

# Web Services in Manufacturing— the Next ERP or a Passing Fad?

**By Nigel Hughes**

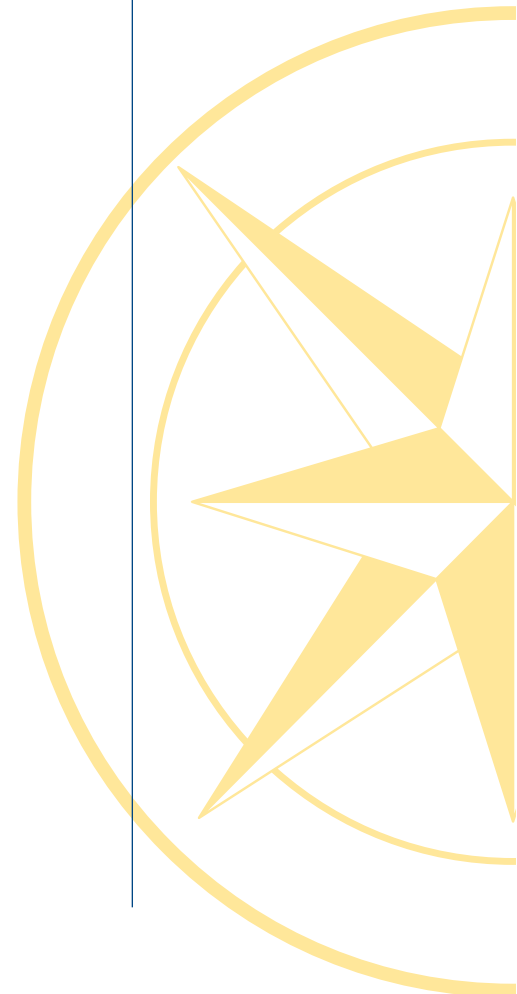
## **Introduction**

The concept of “web services” is creating much excitement these days. But what precisely does it mean for manufacturers? Is it just another over-hyped IT fad? Or do web services present a major opportunity to link and synchronize supply chain activities?

Clearly, web services present an appealing vision of the future, linking diverse and disparate systems on multiple platforms,

all seamlessly communicating together in an application heaven. But will this application heaven become a reality, and how exactly will it impact manufacturing?

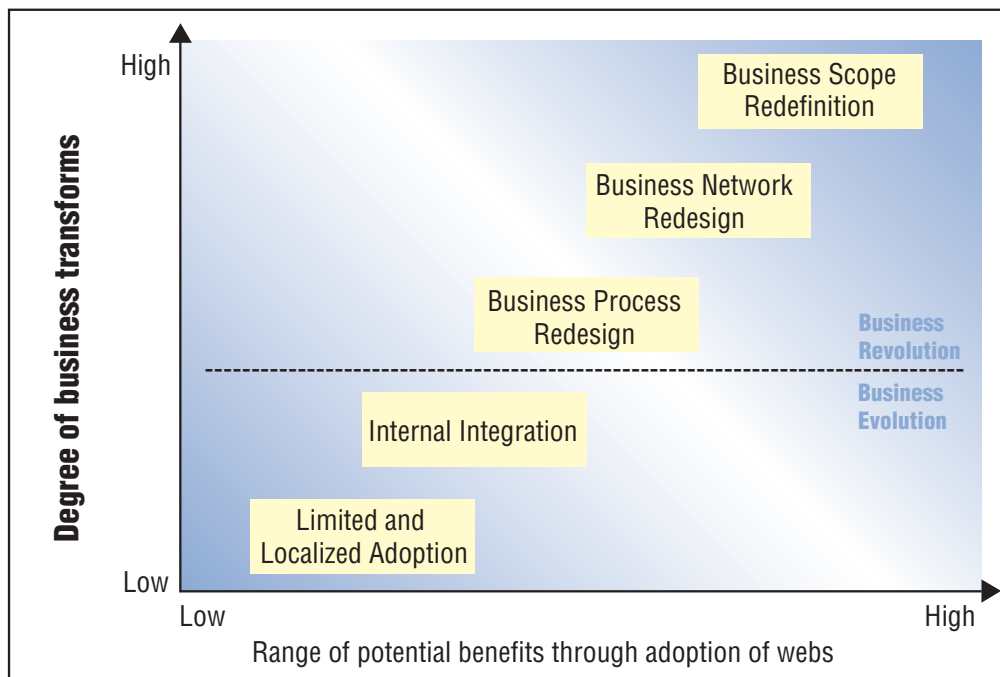
This Compass white paper examines the characteristics of web services, the potential benefits, the current state of maturity of the technology, and the issues and challenges related to implementing web services.



