Chapter 12
Semantic Supplier Contract Monitoring and Execution DSS Architecture

A. F. Salam
University of North Carolina at Greensboro, USA

ABSTRACT

This research is motivated by the critical problem of stark incompatibility between the contractual clauses (typically buried in legal documents) and the myriad of performance measures used to evaluate and reward (or penalize) supply participants in the extended enterprise. This difference between what is contractually expected and what is actually performed in addition to the lack of transparency of what is measured and how those measures relate to the contractual obligations make it difficult, error prone and confusing for different partner organizations. To address this critical issue, in this article, we present a supplier performance contract monitoring and execution decision support architecture and its prototype implementation using a business case study. We use the SWRL extension of OWL-DL to represent contract conditions and rules as part of the ontology and then use the Jess Rule Reasoner to execute the contract rules integrating with Service Oriented Computing to provide decision support to managers in the extended enterprise.

INTRODUCTION

Companies are under increasing pressure to transparently integrate and streamline their business activities to increase their service and shorten product delivery times (Weigand & Heuvel, 2002; Chopra & Meindl, 2003). According to Dyer (2000) the fundamental unit of competition is no longer the individual firm but rather the extended enterprise. Extended enterprises comprise collaborative partners typically coordinated by a focal firm to jointly create value for the customers in the marketplace (see Figure 1). In an extended enterprise each company is self-organized, while the extended enterprise imposes a federal structure...
for communication and synchronization between individual enterprises (Bititici and Mendibil, 2005; Ellram, 1990; Fawcett, Stanley & Smith, 1997).

The key to governing and improving performance in an extended enterprise is to create a new set of organizing principles and measures of performance that allow companies to drive performance across their extended enterprise (IBM Executive Brief—http://www.ibm.com). Performance improvement in the extended enterprise should include the correct set of performance measures and incentives (or penalties) that help motivate the correct set of actions across an extended value chain or network (Dyer, 2000). Business contracts are the key governing mechanisms for inter-organizational collaboration and they are increasingly taking a central role in e-commerce, e-business and extended enterprise governance related to key process integration, exchange of knowledge and information and as drivers for performance (Governatori & Hoang, 2005; Governatori and Milosevic, 2006; Governatori, Milosevic & Sadiq, 2006; Grosos & Poon, 2004; Udupi & Singh, 2006).

Despite the importance of the role of contracts in the extended enterprise, Governatori and Hoang (2005), Governatori, Milosevic and Sadiq (2006) and Nellore (2004) emphasize the limited awareness, among extended enterprise participants, regarding the constraints imposed on business processes and performance by business contracts. The most typical scenario today is in which extended enterprise participants still treat contracts as legal documents typically detached from their governance role for cross-organizational business processes and performance.

It has been recognized in the literature that communication, coordination and other problems arise due to the use of different terms and concepts (and their underlying lack of common semantics, meaning or incompatibility) used in the description of the contracts and those terms and concepts used in the description of business processes and performance. These problems obviously lead to the undesired consequences of inability to fulfill organizational obligations (Governatori & Milosevic, 2006; Nellore, 2004) arising out of contractual agreements (Krishna, Karlapalem & Chiu, 2004). This is nowhere more true than in the case of supplier contracts.