An Agent-Based Approach for Sourcing Business Rules in Supply Chain Management

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ABSTRACT

In recent years, business rule management has become an important component of enterprise information systems. Business rules represent guidelines about how an enterprise should conduct its business and provide better service for customers. Business rules are being widely deployed in supply chains to support real-time decision making. The research reported in this paper is aimed at designing a dynamically adaptable data-sourcing service for deploying business rules effectively in supply chain management. Such a data-sourcing service is important since execution of business rules requires data to be retrieved from various data sources spread across the enterprise, including the enterprise data warehouse. We propose a semantics-based approach to implement the data-sourcing service for business rules. Our approach captures semantics of business rules and provides an agent-enabled mechanism that dynamically maps business rules to the enterprise data model. A prototype system is implemented to illustrate our sourcing service and demonstrate the feasibility of our approach.

Keywords: business rules; e-business; enterprise data management; intelligent agents; supply chain management

INTRODUCTION

In recent years, business rule management has become an important component of enterprise information systems. Business rules are defined as “statements that define or constrain some business aspect, intended to assert business or to control or influence business behavior” (Business Rule Group, 2000). In other words, business rules represent policies and guidelines about how a business should conduct its work to better service customers (Leite & Leonardi, 1998; Rosca, Greenspan, & Wild, 2002). Nowadays, the need to incorporate business rules into information systems is becoming imperative due to the rapid development of e-
business. E-business implies that customers are just one mouse click away. To get a competitive edge in e-business, enterprises must be capable of making fast business decisions based on the market condition without the involvement of humans because any delayed response could easily lead to lost business. Therefore, deploying business rules and accommodating frequent changes to the rules have become major issues that affect the competitiveness of an enterprise.

Because of the importance of business rules, organizations have been paying increasing attention to the management of business rules as a strategic corporate asset (Shao & Pound, 1999). This new focus has led to the development of technologies around managing and executing business rules, such as rule engines providing inference capabilities over business rules (Ceri, Gennaro, et al., 2003; Rosca et al., 2002) and repositories for storing and managing rule sets (Herbst, 1996, 1997; Von Halle, 2002). These technologies follow the principle of “externalizing business rules” (Date, 2000) and manage business rules separately via a centralized facility that resides outside of core business systems. The centralized management of business rules provides enterprises with greater competitive advantage as it enables them to be more responsive to changes within the company (internal policy changes) and the marketplace (products and pricing changes in response to volatile customer demand). However, as a part of the information system of an enterprise, a complete business rule service still requires other software components that interface with core business systems to be effective. For example, a software component that sources data for business rules is important because the logic of business rules must operate on data stored in the databases. Nevertheless, integration of business rules services into information systems has not been adequately addressed in literature.

In this work, we propose a semantics-based approach for sourcing business rules for efficient supply chain management. Our approach employs an agent-based design and thereby emphasizes the flexible interaction of the business rule service with business information systems. A software agent can be defined as an encapsulated computer program situated in some environment and capable of flexible, autonomous action in that environment in order to meet its design objectives (Wooldridge, 1997). Work in the area of software agents has been ongoing for some time, and agent-based systems have proved useful in a broad array of applications (e.g., see Boudriga & Obaidat, 2004; He, Jennings, & Leung, 2003; Jennings, Sycara, & Wooldridge, 1998).

In this paper, we extend the agent-based design paradigm to the domain of business rules. According to Jennings (2001), agent-based systems can potentially help find solutions to a complex task in a widely distributed, heterogeneous, uncertain information environment. Because business rules are often managed independently and the business rule service interacts with distributed business applications across the enterprise, it is a natural choice to create an agent-based approach for managing and sourcing business rules.
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