



Business Rule Management for Enterprise Information Systems

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ABSTRACT

Business rules guide information system development and maintenance in the organization. The issue of business rules for enterprise information systems has recently received considerable attention. However, as yet little research has been reported on a systematic approach to business rules management. This paper proposes a business rules management model. In this model, business rules are supported by three types of independent information system components: system setting, database, and procedural module. A business rule can be formalized into one or more elementary rule, and a formalized elementary rule is associated with one and only one information system component. Business rules, system components, and their interconnected relationships can be organized into an XML enabled repository for the system development, customization, and maintenance. An example of artifact of business rules management system can be found in an apartment rental management system. This example is used to illustrate the concept of business rules management.

Keywords: Enterprise Modeling, Information Requirements Analysis, Information Resource, IS Models, IS Project Management Methods and Tools, Systems Development Techniques, Systems Maintenance

INTRODUCTION

A business rule is a statement that aims to influence or guide business processes in the organization (Steinke & Nickolette, 2003; Kardasis & Loucopoulos, 2005). Business rule management is critical for business success (Hawtin, 2003). Although the context of business rules fits into general management, research into business rules has been active in the information system field. This is because the determination of information requirements is one of the most crucial stages in the enter-

prise information system development process (Mathur, 1987; Shu *et al.* 1982; Frolund & Guerraoui, 2002; Vemuri & Palvia, 2006), and business rules are often made explicit during the system analysis and data modeling process in order to be incorporated into the enterprise information system.

The field of information resource management has been investigating business rule management for a quite long time (McMenamin & Palmer, 1984). However, there is a lack of commonly applied models of business rule management that can be practically used for enterprise information system management. Because of the problem, sellers of ERP systems

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still use free-format descriptions and *ad hoc* style demos to market their products without providing explicit directory of business rules implemented. The information system software industry still has few guidelines of business rules definitions for software customization (Jones et al., 2008). Software maintenance still consumes a large proportion of system costs in response business rule changes (Grubb & Takang, 2003).

Our literature review presented in the next section suggests that the existing business rule research frameworks fail to address two correlated critical aspects of business rule management for enterprise information systems. First, there is a lack of models that describe the unambiguous direct association that can be used to facilitate tracing from a business rule to its support information system components or from an information system component back to its supported business rule. In this study, the explicit form of the association between the business rules and the information system components is called end-to-end mapping. Indeed, without the end-to-end mapping between the business rules and the information system components for an enterprise information system, business rule management remains to be artistic. Second, there is a lack of business rule formalization methods that fully support end-to-end mapping relationships between business rules and information systems components. Indeed, any business rule model makes little contribution to business rule management unless it implements the relationships between business rules and information system components.

This paper addresses these issues by answering three closely related research questions. First, what are the explicit relationships between business rules and enterprise information system components for system management? Second, how can business rules be formalized as an instrument for implementing end-to-end mapping relationships between business rules and enterprise information system components? Third, how can business rule management be implemented through development of a business rule repository that regulates formalized

business rules and their relationships with system components for the enterprise information system?

This paper gives the emphasis on the relationships between business rules and their supporting information system, and presents a business rules management model that can be used for enterprise information systems development, customization, and maintenance. The rest of the paper is organized as follows. The second section reviews related work and describes the classification of business rules based on the enterprise information system components. The third section discusses business rules formalization, the central issue of business rules management. The fourth section presents the implementation scheme of a business rules management system through a real-world case. The final section summarizes this study.

RELATED WORK AND CLASSIFICATION OF BUSINESS RULES

Related Work

Despite of the importance of business rule management, the literature on business rules is not as abundant as expected. The Business Rules Group (BRG, 2009) is an influential organization in this field. There have been several leading researchers of business rules who are active in this group. Ross (Ross, 1997; Ross & Lam, 2003) believes that business rules should be data based rather than procedural based. In contrast, Von Hall (2001) suggests that business rules are *definitions* (entities and attributes), *facts* (relationships between entities), *constraints* (conditions), and *derivations* (logic). In this view, business rules include but are not limited to data models. The Zachman framework for information systems architecture (Inmon & Zachman, 1997) advocates high-level business rules in motivation of the enterprise. In this view, policies and guidelines are the major categories of business rules. In its report, the Business Rules Group defined three types of

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