

When Computers Learn to Talk: A Web Services Primer

What are Web services? Why should you care?

SAMIR PATIL
SUNEEL SAIGAL

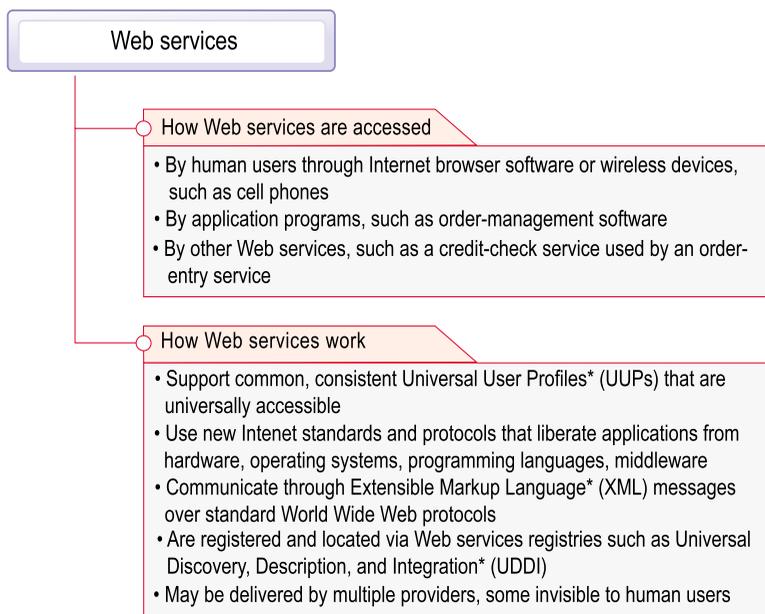
The McKinsey Quarterly, 2002 Number 1, Web exclusive

ANYONE MADE LEERY BY THE UNFULFILLED promises of the dot-com era may feel skeptical, or at least confused, about Web services, the latest wave of innovation on the Internet. Sky-high expectations and reams of hype are too often the death knell for emerging technolo-

gies. Will this one be any different?

At the risk of soliciting conversions to a potentially false creed, we offer a primer on Web services—what they are, what you need to know to be conversant with the underlying technology, and why, in the end, you may

EXHIBIT 1



* See Exhibit 8 for definitions.

decide to pay closer attention as they evolve.

Simply put, Web services are business and consumer applications, delivered over the Internet, that users can select and combine through almost any device from personal computers to mobile phones. By using a set of common protocols and standards, these applications will permit disparate systems to “talk” with one another—that is, to share data and services—without requiring human beings to translate the conversation. The result promises to be “on-the-fly” (real-time) links among the on-line processes of different companies. These links could shrink corporate IT departments, foster new interactions among businesses, and create a more user-friendly World Wide Web for consumers.

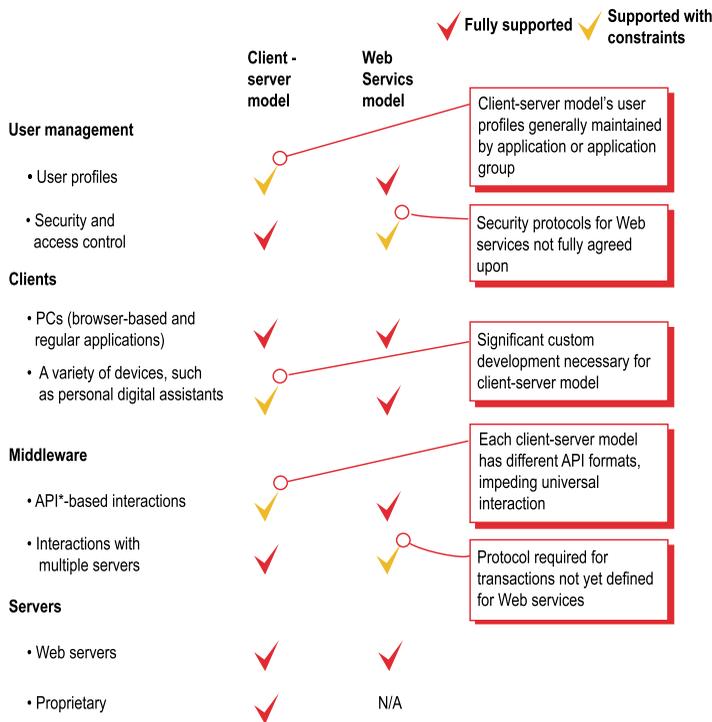
be a reality. Others point to the significant remaining hurdles: key technical standards still haven’t been finished; specific services and new service providers have yet to be defined; and, perhaps most important, questions such as consumer privacy and security remain unanswered.

