

Building a Connected Enterprise

An introduction to web services technologies for business

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Introduction

The Internet promised to streamline business-to-business transactions and communication as never before. But because of the complexity, the lack of standards and the large numbers of disparate business software applications crisscrossing the Web - that promise has been a long time coming.

Web services (a poorly conceived name for the technology) are different from Web sites that help to connect people with technology and information. Web services are a set of technologies designed to automate connections across applications and databases. They are built upon a set of standards and protocols that all major technology vendors have embraced.

The benefit of this is that they replace "big bang" approaches to technology with targeted incrementalism. The business proposition in this scenario is much more compelling: Invest modest sums of money with relatively short lead-times (often six to twelve months) and generate tangible business benefits, particularly in the form of operating savings. In these challenging economic times, that's a powerful proposition.

A Definition of Web Services

In short, Web Services are software resources that can be shared, combined, used and re-used within and between organisations.

As a result of Web Services, a host of new business applications are being created that enable data and tools from diverse applications to be aggregated together in a way that is operating system and programming-language agnostic.

A New Business Model

The business significance of this new information era is that companies will be able to create direct connections between customers, suppliers, partners and employees using innovative, cost-effective processes and up-to-date technology. An organisation with such direct connections is a Connected Business. In our research, getting connected is the fundamental driver behind substantial business change for over 90% of UK organisations.

Web Services will go a long way to enabling the Connected Business. This is why business leaders need to understand how to make the most of their businesses using this technology. The Connected Businesses they will build will share a number of common features:

- Deep and wide process automation, including invisible joins to outsourced processes; today, automating processes is expensive, particularly in terms of integration – in a Web Services context, it will be simpler to provide far-reaching process automation.
- Business systems will pivot on the roles individuals play rather than the business departments they work for – today far too many business problems occur because information is stuck in the software system used by the department that creates the information. Getting access to information, inside and outside departments, as well as inside and outside enterprises will be simpler in a Web Services context.
- New business models will emerge as processes get spliced and intertwined across departmental and enterprise boundaries.

Based upon this information, below is an outline of what a pre-Web Services and post-Web Services organisation may look like.

Pre-Web Services organisation	Web Services organisation
Basic internet presence: website is really an on-line brochure; some e-commerce sales	Sophisticated internet presence: business processes are exposed on the Net; processes can cross enterprise boundaries
Manual or proprietary connections between systems and processes	All processes are electronically represented with standards-based interfaces
Inflexible: creating new processes or systems are expensive and time-consuming	Adaptable: since nothing is “hard-wired” it is relatively simple and cheap to reconfigure processes, systems, even a complete organisation to respond to market changes
Difficult to connect/integrate with new customers	As Web Services can “discover” each other, new customers can be obtained by the systems themselves, plus it is relatively simple to connect new customers into the organisation’s systems and processes
Silo-ed data restricts use of information across the organisation; typically data from one department is stuck inside that department – companies need expensive data warehouses to get around these problems	Information moves freely across departmental, and even enterprise, boundaries and is delivered via portals using roles-based information models

Table 1: Process characteristics

Primary research was conducted in around 700 organisations in the UK to assess their readiness for a truly connected business environment, and their appetite for the change required to collaborate effectively.

The most noteworthy statistic from the research is that as much as 93% of the respondents believe that their company’s business model needs to change, a process that many have already embarked on. In exploring why they believe they need to change a common thread was discovered which links most change scenarios: companies are trying to re-engineer themselves to create a direct connection between their customers, employees, suppliers, partners and stakeholders, using modern technologies and innovative business processes.

Yet most do not have an overarching framework by which to carry out the change activity. Using the research, it is possible to create a framework from four key perspectives that can be used by any business:

Proposition What does a company do? What makes it distinct, relevant and compelling? What are its core competencies and what is its ‘Differentiation DNA’?

Process How does it work?

People Who does what?

Platform What sort of IT systems and technology environment are needed to support the ongoing development of proposition, process and people?

Building a Connected Enterprise

The effective adoption of Net-based technology has had a major impact on each of these four components. It is clear through both quantitative and qualitative assessments that UK organisations fall into two camps; those that are connecting and those that are not.

The Connected Proposition

The value-add that a connected company brings into play is derived by exploiting the connections it can make with its partners, customers, suppliers and employees. A company that connects with its stakeholders usually finds that its fundamental business proposition is quite different from what it was when it was no connected.

