Chapter 7.12
Federated Enterprise Resource Planning Systems

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ABSTRACT

Enterprise resource planning (ERP) systems consist of many software components, which provide specific functionality. As ERP systems become more complex, the financial expenditures that are associated with the application of such systems dramatically increase. Furthermore, ERP system development of nowadays is product-oriented and coordinated by only one instance at any one time. Consequently, each product has a separate data model, which is the basis for the integration of various types of business applications. Based on this fact, the selection of the covered functional enterprise sectors as well as the implemented functions is controlled by the respective vendor, too. Thus, enhancements and modifications of the standard software product are incumbent upon the software vendors. A cross-vendor standardization of data models for ERP systems and the establishment of unified architectural model, however, would change this situation. The new idea is to develop a novel ERP system architecture, which facilitates an overall reusability of individual business components (BC) through a shared and non-monolithic architecture based on Web services. The presented approach uses Web services to wrap up ERP components that are provided within a distributed system, which appears as an ERP community and serves as a vendor-independent platform.

INTRODUCTION

Since the advent of Web services during the last years, software components can be easily distributed and remotely accessed. These components become small services, which provide clients with specific functions. These can be invoked using standardized protocols like simple object access protocol (SOAP) (Gudgin, Hadley, Mendelsohn, Moreau, & Nielsen, 2003). The goal is to create an infrastructure allowing business applications to seamlessly discover and use Web services. This will hopefully make the integration of different applications and the development of distributed applications easier. This kind of architecture, called service oriented architecture (SOA), provides a transparent environment in which applications can be composed out of services.

Some hopes and visions are associated with SOA, for example, enterprise application integration (EAI) strives to seamlessly connect different systems in an enterprise mainly by utilizing Web service standards. While EAI has become an objective for larger enterprises due to the huge number of deployed systems, small- and medium-sized enterprises (SME) still struggle to support business processes using integrated IT systems. SMEs compete against larger corporations utilizing their flexibility and their ability to innovate. In order to compete better, these SMEs need to deploy ERP systems to support their business processes. But to stay as flexible and competitive as today, SMEs have to customize their ERP system each time the business processes change. However, ERP systems are complex and their customization as well as maintenance is costly. Therefore, investments into large and powerful ERP systems often do not pay off financially for SMEs who do not have the necessary financial resources to deploy and maintain such systems at all.

Two approaches try to fill this gap: Cheaper ERP systems with less functionality have been offered and the concept of application service providing (ASP) has emerged. However, both solutions have their drawbacks. ERP systems offering less functionality do not realize all possible opportunities and do not address maintenance costs. Even worse, ASP (i.e., the operation of systems by a third party in an external data-center) has been rejected by the market because enterprises are not willing to store their valuable data externally and the distribution of responsibilities creates management problems (Walsh, 2003). Our aim is therefore a solution, which combines local data management with reduced costs and flexible support for changing and optimizing business processes.

The result is an ERP system whose logic is completely composed of Web services called federated ERP (FERP). The Web services are dynamically arranged to support the company's business processes (Krüger, Marx Gómez, Rautenstrauch, & Lübke, 2004). Such an ERP system has the advantage of storing all relevant data in-house as well as being extensible by integrating as many Web services as required for realizing the desired functionality. For implementing these ideas, some challenges have to be overcome. In course of this chapter, we will focus on the following problems:

- Management of user interfaces in highly dynamic, model-driven environments.
- Server-side data-management.
- Organization and standardization of Web services for the envisioned FERP system.
- Security considerations.

This chapter is structured as follows: Within the next section, we present background information and definitions of the most important terms. In the third section, we discuss the four main points as previously presented. The open research questions and future problems are presented in the fourth section. Finally, a conclusion is given.

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