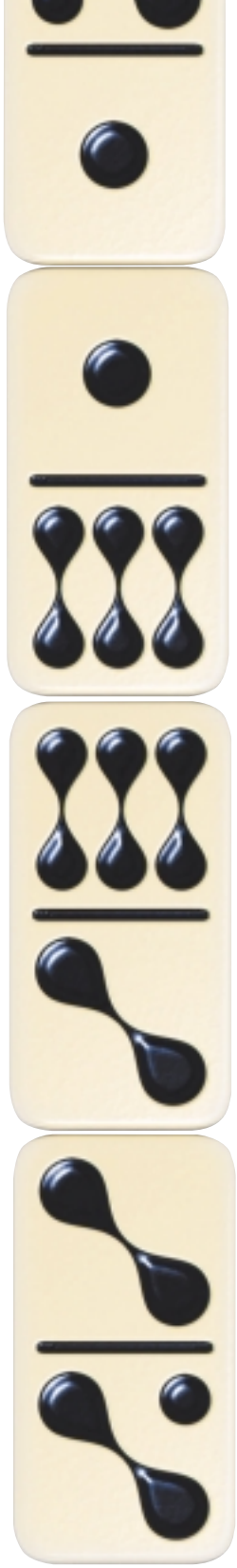
Technology

# How web services will redefine the service economy

By Anatole V. Gershman

By allowing computer applications to talk directly to one another, web services are about to change the way business operates and, even more important, the very meaning of service.



Western economies are already service economies. In fact, according to the World Bank, almost two-thirds of the gross domestic product of high-income countries comes from services that range from the physical performance of mundane tasks to the delivery of high-level intellectual content. But technological advances are about to improve our ability to deliver service and broaden the concept of what a service can be.

Driving this change are web services—software applications that use open standard protocols to communicate with other applications over the Internet. These software components can find, link with and talk to one another automatically, sharing information and performing tasks without human intervention.

The idea behind web services isn't new. Application-to-application communication has been technically feasible for years, although it has been limited by its reliance on proprietary languages. The compelling change today is the emergence of open standard network and application protocols (see box, page 44), which are beginning to make communication transparent across a variety of systems and platforms. Offering a common language equally available to everyone, these protocols can vastly enhance the usefulness of a particular service by lowering the cost, broadening the reach, and increasing the number and variety of participants.

Equally important are other technology advances on which web services build. These include continuous Internet connectivity, wireless devices such as mobile phones and PDAs, miniature cameras and highly sophisticated sensing devices, and telematics (which enable information to be exchanged with vehicles or industrial equipment). In combination with web services, these advances make possible a continuous stream of communication and activity—among applications and individuals—taking place in a context rich with information.

For business leaders, the challenge is not tracking the technology or making sense of the standards behind web services—it is understanding the opportunities that lie ahead. When web services reach their full potential, they will change the way we do business.

**Transforming the transaction**

Look at what needs to happen for a service—nearly any service—to be provided today. Each transaction has five basic steps: The provider and user have to find each other, connect, and communicate what one party desires and the other offers. The service itself then has to be rendered and, finally, paid for.

With web services, each of those five steps can be done differently. The finding, linking, communicating and paying can all happen automatically. When applications or business and technology solutions speak the same "language" based on common standards, any number of service providers can market themselves via the Internet to any potential user. The consumer of the service can use applications that will review and select a provider, engage the appropriate service to complete a task and handle the payment process. Even the service itself can be rendered differently: Sensing technology and mobile devices can act as the service provider's eyes and ears.

The ability of technology to change how a service is provided should come as no surprise—look at the history of manufacturing in the United

States. Until the 1800s most products were made in small shops and consumed locally. Then the railroad came—and goods, many now made in factories, could be shipped cross-country. The telegraph enabled long-distance communication, so people could place orders from almost anywhere. And the advent of standardized parts made it possible for any number of goods to be assembled from pre-selected components. Manufacturing achieved cost efficiency and national, then global, scope.

Like the railroad and the telegraph, the Internet expands the geographic possibilities, making it feasible for services to be solicited and delivered from almost anywhere. Web services add another dimension, as applications rather than individuals find and engage services. The interaction no longer needs to be local—and no longer even needs to be performed by a human.

Just as standardized parts enabled products to be more easily assembled from components, web services are standardizing the components of service. Beyond technical standards that enable systems to communicate, web services require a common language for describing what will be offered and how. In the auto industry, for example, all participants need to agree in advance on the specific nature of various parts so that they can be bought and sold in the open marketplace.

As with manufacturing, services can be delivered at greater volume and efficiency. By automating and improving the transaction process, web service providers can reduce costs and therefore stimulate demand.

What does this mean for business? More and more, products will become a channel for service, and customer relationships will change because many newly possible services will be delivered dynamically through a services supply chain (for a related story, see page 26).