A vast majority (93%) of companies acknowledge the need to change their basic business models, with 23% recognising that this change needs to be fundamental. The reassuring factor for UK business is that 73% of organisations have already started to make these changes.

Connected Processes

Organisations have gone some way towards removing internal barriers to service provision. Customer-focused companies such as First Direct have recognised that processes should be designed to make it easy and enjoyable for the customer to interact with them, and should not be designed to provide lines of demarcation for internal roles and responsibilities.

However, there still needs to be a massive leap of faith before organisations lower the barriers at the edge of their organisations. Companies have been very willing to increase the transparency of their customer-facing processes, but still have some way to go in opening up their back-office processes and those of their supply chain. One notable exception to this is a leading automotive distribution company which sets its suppliers stringent performance targets but uses these targets not to police suppliers, but to collaborate with them in achieving the high standards expected by their customers.

Another example is EasyGroup, which provides rental cars through EasyCars.com which, in effect, outsources part of its processes to the customer. If the customers do their bit, and pay up in advance, then Easy's proposition is that it will exploit its partnerships and technologies to offer a low-cost solution.

The research revealed that the most important challenge facing organisations today is controlling costs. When asked to identify the potential solutions to this challenge, only 16% viewed downsizing as an important lever for reducing costs, and 7% thought that reducing employee packages and benefits would be important.

When asked to consider what solutions were available to increase profitability either by reducing costs or by increasing revenue, the two most popular answers were: 'by enhancing the service to customers' and 'by interconnecting IT systems'.

Within these findings there was also a clear trend towards:

- Recruiting higher skilled / specialist staff
- Outsourcing
- Automating processes

It is clear that these three approaches need to be implemented hand in hand, if organisations are to achieve

cost savings without compromising the quality of their customer service. Companies are keen to outsource non-core activities, to automate services of low-perceived value and to focus their investment on areas where highly skilled people can operate effectively.

Connected People

When asked to rank the barriers to change, the two most popular responses were lack of funds and company culture. The issue of company culture was raised by many organisations in both qualitative and quantitative research as significantly affecting their future. Yet, in contrast, when explicitly asked about management, staff and shareholders' attitudes, these were not seen as important. The Internet has removed the technical excuses for non-collaboration, so people are looking to human aspects to explain the slow rate of change.

Trust, accountability, vision, innovation and balance were cited as the most important descriptors of strong organisational cultures. Yet, as with unconnected processes, so too unconnected cultures do not stretch beyond organisational boundaries. Getting people to collaborate and share is one of the key challenges that the survey respondents expect to tackle.

While many feel that the more they collaborate, the more they will release a culture of collaboration in their organisation, this was not borne out by an example of a leading aerospace company. As is typical in the defence sector, most projects involve collaboration with multiple partners across international boundaries. Despite decades of such project collaboration experience, the company still feels that its people do not share a collaborative environment.

Connected Platform

Most unconnected companies do not want to be unconnected but are constrained by business systems that do not connect with systems in their customers, suppliers and partner organisations. The Internet in general, but Web services in particular, is removing many of the barriers to collaboration, but still the technology is in early adoption. Attitudes towards new technologies are ambiguous, according to the research. Respondents agree that new technology improves organisational efficiency, and that it gives a competitive edge. However, the research shows a clear split between those that believe that technology causes more problems than it solves and those that don't. The same applies to respondents' confidence that new technology will deliver the predicted ROI.

The most interesting finding in terms of attitudes towards new technology lies in the fact that 73% of respondents will only use tried and tested products and 51% will only purchase from leading name suppliers. At the same time 65% of respondents are prepared to try new leading edge products. This implies a subtle distinction in the minds of respondents between leading edge and bleeding edge technologies. Yes, companies are prepared to try new products, but only if they are tried and tested.

Strategy for change

The key areas that board members need to consider in the months and years ahead surround the four connected Ps discussed above. The biggest problem is that the 4 Ps cannot be dealt with sequentially. Each one impacts the other. In an environment of complete change, such as we are being faced with right now, all the Ps have to be tackled together.

I believe that every business needs to assign a senior board member (a Chief Connectedness Officer?!) with responsibility for envisioning and planning the Connected Enterprise. According to the research, there is no single existing job function that naturally fits this job. Instead, companies have picked individuals who combine

a strong strategic sense with an understanding of the opportunities and limitations of technology.

