application in building a Web service.

The idea echoes earlier development efforts using Microsoft’s Component Object Model (COM) scheme and the Common Object Request Broker Architecture (CORBA) favored by Java

## Big companies, big plans

**After years of talk, some of the industry’s largest companies are finally taking concrete steps toward making Web services a reality.**

### Microsoft

Next year the software giant will release .Net My Services, an initiative formerly known as HailStorm that will deliver content, shopping, banking and other services over a variety of devices ranging from cell phones to PCs and handhelds. The massive operation will employ a global network of Web servers to house all manner of personal information, including e-mail accounts, address books, credit card numbers and photographs. On the infrastructure end, Microsoft is selling a family of e-business software for companies to create and run Web services, which include its forthcoming Visual Studio.Net development tools.

### IBM

Big Blue has built support for Web services into its WebSphere application-server software and offers Visual Age tools for building applications. WebSphere includes technology that runs transactions for Web sites and links to IBM’s DB2 database software, which stores vast amounts of corporate and Web information, and its Tivoli Web services manager, which monitors performance of such products. IBM’s Global Services arm is also said to be planning a move into the hosting end of Web services.

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## Business: Old-line companies revolt

supporters. But there is one important difference. Where COM and CORBA relied on proprietary protocols and specifications, Web services are based on four key standards: Extensible Markup Language (XML); Simple Object Access Protocol (SOAP); Universal Description, Discovery and Integration (UDDI); and Web Services Description Language (WSDL).

To understand how these protocols work together, imagine an ordinary phone call. In Web services parlance, XML represents the conversation, SOAP describes the rules for how to call someone, and UDDI is the phone book. WSDL describes what the phone call is about and how you can participate.

While the rules of engagement in the Web services world are clearly defined for all software makers, the major technology companies clearly hold the advantage. Still, analysts such as Schatsky believe that start-ups may have a window of opportunity before larger players ship Web services technology to their customers.

“No matter what your application does, if you have three vendors out there, all of whom have support for Web services, and you don’t, you lose,” he said.

At present, the most fertile ground may be the development of tools to help companies create their own Web services or to deploy new ones. Smaller

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companies, however, must find a way to compete for this business against the likes of Microsoft, IBM and Sun, which have all launched Web services campaigns to build support for their specific technologies.

Asera’s Atherton hopes that his company will be one of those that survive alongside the industry leaders. Although companies like SAP are promising to build support for Web services into their applications, he doesn’t see customers jumping to take them up on it.

Instead, he thinks this will be their response: “That’s interesting, but if I’ve spent \$100 million on these applications, I’m not going to rip these all out, with all the customizations I’ve built in, just to implement Web services.”

Companies such as Asera hope to build Web services that can work with all computer systems so that there’s no need to rework applications, as SAP and others are suggesting.

“If you look at most of the big vendors (other than Microsoft), their strategy around Web services is an adjunct to their existing services,” said Anrair O’Toole, executive chairman of Dublin-based Cape Clear, a Web services software maker. “If IBM comes in, they draw you the beautiful new WebSphere diagram and it has a shiny new pipe called SOAP, and they say, ‘Look, we added Web services.’ You need products that aren’t bolt-ons, but are true, native Web services products.”

### A limited life span

The problem that companies like Cape Clear and Asera will face are similar to the ones encountered by application manufacturers: a limited life span. Eventually, large software companies will re-create any new, desirable tool in their own products. And even if customers demand that their software

### Sun

The company is building support for Web services standards SOAP, UDDI and WSDL into its iPlanet e-business software products, including its application-server software. By the end of 2002, Sun will add the existing Web services standards into Java 2 Enterprise Edition, the Java standard for writing business software. The company says it will also release a tool for building Web services next year and is working on technology that will allow Java-based Web services to be compatible with Microsoft’s .Net operations.

### BEA Systems

As the market leader in application-server software, BEA is expected to be highly competitive. But the company still needs good development tools and integration software. Software development tools company WebGain, which is partly owned by BEA, has yet to build Web services features into its products. In the meantime, WebGain rival Borland makes the best Java tool for building Web services, according to industry analysts.

### Oracle

The database leader is moving in two directions on Web services. First it is adding support for XML, SOAP, UDDI and WSDL to its 9i database-management software, application-server software and development tools so that its customers can use Web services in new systems. Second, it is developing Web-outfitted versions of its sales and customer relationship management software.

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## Business: Old-line companies revolt

“**Start-ups have “one or two paths: Either out-innovate the big guys continuously, or build something cool and hope (to) get bought. Microsoft will catch up and incorporate enough (new technologies) to dissuade people from buying third-party tools.”**

—Frank Gillett, senior analyst, Forrester Research

work with many other systems, it's not hard to imagine the IBMs of the world providing that technology.