Existing suppliers will be able to deliver highly personalized services and maintain continuous customer interaction. Some may join the ranks of intermediaries who emerge to broker web services. At the same time, some business-to-consumer companies may find that the presence of third-party brokers diminishes or ends their customer contact, making it essential that they protect their brand and reputation by other means.

**Intriguing possibilities**

Businesses are starting to use web services to improve operations (see box, page 46). But even more intriguing possibilities lie ahead in the realm of service. Here are some of the areas of opportunity.

*New ways to deliver services*

Picture this scene taking place inside any complex industrial operation, such as a petrochemical plant, oil refinery or nuclear facility. A pump begins to fail. There is no problem yet, but the pump itself, equipped with advanced sensors, sends out an alert. A maintenance engineer responds, equipped with a special PDA that can access, in text and video, the pump's maintenance records, current status, related data on similar problems, a list of suggested corrective procedures, and the availability of materials and tools needed to make repairs. While the engineer works, the pump gives feedback and updates its own maintenance logs.

(Sound a little far-fetched? Accenture Technology Labs, this company's dedicated technology research and development organization, has developed a telematics services prototype

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Web services can create a level playing field, allowing businesses to describe, publish and integrate their services, finding and serving customers more readily.

for an industrial environment that can demonstrate how such a Web-enabled maintenance service could be provided.)

But the opportunity doesn't end there. Because web services enable data to move smoothly across platform and enterprise boundaries, the monitoring and maintenance of that pump, and of other components, could have been handled just as easily, and perhaps more efficiently, by a third-party service provider or the equipment manufacturer.

That means the plant could operate continuously with fewer onsite engi-

## Emerging standards

Web services really aren't services but layers of standards that are emerging in stages. Understanding these layers and their current state of development is key to knowing what is achievable now and when future applications may be feasible (see story).

The most basic layer is already in place. Extensible markup language (XML) is the common language that underpins web services, describing how data is structured. Simple object access protocol (SOAP) defines how applications make and respond to information requests.

These standards enable applications based on different technologies (including legacy systems) to communicate. This means that with the addition of certain software components, it is already possible to integrate diverse streams of data. Applications like the remote maintenance of industrial equipment, or more user-friendly package delivery, are technically achievable today.

The next layer is being developed now. Web services description language (WSDL) is the standard by which providers can describe what their service actually is or does. Universal description, discovery and integration (UDDI) is the set of specifications needed to create directories by which providers can offer their services, users can find them, and the two can connect automatically and dynamically.

Once these standards are widely accepted, we can have a global Yellow Pages with access technically possible and economically feasible for all. Then the many possibilities for microservices on tap will be within reach.

Other layers are in still earlier stages of development. Content standards, for example, are needed to smooth the flow of information within any industry by defining how players will describe elements of their product or service, the type of documents they will need to exchange and how those documents will interconnect.

These standards are now beginning to emerge in some industries, such as electronic components and semiconductors. In addition, some work has begun on standards that would establish a user profile and ensure the security of end-to-end service delivery. Those standards will need to be developed further before web services can reach their full potential.

neers watching over systems that, nearly always, register "normal." And the pump maker could take advantage of a new revenue stream. Many manufacturers of expensive equipment or components have wanted to offer long-term monitoring and maintenance contracts, but the cost of sending out a cadre of engineers to different sites each day on routine system checks was very high. Web services, along with advanced sensor technology, change the equation.

*Information as a new source of value*

What if live streams of data from various sources, internal and external, could be incorporated dynamically and displayed in a desktop application so that users could aggregate, view, manipulate and share the data according to their needs? (That's what the Accenture Technology Labs' Live Information Models prototype does.)

This opens up the possibility of new information services that can improve strategic decision making in any industry in which daily decisions are influenced by even small changes in external trends or events. Transportation, energy and financial services come to mind.

Within such industries, aggregators who will buy, package and sell data streams are likely to emerge. For example, market research could be aggregated to create live analytical reports delivered via the Internet. Retailers might subscribe to that service, combining it with real-time inventory data from their internal systems to have a continuously current data picture on which to base ordering and pricing decisions.

Most businesses have databases or business models that could be of great value to others. With web services, selling such data could be as easy as posting pages to the Web. Even now, forward-thinking business leaders should begin asking two questions: Does this company generate information that is being stored or even thrown away—but that has value to others and could be sold? And is this company positioned to be an aggregator, acquiring information externally to supplement its own, then serving as a trusted and reputable source of data that others would be glad to acquire?

*User-centric services*

Any number of services, for individuals or for businesses, could be customized to meet user needs, improving customer satisfaction and strengthening relationships. Take package delivery, for example. Each business day, express shippers deliver more than 13 million packages worldwide. Missed deliveries cost money and cause frustration all around. But suppose package delivery were shifted from being address-centric to being user-centric so that the package is delivered

efficiently at a time and place convenient to the user.

