Chapter 4

Building Semantic Business Process Space for Agile and Efficient Business Processes Management:
Ontology-Based Approach

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ABSTRACT

Current practices of BPM suffer from the several fundamental problems, including difficulty with automatic discovery and the integration of business processes across organizations. Many studies uncovered that the main cause of these problems lies in insufficient semantics on business processes and suggested semantic business process management (SBPM) as a solution. Although building semantic business process space (SBPS) must be at the core of the SBPM approach to resolving the problems, most research on SBPM hardly deal with it seriously. Thus, this research shows how to build SBPS by incorporating semantics with business processes. The authors first illustrate the idea of building SBPS by defining a variety of generic and specific business process ontologies for the limited area of sales order process. They then explain how the SBPS satisfies the requirements for successful implementation of SBPM and demonstrate with a scenario how SBPM can be realized in the environment of SBPS for the agile and efficient BPM.

INTRODUCTION

The competitiveness of a company which wants to improve the performance and survive ever-increasing competition is getting more dependent on its business processes and accurate knowledge to execute them with agility and efficiency. Business Process Management (BPM) that emerged in the early 2000s as a leading technology was adopted as a silver bullet by companies which pursued the required agility and efficiency for their competitiveness. BPM initially promised to provide business world with suitable tools and techniques with which to design, modify, execute, and analyze business processes, without technical help from IT world (Aalst, Hofstede, & Weske, 2003; Dumas, Aalst, & Hofstede, 2005; Liu, Li, & Zhao, 2008; Smith & Finger, 2003).

However, current tools and techniques for BPM still leave much to be desired with regard to fulfilling the promise (Hepp, Leymann, Domingue, Wahler, & Fensel, 2005; Hepp & Roman, 2007), including fundamental problems such as difficulty in querying and reusing business processes (Hepp, et al., 2005; Hepp & Roman, 2007), retrieval of irrelevant web services resulting from the insufficient semantics of signatures in Web Services Description Language (WSDL) (Cardoso, 2006; Leymann, Roller, & Schmidt, 2002; Preist, 2007; Studer, Grimm, & Abecker, 2007), non-automatic transformation from a business process model to an executable workflow model, lack of semantic description in Business Process Execution Language (BPEL) for dynamic discovery and automatic composition of web services (Alves et al., 2007; Mendling, 2006; Verner, 2004; Wetzstein et al., 2007), and difficulty in integrating business processes across organizations (Thomas & Fellmann, 2007; Wetzstein, et al., 2007). These problems have continually prohibited companies from achieving agile and efficient business processes management.

Having recognized that these problems occur due to the lack of semantics related to business

process, a few researchers have suggested semantic business process management (SBPM) as a solution to the problems (Hepp, et al., 2005; Hepp & Roman, 2007; Pedrinaci & Domingue, 2007; Wetzstein, et al., 2007). The aim of SBPM is to support agile and efficient implementation of alignment between business processes and web services by combining BPM technology with semantic web services technology. BPM technology provides a means with which stakeholders in business can directly design, modify, and execute business processes from the managerial perspective. On the other hand, semantic web services technology provides a means for a semantic description of a web service and for interaction of web services using ontology. The combination of the two technologies enable stakeholders in both the business and IT worlds can query and manipulate business processes by traversing the business process space without a great deal of manual efforts (Cardoso, 2006; Drumm, Lemcke, & Oberle, 2008; McIlraith, Son, & Zeng, 2001; Preist, 2004, 2007; Stollberg, Feier, Roman, & Fensel, 2006; Sycara, Paolucci, Ankolekar, & Srinivasan, 2003).

In order to achieve the successful SBPM, it was argued that the core of SBPM should be semantic business process space (SBPS), which is a semantic knowledge space where all information associated with business processes is stored and maintained in machine understandable form. However, the majority of research into SBPM, rather than dealt with it seriously, focused on describing what is required to implement SBPM in non-technical terms or on resolving several problems that occur during BPM lifecycle, neither of which is helpful to practitioners who want to build SBPS in a technical manner.

Therefore, the objective of the current research is two-fold: 1) to explain how the SBPS can be implemented by defining various ontologies associated with business process, and 2) to show how successful SBPM can be realized by resolving the fundamental problems in current practice of BPM

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