“Companies like Cape Clear are banking on the idea that they can innovate faster than big tech companies,” said Frank Gillett, senior analyst at Forrester Research. “They've got one or two paths: Either out-innovate the big guys continuously, or build something cool and hope (to) get bought. Microsoft will catch up and incorporate enough (new technologies) to dissuade people from buying third-party tools.”

Others are pursuing a third option, acting as a type of brokerage that helps customers find, buy and deploy the Web services they want. That's what companies such as Grand Central and Lucin are trying.

“**It's not like other (technological) changes where the big guys didn't have their eye on the ball. All the big guys have their eyes on it—in fact, they're even driving it.”**

—Craig Donato, CEO, Grand Central

On the plus side, these companies don't have to join the software development race; on the downside, it will take at least a year or two before most companies discover needs for Web services, let alone look outside to get them—assuming the trend takes off at all.

“The biggest activity over the next 16 to 18 months will happen internally, as companies try to understand what it is and get their feet wet internally behind the firewall,” said Massimo Pezzini, vice president and research director at Gartner. A recent Gartner survey of senior technology managers found that 60 percent said they planned to work with Web services only internally in the next year.

That's why Grand Central CEO Craig Donato says it is imperative for new businesses in this market to focus on helping companies, not just on developing new technologies.

“Web services are very revolutionary from a business perspective, but not revolutionary from a technology perspective. As a result, compared to other technology evolutions, we don't think there will be so many start-ups,” Donato said. “It's not like other changes where the big guys didn't have their eye on the ball. All the big guys have their eyes on it—in fact, they're even driving it.” ■

### Hewlett-Packard

The computing giant has the potential to be a major player, but it remains to be seen whether the hardware maker can make inroads into the software market.

“HP and BEA are likely to have a significant play, and Sun's iPlanet is making some headway and will eventually catch up. HP has an edge because they had the idea before with E-speak,” said analyst Mike Gilpin of Giga Information Group.

“BEA is typically one of the quickest to get products out. That was true with Java 2 Enterprise Edition, but they haven't been as focused on Web services as IBM. Oracle has some Web services capabilities, but it looks comparable to what BEA has.”

—Wylie Wong

## The smaller fish

These Web services start-ups hope to take on the likes of Microsoft, IBM and Sun Microsystems.

Company	Where based	Year founded	Product/description
<b>Asera</b>	Belmont, Calif.	1998	Asera eBusiness Operating System, to help companies create Web services based on existing applications. Backed by Kleiner Perkins.
<b>Avinon</b>	San Francisco	1999	NetScenario, a Web services development and deployment tool tightly tied to Microsoft.Net.
<b>Cape Clear</b>	Dublin, Ireland, and Campbell, Calif.	1999	Tools for building Web services. Led by former Iona Technologies execs.
<b>Epicentric</b>	San Francisco	1998	Web portal software and services for delivering Web services.
<b>Grand Central Networks</b>	San Francisco	2000	Grand Central Network to provide secure network and integration technology for Web services.
<b>Kenamea</b>	San Francisco	1999	Kenamea Applications Network, to secure network connections for Web services delivery.
<b>KnowNow</b>	Mountain View, Calif.	2000	Software that links clients and servers for real-time communications over the Internet.
<b>Oblix</b>	Cupertino, Calif.	1996	Security software for managing Web applications.
<b>OpenDesign</b>	Bellevue, Wash.	2000	Software for deploying business applications as Web services (in development). Headed by a former Microsoft executive.
<b>VelociGen</b>	San Diego	1998	VelociGenX, a development tool for building XML Web services.
<b>Ximian</b>	Boston	1999	Mono, an open-source, Linux-based version of Microsoft's .Net development technology (in development).

## Rules: Leaders avert standards battle—for now

By Wylie Wong  
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**Not long ago, the idea would have been unthinkable: Microsoft and IBM, sworn enemies after their struggle for control of the PC operating system in the early 1990s, laying down their swords and cooperating to create an industry standard for an important new technology.**

Yet that's exactly what has happened in the emerging market for Web-based software and services. It is a testament to vastly changing times in the high-tech industry, when longtime rivals are seeking such truces to survive a combination of global economic malaise, dot-com bust and saturation of the PC market.

Although Web services look to some to be simply the latest ploy in an industry that depends on marketing hype, the extraordinary cooperation by Microsoft and IBM, and more recently by Sun Microsystems, may be an indication that the latest trend is more than just "vaporware."