Despite these obstacles, new and potentially powerful innovations are building behind the buzz. Click (on the Web) through the following exhibits for a look at the new world of Web services.

ACCESS AND FUNCTIONS (EXHIBIT 1)

The hype around Web services reflects their potential for helping computers talk with one another more easily. These conversations will

EXHIBIT 2



* Application-programming interface; allows applications to communicate with other applications.

What will it take for this vision to materialize? The substantial investments in Web services that players such as IBM, Microsoft, and Sun Microsystems are now making have convinced some observers that this technology will soon

take place through new Internet standards and protocols that allow computer applications to reach beyond the confines of operating systems, programming languages, and middleware. The lingua franca of this machine-to-machine

discourse will be the Extensible Markup Language, or XML, which “tags” digital content in standardized formats. Once computers have been linked in this way, it will be possible for consumers to access a more seamless World Wide Web from many different devices, while businesses will be able to connect their operations quickly and cheaply and thereby to cut their transaction costs and improve their ability to serve customers.

WEB SERVICES AND THE CLIENT-SERVER MODEL (EXHIBIT 2)

Although some aspects of the technology (such as security) are still maturing, Web services implement the client-server model over the World Wide Web. On the client side, for example, they manage the different screen shapes and sizes and the different connection speeds of desktops, mobile phones, and PDAs. On the server side, the different programming languages and middleware technologies at work

behind each application or data source become transparent to programmers, thus making it a lot easier to develop applications.

THE UNIVERSAL USER PROFILE (EXHIBIT 3)

To give users easy access to any number of Web sites and services—through a variety of devices and in a variety of roles (for example, that of a customer or an employee)—passwords and other user information will be stored in the form of Universal User Profiles.

Each of these UUPs probably will be stored with a service provider (such as Microsoft.NET Passport or AOL Magic Carpet). Once users have registered with a provider, they would own this “sticky” information, at least nominally, and other Web sites and services would be allowed to interact with them. To succeed, service providers would have to win the trust of consumers and on-line partners—no easy task.

EXHIBIT 3

A virtual ID, the Universal User Profile, provides for...

- Centralized management of user-specific data, preferences
- Storage on World Wide Web; universal accessibility; independence from Web sites, devices, service providers
- Usage by individuals, service providers, machines
- "Stickiness"; ownership – at least nominal – by user

... and stores personal data and preferences, such as

UNIVERSAL USER PROFILE

Name	Jane Doe
Address	123 Pleasanr Street Springfield, USA 55555
Credit Card	xxxx-xxxx-xxxx-xxxx
Exp. Date	12/03
User IDs	jane87, janedoe
Passwords
Services	Email: jane5@mailweb.com
Calendar	Digital photod: Kodak
Devices	www.calendaronweb.com PDA, cell phone

Name and address for identification, shipping of on-line purchases, local weather forecasts

Credit cards for making purchases, booking travel, engaging financial services

User IDs and passwords for authentication, authorization at various Web sites

Preferences for on-line calendar, digital photo printing, music downloads

Number and type of user's devices, such as cell phone or personal digital assistant