## Benefits of Web Services

The implied benefits of web services are much the same as those touted for ERP solutions – whose premise was the replacement of outdated legacy systems running on mainframes with a single application package uniting internal departments. However, the reality of many ERP installations has been long implementation times, considerable cost in customization and training, and an often-questioned return on investment. Web services promise the same inter- and intra-enterprise process and information integration, but without the need to replace existing and often valuable legacy applications.

ERP systems helped manufacturing organizations generate a model of global consistency internally. The challenge now is to differentiate their operations from that of the competition. Manufacturers need to use both defensive and offensive means to protect existing business, change the rules of the game, and create new opportunities. Figure 1 illustrates five progressive levels of how web services could support reconfiguration of business operations and create opportunities for advantage.



**Fig 1**

*Level 1* – limited and localized exploitation is representative of current web services programs. Focus is on delivering functionality to a limited set of applications, usually as pilot or as test projects that build understanding and skills within the organization.

*Level 2* – is the internal integration of an organization’s operations and involves linking business processes across geographically dispersed locations. Improving information flow and reducing transaction costs are key; business processes, however, are not reengineered.

*Level 3* – business process redesign explores new ways of operating and improving the efficiency of the whole supply chain. Decisions made on whether to retain activity in-house or source it from an external party.

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Level 4 – business network design establishes collaborative commerce, new links with suppliers, customers, government bodies, and other external parties.

Level 5 – business scope redefinition is innovation and development of new types of business opportunities. Might include selling capabilities built up in levels 1 to 4, and potentially becoming the supplier of sourced business solutions.

A hypothetical example of how an organization could use web services:

*A web service could be created to reduce the cost of manually fielding requests for order status information from disparate systems.*

*The address of the web service would be published in a UDDI directory. The required inputs to the web service – such as the customer's account number and password and outputs such as payment confirmation – would be described using WSDL.*

*The web service would then handle the requests from customers, internal sales staff, or external suppliers by automatically collating the relevant data from internal applications, also exposed as web services, and through SOAP feed back the required information.*

*The service could be extended to link to other suppliers' information and be a single point of contact for a customer to investigate the status of a set of orders from various suppliers. The idea is that the services are extendable, platform-independent, and can be organization-independent. Ultimately, the service itself could be used as a solution for many different organizations.*

Manufacturers are initially focusing on developing internal web services for greater transparency of information across the enterprise, for rapid deployment of new products, and easier reconfiguration of the manufacturing process. The next stage will be exposure of internal functions to partners, especially where manual interfaces exist. With more open relationships and flexible reconfiguration possible, business process outsourcing will become a prevalent activity. But this increased flexibility also carries a significant risk, as outsourcing is not a panacea for business process problems.