"We have not created multiple standards, but rather we've gone out and supported interoperability," said Philip DesAutels, Microsoft's product manager for XML Web services. "It's safe to assume the goal is to have one standard."

The goal is also the straightest line to profitability, instead of the consumption of time and resources in costly industry infighting over which specifications should be used and who would benefit most from them. The incentive is even more understandable when the stakes are assessed: If the concept of Web services catches on, it could fundamentally change the way companies do business and people use the Internet.

The idea is to sell software as a subscription-based service over the Web instead of through traditional methods such as boxed copies at retail stores. By running software

on central Web servers, as opposed to on individual PCs, people can theoretically have access to all manner of applications and services from any computer, cell phone, handheld device or anything else connected to the Internet, with updates made automatically, in real time.

At the heart of this broad vision is a technology known as XML, or Extensible Markup Language, which allows companies to more easily exchange data online. Last year, Microsoft, IBM, Sun, Oracle and others put aside their competitive differences to agree on three Web standards related to XML that serve as the underlying technology for Web services.

"No one is stepping on each other's toes," said Eve Maler, Sun's XML standards architect.

With the help of industry standards groups such as the World Wide Web Consortium and Oasis, the companies hope to continue their collaboration in building a second wave of standards for such issues as security and reliability that are crucial to making Web services fly on a global scale.

At this juncture, smaller specialty companies are hoping they can pick up ancillary business left behind by the industry leaders.

"We have 5 to 10 percent of the software stack needed to implement a complete software-as-services strategy," said Gartner analyst Mark Driver. "We have the

### Defining the standards

The real hallmark of any IT trend is the alphabet soup it dishes out, and Web services offers up a rich helping. The following is a quick guide to the protocols, languages and other ingredients:

#### XML

*(Extensible Markup Language)*  
Language used to exchange data between computers over the Internet.

#### SOAP

*(Simple Object Access Protocol)*  
Describes how Web services communicate over the Internet.

#### WSDL

*(Web Services Description Language)*  
Describes Web services and how to access them.

#### UDDI

*(Universal Description, Discovery and Integration)*  
Lets businesses register, advertise and find Web services in a directory.

#### Xlang

(pronounced "slang")  
Microsoft specification for XML-based language to describe business processes.

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## Rules: Leaders avert standards battle—for now

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XML Web services, Microsoft

basic plumbing, but there’s no quality of service and security.”

### A Darwinian winnowing

Not everyone, however, believes the standards peace will last.

Already, software companies and industry groups are building a handful of competing standards to show how Web services work within and between businesses in specific areas, such as credit card checks and shipping. Microsoft and IBM have built competing languages called Xlang and Web Services Flow Language (WSFL), respectively, and industry groups such as Oasis and the Business Process Management Initiative are working on their own standards.

The stated objective is to eventually stitch these technologies together, but at least some in the industry are skeptical that they will work harmoniously.

“Over the course of the next 12 to 24 months, we will see a Darwinian process where some initiatives will cease to exist, and the way it will play itself out is who backs the initiatives,” said Norbert Mikula, chief technology strategist for software maker DataChannel. “It will be contentious, but that’s OK, because if we all agree, who says we’re doing it the right way? By having different approaches, we ultimately learn.”

Bob Sutor, IBM’s director of e-business standards, acknowledges that the issue is complex and likens the challenge to trying to combine the French and Japanese languages. But he remains optimistic.

“The grand plan is to find an appropriate standards group and sort it out,” Sutor said. “We’ve been working in the background on a number of things. You will see something public in terms of standardization by the end of the year.”

One of the first major standards for Web services is called Simple Object Access Protocol, or SOAP, a communications technology that solves an age-old problem: It allows businesses to glue together different computing systems that were built with different software programming languages. Sun initially criticized the technology before finally supporting it.

Then Microsoft, IBM and Ariba proposed a standard called Universal Description, Discovery and Integration, or UDDI, that lets businesses register in a Web directory so they can advertise their services and find each other easily.

Finally, Microsoft and IBM merged competing standards that allow businesses to describe what a Web service does. The combined standard, called Web Services Description Language, or WSDL, would be used by businesses to find each other on a UDDI directory.

### Security standards

Rival software and security companies, such as RSA Security, Entrust and VeriSign, are working on XML-based encryption and digital-signature standards through the W3C. Microsoft and VeriSign also have worked together to create XKMS, or the XML Key Management Specification—technology intended to help programmers easily add digital signatures and data encryption to their e-commerce applications.

### WSFL

*(Web Services Flow Language)*  
IBM’s specification for describing how Web services work together to complete a business process.

