Chapter IX

A Service-Oriented Agent-Based Model for Electronic Procurement

Manas Ranjan Patra, Berhampur University, India

Abstract

Globalization has evoked rethinking in organizing the business processes of many enterprises in order to keep pace with the competition and dynamic nature of the market. There has been continuing research for suitable paradigms and technologies that can facilitate efficient and yet less expensive solutions, a feature that is so important for small and medium-sized enterprises (SMEs). Towards this end, the chapter presents a service-oriented framework that is based on the notion of Internet-accessible services to represent applications and to integrate business processes. This model propounds a metadata-driven approach to dynamically publish, discover, and select services in heterogeneous settings while engaging in business transactions such as e-procurement across organizational boundaries. The concept of software
agents is also employed as a means to automate the activities relating to a procurement cycle. The central theme of this chapter is to motivate the adoption of a service-oriented agent-based framework which can provide an effective and efficient solution to e-procurement.

Introduction

Recent developments in the field of information and communication technology (ICT) have revolutionized the way business can be conducted in a dynamic and globally-competitive market environment. This has led to a profound change in the traditional business models leading to the adoption of an e-business philosophy that is manifested in the form of e-procurement, supply chain management (e-SCM), customer relation management (e-CRM), e-auction, e-tendering, e-payment, and so forth. Application of ICT is no longer an afterthought, but an inevitable driver for business enterprises to facilitate cost-effective, timely, and customer-centric solutions in an electronic market place (e-marketplace). An e-marketplace provides a virtual space wherein parties meet to accomplish their business objectives. One of the major application areas that can enjoy the real benefit of such a virtual marketplace encompassing several organizational boundaries is e-procurement. A buyer firm can streamline its purchasing activities using the Internet as a procurement channel and maneuver its way out of the tedious process of supplier-selection, placing an order, and tracking all activities until the shipment is received and payment is settled. Thus, e-procurement can help enterprises in automating the workflow associated with an entire procurement cycle and various related tactical processes, thereby helping to reduce the massive paper trails to a large extent. In recent times, the service-oriented paradigm for application development has been manifested in the form of Web services that promise interoperability and pragmatic interaction behavior among business partners, thereby bringing about business agility (Chiu, Cheung, Till, Karlapalem, Li, & Kafeza, 2004; Huhns & Singh, 2005; Myerson, 2002; Peltz, 2003). This helps one to envisage an environment where businesses can expose their current and future applications as Web services that can be easily discovered and consumed by interested parties. However, the real benefit of such an application environment can be appreciated, provided most of the operations can be carried out with a minimum of
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