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Editorial

# Web services and process management: a union of convenience or a new area of research?

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## Abstract

Two recent trends are reshaping the research landscape in business process management. One such trend is the adoption of process-driven application integration by major e-business middleware vendors, and the other is the advancement of web services as a universal computing platform. In this paper, we investigate the impact of web services on business process technologies and present our viewpoints on research directions in business process management in the presence of web services. Finally, we introduce the papers published in this Special Issue on Web Service and Process Management.
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## 1. Introduction

Web services have been hailed as the new industrial standard for distributed computing and are considered, for the first time, a real opportunity to achieve universal interoperability. However, the value of web services goes far beyond merely to enable universal interoperability. In this paper, we investigate the impact of web services on business process technologies and present our viewpoints on research directions in business process management in the presence of web services.

We first recognize the recent surge of research in web services and describe the main achievements in this area in Section 2. We then discuss in Section 3 the renewal of interests in process management research

induced by its unique role in the development of web services. In Section 4, we examine the unique relationship between web services and business process management and discuss the research directions in this area. Finally, Section 5 introduces the papers published in this special issue.

## 2. The surge of research in web services

Recently, there has been a surge of web services research. This dramatic increase of research interests in web services is clearly indicated by the increasing number of publications during the last few years. Table 1 summarizes the results of search on the phrase "web services" that appears in the abstracts of the journal and conference articles indexed in the three major reference sources—the IEEE Xplore, the ACM Digital Library, and the INSPEC index database. As

Table 1
Number of "web services" articles in three major digital libraries

| Year | IEEE Xplore | ACM DL | INSPEC | Total |
|------|-------------|--------|--------|-------|
| 1995 | 2 | 5 | 3 | 10 |
| 1996 | 5 | 4 | 7 | 16 |
| 1997 | 6 | 6 | 15 | 27 |
| 1998 | 6 | 12 | 17 | 35 |
| 1999 | 15 | 14 | 17 | 36 |
| 2000 | 15 | 61 | 25 | 101 |
| 2001 | 54 | 97 | 56 | 207 |
| 2002 | 149 | 161 | 207 | 517 |

shown, there appears to be an exponential growth of articles according to the three reference sources, and this trend becomes particularly apparent from 2000 to 2002.[1] We choose these three reference sources because they are widely recognized as the best sources for literature in information technology. Although the articles quoted in INSPEC do overlap somewhat with those in IEEE Xplore and ACM Digital Library, the former include journals and conferences focusing more on applications. There is little overlap between the articles in IEEE Xplore and ACM Digital Library.

A web service is a "software application identified by a URI, whose interfaces and bindings are capable of being defined, described and discovered by XML artifacts, and which supports direct interactions with other software applications using XML based messages via internet-based protocols" [21]. According to a recent survey by Delphi Group, 14% of organizational respondents had web services initiatives underway to expose APIs, services and/or content to their business partners, 8% had initiatives to share software with business partners as web services, and 33% were actively engaged in using web services to support the integration of internal applications [2].

Web services represent the latest approach to address the integration of enterprise applications, a core challenge of corporate information technology [10]. As the business world moves towards globalization, firms are expanding their territories into new markets abroad to create growth. Supply chains are being established with partners spanning different geographical regions to increase sourcing efficiency.

To reap the full benefit of globalization, a firm oftentimes needs to standardize or reengineer its business processes, which calls for the "integration" of various Information Systems built on different platforms at different times. Further, the globalization of business requires a distributed computing environment that allows companies to take advantage of the computing power at various operational units regardless of the geographical location. One popular answer to the quest for integration in the 1990s was to implement a company-wide enterprise resource planning (ERP) system. It becomes well known now that the ERP system implementation entails tremendous human and financial resources at unacceptably high risk of failure.

Today, the web services technology helps streamline business processes by creating an open, distributed system environment and promises to reduce the cost of business process management because it enables dynamic process integration without "hardwiring" the code [6]. As a result, firms are no longer locked into the products from a single company, thus enhancing the flexibility of the Information Systems.

Web services grew out of numerous past efforts directed at the collaboration and interaction among heterogeneous systems such as RMI (Remote Method Invocation) by Sun, CORBA (Common Object Request Broker Architecture) by OMG, DCOM (Distributed Common Object Model) by Microsoft. As a result, web services have gained industry-wide acceptance as the universal standard for enterprise integration [8].

Web services consist of a set of universally agreed specifications including XML (eXtensible Markup Language), SOAP (Simple Object Access Protocol), WSDL (Web Services Description Language) and UDDI (Universal Description, Discovery and Integration) [3,20]. The self-describing nature of XML and WSDL allows disparate software components to understand each other. The messaging protocol SOAP supports the interaction between software components via RPC-like communication. UDDI represents a set of protocols for the description, registration, lookup and integration of software components.

In sum, web services provide a new standard for enterprises to build a cost-effective application integration infrastructure and create a universal computing environment where all computer programs can communicate with one another from anywhere at

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[1] We did not include results of 2003 since not all articles of 2003 have been indexed yet when the search was done at the start of 2004.