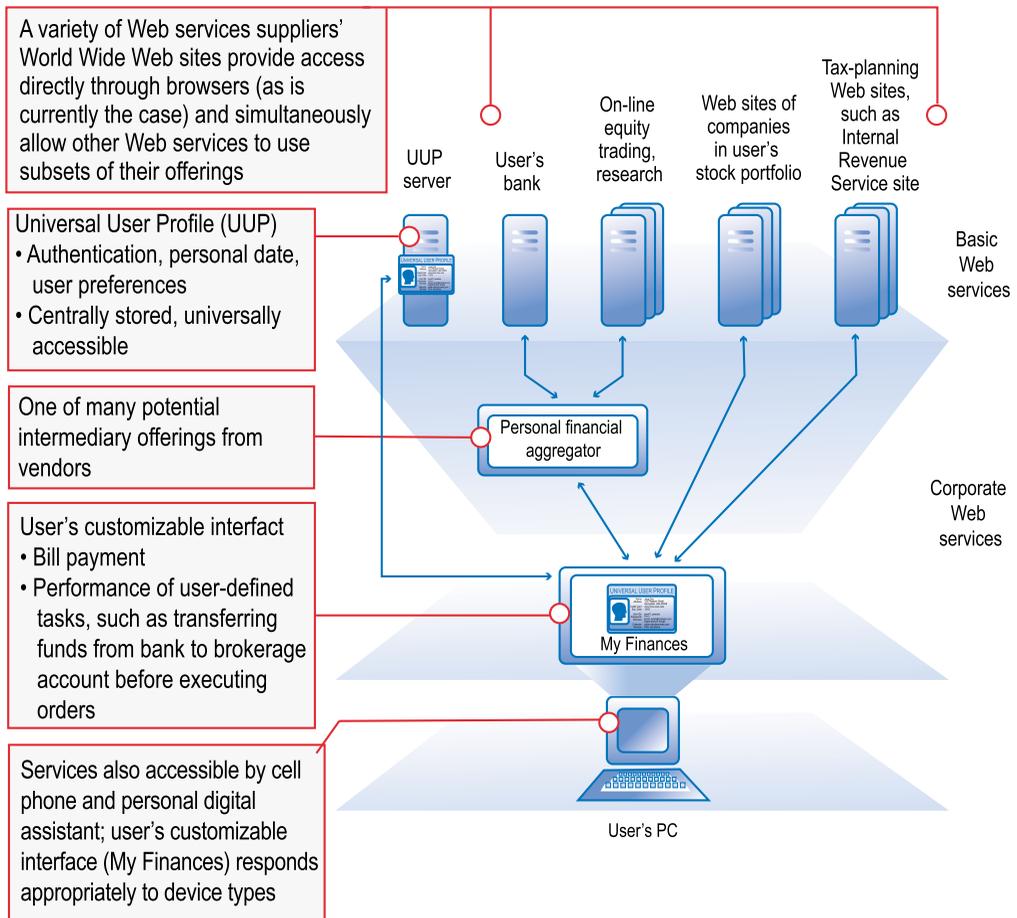
THE USER EXPERIENCE (EXHIBIT 4)

Web services not only promise consumers a more consistent and uniform experience but also allow them to integrate and personalize data and services from diverse sources. Today, for example, a consumer who wants to research a stock, trade on-line, and plan the tax strategy for that transaction might have to visit several World Wide Web sites. Web services, by contrast, would bring best-of-class offerings direct to the user's desktop. New intermediaries may integrate and deliver these services – some free, some fee based – from a number of different vendors.

WEB SERVICES CUT SYSTEMS INTEGRATION COSTS (EXHIBIT 5)

Web services will cut the amount of time and money needed for systems integration, the single biggest IT expense of most companies. Savings of up to 20 percent are possible, mainly through reductions in the cost of developing interfaces among systems. Systems integration firms may not need to worry, however, since an increase in the volume of integration projects could offset the reduction in unit costs.

EXHIBIT 4



WEB SERVICES CHANGE BUSINESS AND CUSTOMER RELATIONSHIPS (EXHIBIT 6)

When and if Web services reach their full potential, they will change the way many companies do business. Reduced transaction costs will encourage the outsourcing of noncore functions through electronic links with key partners. The likely result: increased fragmentation of value chains and industries as well as more narrowly focused companies.