This individual's task list:

- Create a gap analysis identifying where the “unconnected” company is today and where the “connected” version of the company needs to be
- Consult with customers, employees, suppliers, shareholders and partners on the implications of the 4 Connected Ps.
- Launch change initiatives related to the Connected Enterprise that demonstrate early benefits to the company and which will provide lessons on moving forward
- Release employees into collaborative opportunities so that they can practice being connected

Creating a Connected Business with Web Services

The following provides an outline of the steps that an organisation will take in order to build a connected business using Web Services.

1. Select a business resource that can be supplied as a service

The trick in getting started with Web Services is working out which business assets are best recreated as a service. What may seem like a good idea at first glance may actually have problems down the line. For example, on-line mortgage applications could make a good Web Service. However, if the business application that actually processes mortgage applications is a proprietary one with poor opportunities for building connections into it, then having a good Web Service that makes access to mortgage applications easy may only compound the difficulties your customers have in getting a result from the Web Service.

2. Pick a platform for your Web Service

The two main choices you have are .NET from Microsoft and J2EE which is available from a number of sources, including IBM, BEA Systems, Oracle, Novell and Sun Microsystems. .NET has been written using Web Services from the ground up, whereas J2EE has retrofitted APIs to enable XML communications in the Java environment. But the choice between the platforms is more often than not made on whether the system is server-centric (J2EE is the preferred choice here) or client-centric (where .NET wins because of the Windows connection). Those who are concerned about Microsoft's monopolistic tendencies take comfort in the fact that J2EE has a number of competing vendors who are keen on making products interoperable and standards-based.

3. Choose a development environment and an application server

If you choose .NET, then you will probably use Visual Studio.Net from Microsoft as your development environment, though you may choose to use an open source product or Borland's Delphi. In the J2EE world, the choices are large and include WebSphere tools from IBM, Forte from Sun Microsystems, Extend from Novell, WebLogic Workshop from BEA Systems, and so on. The Web Service will need to be delivered on an application server. Again the Microsoft environment will be dominated by the new application server that Microsoft has put into Windows Server 2003. But the J2EE user will need to choose an application server, most probably from the company that provides the development environment.

4. Expose your web service for discovery

Web Services need to be able to describe themselves to other software resources, using a standard such as Web Services Description Language, or WSDL. But the real excitement of Web Services is tied to dynamic discovery, which has two different dimensions. One, a number of different services can be tied together to a single URL - these services can change over time but clients only need to know the one URL. Two, services can be listed in directories, that work like intelligent versions of Yellow Pages, using UDDI (Universal Description, Discovery and Integration) so that one software system can discover a service it needs.

5. Secure your Web Service

Scare-mongers pick on security as a gaping hole in the Web Services standards. For once, they are probably correct, though much work is taking place in developing standards that make Web Services secure. One significant issue in security is authentication – knowing that the sender of a Web Service is who they claim to be and that their message has not been tampered with. A number of security specialists, such as RSA Security, WestBridge and Entrust, offer products that focus on security concerns specific to Web Services, such as the lack of firewall protection and the exposure of multiple applications interfaces to the outside world.

6. Orchestrate your Web Service

Orchestration sounds like getting a bunch of musical instruments to work together to create something complex but unified like a symphony. That is exactly the analogy that the Web Services standards people are seeking – defining and executing the logic and rules that assemble disparate Web Services into a multi-step business process. A lot of standards are being developed in the area of business process orchestration, particularly by the Web Services stalwarts such as Microsoft, IBM and BEA, but a number of process and workflow vendors are also getting involved.

7. Connect your Web Service to an application

Web Services are not expected to replace the vast majority of business applications that already exist. However, if the applications cannot interface with Web Services, then companies will have to make a decision whether they want to continue using closed, proprietary software systems. Increasingly, business applications vendors such as SAP, Microsoft Business Solutions, Epicor and PeopleSoft (now owned by Oracle) are using Web Services standards and protocols to open up their own applications, plus we will see many new applications that are architected on Web Services platforms from the ground up.

Next Steps

If you get this far, your competitors will probably be way behind you. But you will be sucked into looking at many more ways in which you can use Web Services. At that point, you will probably experience a skills shortage in your organisation as you seek more and more developers and business analysts who can together orchestrate and automate business processes. You will also find that your early Web Services have been developed on multiple Web Services platforms, environments and toolsets. Pick on a single Java company to work with and figure out how you can deal with Microsoft, because many of your users will probably be using the next version of Office as their entry point into the world of Web Services. And always ask the question of your developers, “Can’t we use Web Services instead?”

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