Chapter 12

Business Process Integration within Lightweight Semantic-Enabled Enterprise Service-Oriented Architecture

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ABSTRACT

In the last decade, the Small and Medium Enterprises (SME) market has been enormously raised, and the major vendors are trying to adapt their software to suit it. One important factor to be taken into consideration in such context is the support of internal and external business process integration. Service-oriented systems are offering reasonable business process integration support. However, they lack semantic definition of their service interfaces. The research presented in this chapter tries to solve this issue by proposing a lightweight semantic-enabled enterprise service-oriented framework where services can be semantically grouped based on the domains to which they belong. The proposed framework is merging both business processes and service orientation concepts to provide an agile and flexible enterprise solution that utilizes reusability, better quality, and faster time-to-market factors. This chapter will illustrate this framework, its goals, and outcomes, together with demonstration of a business case built on top of it.

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INTRODUCTION

It is very rare nowadays to find any enterprise that is based merely on a single information system. Rather it has a bundle of systems specialized for different organizational sections within the business. As far as e-procurement is concerned, the most three significant systems are Supply Chain Management (SCM), Customer Relationship Management (CRM), and Enterprise Resource Planning (ERP) systems. One of the most problematic issues that these businesses have to overcome is the integration issue. In clearer words, how to handle the data exchange among heterogeneous dissimilar information systems? We will try to answer this question in this chapter by proposing our approach.

The remainder of this chapter is organized as follows: section two will provide background information about service orientation and business process management. A literature review and brief comparison between the proposed approach and existing frameworks and techniques is presented in section three. Section four presents the semantic-enabled SOA concept together with its main components interactions. Section five details a business case built on top of the proposed concept with highlights on its corresponding prototype. The main system’s outcomes are then listed in section six. Finally, we conclude the chapter and present a brief outlook and future directions.

BACKGROUND INFORMATION

Service-Oriented Architecture and its Limitations

This section illustrates the main service-orientation concept. The OASIS SOA Reference Model group defines SOA as follows: “SOA is a paradigm for organizing and utilizing distributed capabilities that may be under the control of different ownership domains. It provides a uniform means to offer, discover, interact with and use capabilities to produce desired effects consistent with measurable preconditions and expectations” (MacKenzie et al., 2006, p. 29). Several technologies are used to realize SOA but Web Services are accorded the most common ones. A Web Service as defined by the W3C consortium is “a software system designed to support interoperable machine to machine interaction over a network” (Booth et al., 2004). A Web Service in general can be implemented through the use of technologies and standards like the Simple Object Access Protocol (SOAP) and the Web Services Description Language (WSDL) using the Extensible Markup Language (XML) (Graham, 2006).

SOA concept has in general three main ingredients namely: service provider, service consumer and service registry. The service provider creates a Web Service and possibly publishes its interface and access information to the service registry. This latter (also known as service broker) is responsible for making the access information of both Web Service interface and implementation available to any potential service consumer, and categorizing the results in taxonomies. The Universal Description Discovery and Integration (UDDI) (Clement et al., 2004), defines a way to publish and discover information about Web Services. Finally, the service consumer or Web Service client locates entries in the registry using various find operations and then binds to the service provider in order to invoke one of its Web Services.

Based on SOA (see Figure 1), the vision of software integration has been carried out by realizing systems’ functionalities in the form of Web Services. From the perspective of application developers, this means composing new applications can rely on using existing services. There is no need for the developer to have knowledge about the underlying implementation of the used Web Services in order to assemble these services into a productive application.

The 2000s decade came to strengthen the concept of information system integration by be-
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