

## Chapter 2.15

# The Utilization of Semantic Web for Integrating Enterprise Systems

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### ABSTRACT

Integrating enterprise system has become an issue of sharing information rather than transforming information due to the increasing complexity and the heterogeneity of the applications. The transition from application centric to integration centric enterprise application integration (EAI) requires methods and technologies that will enable and facilitate the definition of shared information. The use of ontologies semantic Web and technologies can improve the existing EAI methods by providing a framework capable to define shared information. Ontologies-based enterprise application integration (ONAR) framework utilizes semantic Web technologies to define shared information among heterogeneous systems. The present chapter presents the utilization of ontolo-

gies for the formation of ONAR framework and its application for service oriented application integration (SOAI).

### INTRODUCTION

The integration of enterprise application such as enterprise resource planning (ERP) systems due to their internal complexity, has lead many EAI solution vendors to create solutions based on the structure and the semantics of the application. Nowadays the problem of integration is confronted with technologies (like Enterprise Java Beans) that provide sophisticated and advanced techniques for technical interfaces.

The most recent orientations in enterprise application integration (henceforth EAI) present new techniques that provide methods to define and exploit semantics of complex application. Still this

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definition is application centric and it cannot be shared among other heterogeneous applications. Tektonidis, Vontas, Hess, and Meschonat (2002) have stressed the problem of integration as a problem of information sharing not as a problem of adaptation that is very common case for ERP systems.

In the technological level, service oriented application integration (SOAI), as it is presented in Linthicum (2004), exploits the capabilities for the functional description of Web services that are used for the actual integration. This section focuses on the creation of an integration framework based on SOAI that utilizes semantic Web technologies (W3C, 2006) in order to enrich the semantics of the exchanged information.

The approach used follows the ontologies based enterprise application integration (ONAR) approach presented by Tektonidis et al. (2005) that utilizes Web ontologies to create semantic conceptualizations of the business concepts that exist inside an application. This conceptualization is used for the creation and the registration of the Web services in a UDDI based registry.

## UTILIZING SEMANTIC WEB FOR ENTERPRISE APPLICATION INTEGRATION

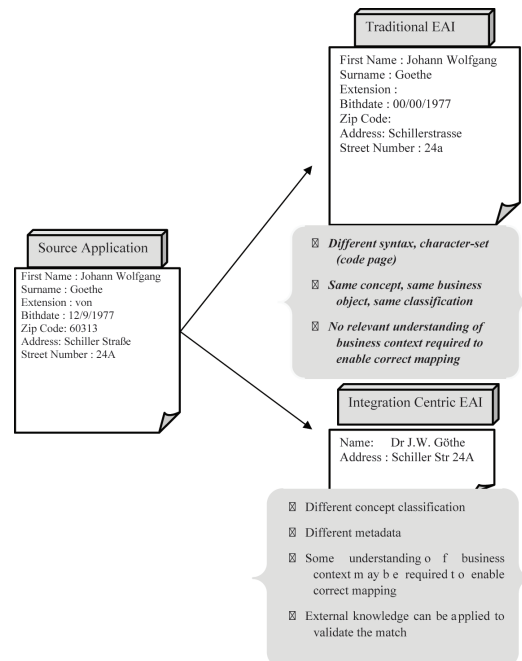
The need for the utilization of semantic Web derives from the requirement for sharing information instead of exchanging information. The adaptation of ontologies for software engineering extends further than the semantic definition of a domain. Liu and Halper (1999) and Chiang (2001) proved that the utilization of the ontologies requires certain modifications in the principals of the frame-based ontologies languages. The utilization of ontologies in order to define concepts for application integration involves also characteristics of the system that are integrated. However in order to avoid definition of concepts based on the structure and the logic of the applications we have defined

two layers for the definition of concepts and the association to the application resources.

The semantic definition of the concepts is based on the integration requirements. This implies the concepts and their relation define the information need to be exchanged. This “integration centric” approach follows the principals of modern enterprise application integration (EAI) specification (Linthicum, 2004) contrary to traditional integration approaches that aim to improve the definition based on the semantics of the applications. Figure 1 presents the difference between traditional EAI (data transformation) and integration-centric approach.

The formation of an integration centric information definition EAI methodology required the utilization and the adaptation of semantic Web technologies. ONAR methodology utilizes ontological definitions for the definition of semantic and uses association techniques in order to associate concepts with the information repositories of the applications.

Figure 1. The difference between data transformation and semantic integration (Source: Capgemini)



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