

Chapter IX

Incorporating Web Services into E-Business Systems: An SME Perspective

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ABSTRACT

There are a multitude of benefits and challenges that can be derived from the convergence of two major current technologies: (a) Web services (WS)—technology that allows application development and integration using the service-oriented computing paradigm; and (b) e-business systems—using the Internet as the basis for interacting with customers, suppliers, and other business partners. This combination called WS-based e-business systems promises to provide a dynamic e-business environment. We investigate the existing deployment barriers for such an environment from the perspectives of the three WS stakeholders, namely the service providers, service consumers, and the WS standards organizations, and present a challenges framework that organizes and interrelate these barriers in an easily understandable manner to help study further the factors that impact the deployment and use of WS within e-business. Using this framework, we analyze WS incorporation challenges for small- and medium-sized enterprises (SMEs) since they are a vital engine driving the world economy, and are realizing significant benefits from adoption and implementation of Internet-based business solutions. WS-based e-business system applications promise to do even more for them.

INTRODUCTION

Electronic business or e-business—the process of doing business electronically—is more than elec-

tronic commerce. While e-commerce describes the world of business-to-consumer commercial transactions, the term e-business usually refers to a broader scope of electronically enabled and

integrated front-end and back-end business operations, within business-to-business (B2B), business-to-consumer (B2C), and business-to-government (B2G) models. E-business is a large, fast growing industry, and organizations of all sizes are looking for fast, effective ways to implement e-business. E-business applications have significantly matured in functionality and reliability over the years. Currently B2B e-business systems have gained in popularity with many organizations of different sizes (Gonsalves, 2002).

The service-oriented computing paradigm (Bichier & Lin, 2006), which also is gaining in popularity as a viable and cost-effective application software development option for organizations, is designed to utilize services as the basic constructs to support the development of rapid, low-cost and easy composition of distributed applications. Web services (WS), based on service-oriented computing, enables different software components to be integrated within an application without having to develop these components from scratch and without the hassle of custom coding (Chen, 2005; Stal, 2002).

The idea behind the WS technology is that the service provider defines a service description of the service and publishes it to a client (or service discovery agency) through which a service description is published and made discoverable. The service client (requestor or consumer) discovers a service and retrieves the service description directly from the service (through meta-data exchange) or from a registry or repository; it uses the service description to bind with the service provider and to invoke the service or to interact with the service. Service provider and service client roles are logical constructs and a service may exhibit characteristics of both.

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Internet as the basis for interacting with customers, suppliers, and other business partners. This combination called *WS-based e-business systems* promises to provide a dynamic e-business environment.

WS-based e-business systems make it possible to provide the ability to deliver a standards-based, interoperable infrastructure for e-business. Interoperability in an e-business environment allows information to be presented in a consistent manner between business systems, regardless of technology, application, or platform. It thus provides organizations with the ability to transfer and use information across multiple technologies and systems by creating commonality in the way that business systems share information and processes across organizational boundaries. Additionally, WS-based e-business systems make it possible to enable dynamic e-business by providing a standard mechanism for supporting complete automation through all aspects of the end-to-end business process that include finding suitable business partners, getting information about their products and service offerings, negotiating and establishing business terms and conditions, service level agreements (SLAs), payment options etc., to use those services, and invoking those services; all automatically.

WS technology application is resulting in significant changes in the way applications and supporting infrastructures are integrated (Schmidt, 2003). These changes have led to the design and development of service-oriented architecture (SOA) of application systems (Fowler, 2003). SOA is a way of logically designing an application system to either provide services to service-consumer applications or to other services distributed in a network, via published and discoverable interfaces. WS are becoming the basic building blocks out of which new applications are being created, and service composition is becoming the main focus of the application development process (Peltz, 2003). Service composition combines two or more WS following a certain composition pattern to achieve

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