

## Chapter 16

# Ontology Based Business Rules and Services Integration Environment

**Aqueo Kamada**

*CTI – Information Technology Center Renato Archer, Brazil & State University of Campinas, Brazil*

**Adriana Figueiredo**

*CTI – Information Technology Center Renato Archer, Brazil*

**Marcos Rodrigues**

*CTI – Information Technology Center Renato Archer, Brazil*

### ABSTRACT

*Nowadays, the relationships among people, governments and organizations are subject to fast changes. The increasing demand for new services conducts to the need to create services from scratch and by integrating disparate and heterogeneous legacy systems. The problem is that the monolithic form as most of the systems were implemented turns the change excessively slow and expensive. Considering that some business logic portions are quite volatile and susceptible to changes and other portions are quite stable and less susceptible to changes, this paper proposes ontology based integrated development environment (IDE) that can capture business changes and quickly implement them into computational systems. The volatile portions are externalized as business rules and the stable portions as SOA based services. Business rules' facts and conditions are linked to services, which are discovered in the business rules development or maintenance time. The IDE aggregates a set of tools to automate the modeling of business rules in the business people's terminology and to automate the integration of services. It is based on a set of ontologies to deal with metadata related to services, vocabularies and business rules. Business rules are modeled according to OMG's Semantics of Business Vocabularies and Business Rules Metamodel.*

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## INTRODUCTION

A computational system should reflect the knowledge of the business domain in which the system is used. Due to the business high competition, communication speed and degree of the customers' information, the organizations have to make changes in their computational systems in a much more accelerated rhythm than in past decades. Consequently, the computational solutions for the business problems cannot accompany the speed in which the change necessities appear. In this context, governments and companies need to incorporate new technologies to implement solutions integrating business processes and services already existent with new processes to generate other services. In this way, all the time, processes and services need to be reviewed so that the organization can act according to the changes that happen in the business scenario. For most of the organizations the adaptation capacity to the new realities in a fast and efficient way is a crucial challenge to maintain their competitiveness or their survival in the business.

Commonly, documents containing procedures, contracts, regulations and laws define the strategies, policies and relationships among organizations and consolidate that knowledge. From those documents arise the rules that define the behavior of the business processes in the organizations (Hildreth, 2005). Thus, a set of such rules, known as business rules, that contain important information for the realization of the business represent the business essence and define how an organization must behave to deal with its daily situations.

Business processes can be described by a variety of means, such as, objects, actions and events. Hence, business processes can be described by splitting them up to patterns, which can be represented by business rules through event-condition-action schemes. Therefore, a business rule describes the actions that have to be executed if an event happens and a condition is

met. In this way, business rules can provide some modularization capabilities for business processes and offer advantages in terms of flexibility and reusability. Thus, business process changes can be easily implemented by changing the business rules and the reuse of individual business rules can be easily done across different business processes (Schmidt, 2001).

In this context, many services have to inter-operate seamlessly, such as ordering, billing and calculation services to perform actions related to a specific business process. In addition, the set of services is not fixed, because business process changes and extensions require the integration of additional services. The services are dispersed across different organizations and implemented using different platforms, programming languages, and due to the fact that there is no centralized organization, the services are changing independently. Therefore, the execution of business processes means not only the distributed execution of business processes, but also the integration of a changing set of heterogeneous services (Schmidt, 2001).

The difficulties and inflexibility to quickly reflect the business' changes into the computational systems motivated this research. The identified reasons for those difficulties are as follows: (1) in most of the computational systems the business rules are dispersed in the documentation and in the executable code and this turns the maintenance slow and expensive (Halle, 2001) and (2) the orthogonality between the perspectives of the process composition mechanisms and the business rules mechanisms make the integration of these mechanisms difficult in terms of collaboration in treating the business logic (Charfi & Mezini, 2004) and (Orriens & Yang, 2006).

In the government and business applications there are portions of the business logic that are dynamic and sensitive to the business changes and other portions that are quite stable. However, the monolithic form in that most of the applications

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