(Accenture Technology Labs has developed a Dynamic Delivery prototype, which enables the shipping company to locate recipients in real time and send a delivery alert to the device of their choice—cell phone, pager or PDA. Recipients could then "sign" electronically using identification such as a thumbprint, or they could choose to route the delivery to another address or schedule another delivery time. Alternatively, recipients could preauthorize access to a personal calendar, allowing the shipping company to find and pick a convenient time and place for delivery.)

Or consider the purchase of any sophisticated or expensive object—say, buying a printer in an electronics store. One day, because of web services, the buyer may be able to point a mobile device at the printer and instantly access information that includes product reviews, recommendations, warranty details and payment options. The manufacturer would be

## Getting value today

Web services are still emerging (see story), but they already offer two immediate opportunities to improve business operations.

*Improving supply chain efficiency*
Dell Computer Corporation uses web services to integrate its assembly operations with its multiple vendor-managed materials distribution hubs. Smooth information flows among these disparate systems allow Dell to create a manufacturing schedule for each plant every two hours, depending on actual orders received. The company then distributes that schedule to vendor hubs via its extranet. Dell can now meet its production schedule with inventory buffers at plants reduced from 30 hours to about 5.

Web services also enable an automated dialogue between Dell and its suppliers, giving each a heads-up on potential problems. By making real-time adjustments, the company believes it can help vendors to reduce inventories by as much as 40 percent.

*Better e-channel integration*
Telenor, a European telecommunications company, set up a customer self-service portal. The goal was to offer personalized information services, tailored to different customer segments, to advise customers in selecting company products based on their needs, and to launch future products and campaigns—all while reducing Telenor's customer service costs. That called for a complex portal encompassing nearly 200 webpages. Web services were critical to integrating the portal with corporate middleware and with the server used to promote and personalize the portal (for a related article, see page 73).

Early adopters like Dell and Telenor are enjoying benefits today—and positioning themselves for tomorrow. With web services standards already incorporated into their systems, these companies are more prepared to take advantage of emerging opportunities to transform business service.

offering value-added service, or a third-party provider might do so for a fee. (A working prototype demonstrating this possibility has been developed at Accenture Technology Labs.)

*Microservices on tap*

Furthest in the future—but already on the horizon—is a new category of services that could come in granular bits, on demand. Many services consist essentially of information, advice or hands-on assistance, which ideally would be provided when and where needed. Web services could make it feasible and cost-effective to dynamically bring together the provider and the user, while ubiquitous sensors and devices would enable the service to be provided virtually.

Picture a homeowner having trouble installing a light fixture. What to do? Reread the instructions? They weren't clear the first time. Hire a handyman? That's expensive—and it's Saturday night.

Now imagine this: Still up on the ladder, the homeowner pulls a device containing a wireless microphone out of a pocket and describes the project and the problem. This prompts a computer to search for service providers and choose one who is available, qualified and affordable. The homeowner then turns on a wireless camera. The service provider and homeowner look at the problem, and then the homeowner follows step-by-step, real-time instructions. The charge is billed electronically. (It's feasible, as demonstrated by our Virtual Home Improvement Services prototype. And it would work wherever a real-time personal coach could help—cooking, shopping, gardening, auto repair, first aid, fitness training and more.)

Safety and security offer another area of opportunity. Here's how our prototype Personal Security Services works. Picture a woman walking through a parking garage late at night. Uneasy, she takes out a device with a global positioning satellite receiver and a microphone, and asks for protective assistance. Instantly, an application finds, screens and connects her to a service. Now a security representative can access a nearby camera to watch her, scan the surrounding area, talk to her through her microphone and call for any help she might need. Once in her car, the woman signs off and is automatically billed. Variations of this service could be used to watch over the elderly or ill, children or pets, or a home or office during an extended absence.

These applications make business sense for users and providers. Users are able to purchase otherwise expensive services in affordable increments as needed. And providers may be able to extend the services they can offer. For example, the elderly or ill may be able to have in-home monitoring and companionship, helping them to remain independent longer. That would be a benefit for their families—and a new business opportunity for health care.

Providers may even be able to offer these services by leveraging existing resources. Skilled healthcare staff and in-house experts almost always have some downtime during which they could log on and offer virtual services. Web services, by removing the constraints of cost, time and geography, make it feasible for them to find and serve customers during those intervals.

**A more valuable platform**

If web services haven't captured the imagination of corporate leaders until now, it may be because these services are often dismissed as just the latest Internet innovation. They do add to the Internet infrastructure—but that in itself isn't magic.

The excitement lies in their potential application. As standards are defined and broadly accepted, the Internet will become a much more valuable service platform, especially for businesses. Web services can create a level playing field, allowing businesses to describe, publish and integrate their services, finding and serving customers more readily and at drastically reduced transaction costs.

Furthermore, web services work hand in hand with other technology advances; in combination they can transform the way businesses think about service. The magic lies in their ability to enable business innovation. ■

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