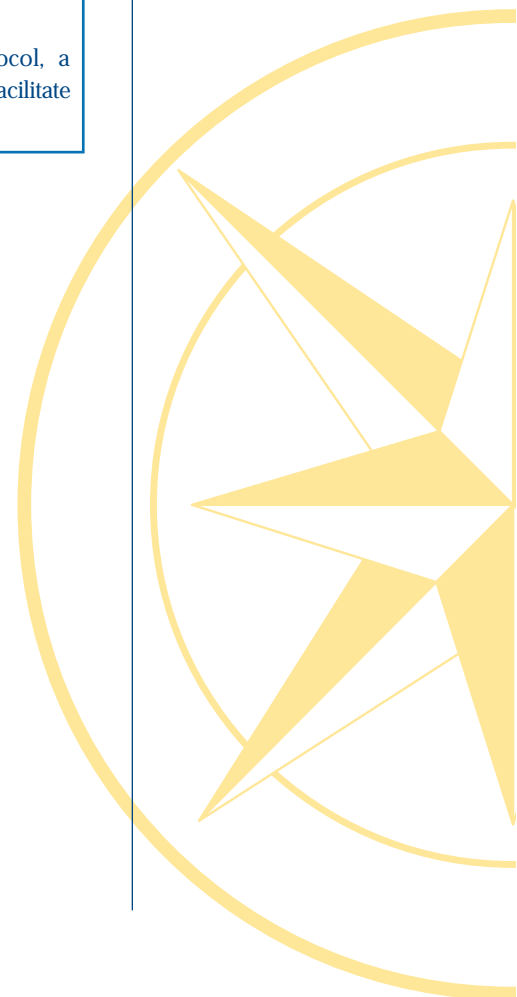
Web services: what the acronyms mean

**UDDI:** Universal Description, Discovery and Integration is the web services equivalent of Yellow Pages, a set of specifications for creating web services directories. UDDI repositories are accessed to see what web services are available.

**WSDL:** Web Services Description Language is an XML formatted language for describing tasks performed and capability of a web service such as what information is offered by an inventory system.

**XML:** Extensible Mark-up Language enables the definition, transmission, validation, and interpretation of structured data between applications and between organizations. The key features of XML are that it is extensible and platform-independent.

**SOAP:** Simple Object Access Protocol, a platform independent set of rules that facilitate XML exchange between applications.



## Maturity of Web Services

Organizations are already implementing web services initiatives; Compass estimates that between 50 percent and 60 percent of manufacturing firms have one or more web services projects underway. But web services are clearly not a mature technology. IBM and Microsoft have jointly developed a number of standards (UDDI, WSDL and SOAP – see box page 4), but a split has recently developed between these two ‘collaborating’ partners on next steps. The spat should be brief with each needing the other to ensure continuing momentum.

Security standards dominate concerns related to deploying web services outside of a company’s firewalls. The lack of security standards is the most commonly cited reason for lack of adoption of web services, the primary security concerns being confidentiality and integrity of information. In April 2002, IBM, Microsoft, and VeriSign published a new web services security specification, WS-Security. The specification aims to help organizations build secure web services and applications and, through some SOAP extensions, to implement integrity and confidentiality.

This is not to say that web service developments are inherently insecure, simply that no standard currently exists for implementing secure services. Absent such a standard, we see tailored solutions using PKI (to facilitate the secure exchange of information over a public network) and SSL (to manage the security of a message transmission on the internet).

The lack of security standards partly explains why most current developments are internal to the organization. Internal development is also a relatively low risk and cost effective way to build up required skills in the organization. Most initiatives are experimenting with web services to link internal systems such as warehouse management with customer order systems.

Two other key challenges cited with respect to web services are:

- Change management and problem resolution. Some analysts argue that the implementation of web services will create complex inter-relationships and dependencies between applications,

and make it more difficult to identify problems, assess their impact, and devise a solution. However, the likelihood of this scenario depends on the quality of the designs and standards implemented. In theory, since each web service can act as a single integration point for multiple external applications, the identification of a problem should not be an issue.

- The lack of available IT skills. This will be a short-term issue and it presents early adopters an opportunity to steal a lead.

Other criticisms of web services include the potential to consume network bandwidth, questionable reliability, and poor message tracking. However, the only fundamental challenge to the implementation of web services in manufacturing is that of value to the business – and that challenge characterizes *any* IT investment. Investment in web services has to be business-driven and, more crucially, business-owned. The IT department may have the job of implementation, but the business needs to take responsibility for deriving value from any web services investment, with web services investment decisions made like any other investment decision – on the basis of value.

In assessing if web services will deliver business value, apply the following three questions:

- Will operational performance improve over time relative to itself, the competition, or best practice?
- Will the improvement be due to the web services functionality?
- Will it be at a cost commensurate with that improvement?

If all three will not hold true then rethink the investment decision. If investment in web services is warranted, proceed with some caution. Remember – if you see the bandwagon you’ve probably missed it.

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