### XKMS

*(XML Key Management Specification)*  
Developed by Microsoft and VeriSign, it allows digital signatures and encryption in Web services programs.

### SAML

*(Security Assertion Markup Language)*  
Security and authentication spec created by the Organization for the Advancement of Structured Information Standards (OASIS) group.

### WSEL

*(Web Services Endpoint Language)*  
IBM-developed spec allows Web services to describe their features.

### HTTP-R

*(Hypertext Transfer Protocol-Reliability)*  
Protocol proposed by IBM to ensure that messages sent across the Internet reach their intended targets.

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## Rules: Leaders avert standards battle—for now

The Oasis group, meanwhile, is creating a standard called SAML, or Security Assertion Markup Language, that will authenticate people to make sure they are in fact who they say they are.

For reliability, Sutor said IBM has proposed a new version of HTTP (Hypertext Transfer Protocol), which is the set of rules for exchanging text, images, sound and video over the Web. A new proposal called HTTP-R is designed to ensure that a message for a \$1 million order is received—and that it's received just once, not 10 times.

IBM also expects to propose a standard next year that will help businesses monitor and manage Web services. The company is considering something called Web Services Endpoint Language, or WSEL, that would allow Web services to describe their features, such as whether they can perform a credit check within 5 seconds.

Last month, Microsoft previewed a new thrust to make Web services built using its .Net tools more secure and attractive to businesses. The new specifications are part of an initiative called the Global XML Web Services Architecture. The company also previewed four new related specifications that it will submit to standards bodies after a review period.

Microsoft did not specify how long the review period will be or which standards body will handle the submission, but XML, SOAP and other Web services specifications are W3C standards. Microsoft said the architecture adheres to

a plan it outlined with IBM this spring at a W3C workshop.

The four specifications cover security, licenses, routing and referrals, and all are built on XML and SOAP. The WS-Security specification outlines how to use existing W3C guidelines called XML Signature and XML Encryption. Together with WS-License, they outline how existing digital credentials can be associated with SOAP messages, according to Microsoft. The WS-Routing specification, formerly known as SOAP-RP, describes how to place address information in messages using SOAP and allows SOAP-based messages to arrive at multiple destinations along a path. WS-Referral allows the dynamic routing of messages between networked systems using SOAP.

Last week, Microsoft and IBM released another potential Web services standard, called WS-Inspection, that allow businesses to directly find each other's services over the Internet. The new technology is meant to complement the aforementioned UDDI standard. While UDDI acts like a "yellow pages," through which businesses can find a list of companies that cater to their needs, WS-Inspection is for businesses that already know which companies they want to work with and how to contact them but want to see what Web services they offer.

Some companies have already begun using existing low-level XML standards to build Web services into their business operations.

“**The grand plan is to find an appropriate standards group and sort (the issues) out. We've been working in the background on a number of things. You will see something public in terms of standardization by the end of the year.**”

—Bob Sutor, director of e-business standards, IBM

Scandinavian Airlines System, for example, has built a Web service that allows people with cell phones and personal digital assistants to access its Web site to buy airplane tickets or check their flight status. More complex uses would connect the companies' business operations with computing systems used by their partners and suppliers for requests such as purchase orders and inventory updates.

Because such operations are so complicated, Macromedia Project Manager Peter O'Kelly compares the industry's XML standards effort to the creation of rules for the English language, something that allows people to interact and communicate in a common way.

“We have an embarrassment of riches with so many organizations involved. But there are areas that need to be taken to the next level,” said O'Kelly, formerly an analyst with the Patricia Seybold Group. “You now have the basic nouns and verbs, and you want to do meaningful things around them, like sentences and paragraphs and stories.”

Now the companies just need to turn their talk into action. ■

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## Star: XML could become new lingua franca

By Mike Ricciuti  
Staff Writer, CNET News.com

**In a few short years, a once obscure technology bearing the unremarkable name of Extensible Markup Language has gone from a dry-as-dust specification to the center of the newest Web revolution.**

Like the title character in Woody Allen's movie "Zelig," whenever industry luminaries—Microsoft's Bill Gates, Oracle's Larry Ellison, Sun Microsystems' Scott McNealy—take the stage to tout their companies' Web services strategies, XML is right there. Although it predates the Web services stampede, the technology seems almost custom-made for development of the trend.

But as with many new technologies, initial enthusiasm and unrelenting hype have combined to blur an understanding of what XML is and where the technology fits in Web services development—which itself is just emerging and still being defined. Some issues being debated are XML file size, the handling of mixed media such as voice and video, and the safeguarding of data in a document created with the language.