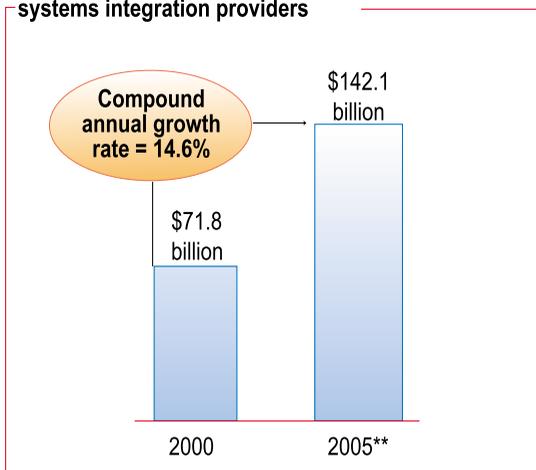
For on-line business-to-consumer companies, customer relationships will be affected dramatically. E-tailers, e-mail services, financial-service providers, and other kinds of B2C companies stand to lose out to Universal User Profile providers, which could control access to customers. As consumers dealt directly with their UUP providers, companies without strong brand names or reputations could be relegated to the virtual backwaters.

EXHIBIT 5

Projected Impact of Web services on systems integration costs

Category	Share of cost	Fixed cost	Impact of Web services
Systems interfacing • Legacy • Packaged	40-50%	Yes	High* 
Customization	15-20%	Yes	Low
Configuration	15-20%	Yes	Low
License	15-20%	No	Low

Projected worldwide revenues for systems integration providers



*Assuming 50% reduction in costs when Web services technology matures.

** Forecast.

Source: International Data Corporation; McKinsey analysis

EXHIBIT 6

Business interactions

- Interaction costs fall and operations become more flexible
- Functions and activities within organizations and across supply chains are unbundled
- Applications such as order fulfillment and inventory control are now more likely to be outsourced; remaining IT staff focuses on partner relationships and development of new on-line skills within company

Customer relationships

- Incumbent on-line business-to-consumer companies risk losing direct links to customers
- Intermediaries direct users to selected service providers
- Enhanced service offerings and reputation become even more important for customer retention

EXHIBIT 7

Questions for all companies

- How can you use Web services to reduce information technology costs and time to delivery?
- What new revenue-generating services can your company offer via the World Wide Web?
- What are the new ways to interact with your trading partners? What threats and opportunities will emerge?
- Do you have the organizational and IT capabilities to operate in the Web services world?
- How will each of the competing Web services architectures (for example, Microsoft.NET vs. SunONE) compare in terms of costs, capabilities, and your company's IT environment (Windows, Unix, and so forth)?

WEB SERVICES BRING UP THORNY QUESTIONS FOR BUSINESSES (EXHIBIT 7)

Web services and the associated development tools are in their infancy and still show more promise than results. Some key standards – most crucially, those involving the rollout of Universal User Profiles – remain unresolved. UUP providers must ensure the privacy and security of the users’ credit card and other sensitive information, for example, while allowing access to all those (and only those) businesses that provide requested services. In addition, businesses interacting with each other must be able to specify the appropriate level of service promised to each user.

If past patterns hold, the future of the technology – boom or bust – will become apparent over the next 12 to 18 months. Meanwhile, companies would do well to think about a number of questions.

BEHIND THE ABBREVIATIONS AND ACRONYMS (EXHIBIT 8)

Web services have their own rules and assumptions, conveyed through a sometimes bewildering terminology. Here, in short form, is the information you need to hold up your end of the Web services conversation. **E**

EXHIBIT 8

Definition	Status
<p>Shareable services</p> <p>UUP – Universal User Profile – a set of user-specific data and preferences stored on the World Wide Web and used by Web sites to perform tasks such as authentication, personalization.</p>	Standards not yet defined
<p>Services infrastructure</p> <p>UDDI – Universal Description, Discovery, and Integration – a set of specifications for creating XML-based directories of Web services offerings. Users and applications may discover and locate Web services through these directories much as callers consult Yellow Pages for telephone numbers.</p>	Standards widely accepted
<p>Message transport</p> <p>WSDL – Web Services Description Language – a common framework for describing tasks performed by a Web service. For example, suppliers can discover what kind of information is offered by a company’s inventory system – whether it indicates only when inventory approaches zero or also indicates possible due</p> <p>SOAP – Simple Object Access Protocol – a set of rules that facilitate XML exchange between applications. Along with WSDL, SOAP performs message transport functions.</p>	Standards widely accepted
<p>XML – Extensible Markup Language – a universal language for defining data schemes. It makes it easier to exchange data among applications and to validate and interpret data.</p>	Standards widely accepted

Reprinted with permission from *The McKinsey Quarterly*