"The main problem is the very buzz about XML as the solution for all needs," said John E. Simpson, an XML specialist who has been a programmer for more than 20 years.

Classified as a "page description language," it is something closer to Hypertext Markup Language (HTML)—the current lingua franca of the Web—than to true programming languages such as Java or Visual Basic. Just as HTML helped fuel the first great wave of the Web's popularity, XML is poised to spur a new world of Web-based services that promise to make technology more usable.

XML grew out of the publishing world as a way to describe the contents of documents exchanged over the Web. One of the language's key qualities is that it is readable by people, not just machines, making systems easy to debug.

The language provides terms used to define a Web document's tags—that is, the elements of the document that describe its various pieces—and the relationships between them. Developers at either end of a data exchange then agree to use a common set of tags. In this way, XML is uniquely flexible and versatile: It can be used to describe tennis balls or tires, employment contracts or engine parts.

That flexibility, however, can also present a problem. Because each XML transfer includes a large amount of information describing the data contained in it, file sizes can quickly mushroom.

Some companies have found XML files too big, especially when the transmission already carries large amounts of primary data. Humana, a regional health insurance company based in Louisville, Ky., uses XML to transmit some of its claims information to health care providers and other

“**The main problem is the very buzz about XML as the solution for all needs.**”

—John E. Simpson, XML specialist

partners but relies on decades-old electronic data interchange systems for the bulk of its transfer needs.

Yet Brian LeClaire, a vice president of information technology at Humana, said XML is the best technology available for data transmissions, adding that it will improve as industry standards are adopted.

"XML is much more flexible," he said. "But it's not a well-standardized world yet, so when people talk about XML they are still trying to evolve standards around how data will be defined, and so on."

XML's creators at the World Wide Web Consortium don't see the language's propensity for weight gain as an obstacle. In fact, a document describing XML and posted to the W3C's Web site states that XML is "verbose, but that is not a problem. That was a conscious decision by the XML developers. The advantages of a text format are evident...and the disadvantages can usually be compensated."

“**XML is much more flexible. But it's not a well-standardized world yet, so when people talk about XML they are still trying to evolve standards around how data will be defined, and so on.**”

—Brian LeClaire, vice president of information technology, Humana

Continued

## Star: XML could become new lingua franca

Those advantages are apparently clear to Microsoft, which has in large part defined Web services through a high-pitched marketing campaign for its .Net strategy. XML is the technological linchpin of the .Net services plan.

“XML is the next revolution on the horizon,” Microsoft CEO Steve Ballmer said at an industry conference earlier this year.

Sun, Oracle and IBM have also lauded XML and its central role in the Web services world, as have other major players. “XML has many really strong, positive characteristics, and that is why we have chosen it for more or less the foundation of everything we do,” said Ray Ozzie, founder of Groove Networks and creator of Lotus Notes.

### Going beyond Web pages

One of XML’s key strengths is its application beyond Web pages. For example, the language can be used to exchange vital information for business transactions—such as shoe sizes, shipping crate numbers or the vintage of a case of wine—between different computing systems that would otherwise be unable to communicate.

In this way, XML is unparalleled for broadcasting data between servers and to Web pages as part of a Web services architecture. Many of the first uses of XML-based Web services are for unglamorous yet essential data-exchange applications.

In HTML, a markup language that defines elements of Web pages, a vocabulary used by all developers has been defined by standards organizations. The HTML terms used to describe a Web page based on a server in Prague are the same as those used in Detroit.

XML, by contrast, describes the language used to define documents. In other words, it is used when no preset vocabulary exists.

“In XML, you are defining the data, the names you call the data, and the relationship of all data to one another,” Humana’s LeClaire said.

While Web services pioneers find ways to adapt XML, the W3C is tackling new parts of the language that could play a key role in advancing the trend, such as technologies involving multimedia and security. Last month, the organization posted a draft specification for VoiceXML 2.0, which is designed to bring synthesized speech, spoken and touch-tone commands, digitized audio, and computer-human conversations to the Web.

The W3C also is soliciting comment from programmers on how best to encrypt data transmitted using XML. A draft of a specification has been posted, and final debate is slated for this month.

As with all other evolving technologies, the progress of Web services will mean

that other areas will be more fully defined either through standards or through accepted workarounds.

Dan Bricklin is confident that it will be only a matter of time before Web services take off. As the co-inventor of the first PC spreadsheet, VisiCalc, and one of those who helped start the personal computer revolution two decades ago, he has seen other major technologies go through similar growing pains.

“A lot of what we are building today we are building for the first time,” Bricklin said. “And we don’t fully understand it.” ■

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