# Chapter 14
# Semantic Enrichment of Web Service Architecture

**Aicha Boubekeur**
*University of Tiaret, Algeria*

**Mimoun Malki**
*University of Sidi Bel-Abbes, Algeria*

**Abdellah Chouarfia**
*University of Oran, Algeria*

**Mostefa Belarbi**
*University of Tiaret, Algeria*

## ABSTRACT

*The SOA: Service Oriented Architecture is a paradigm which allows the unification in the approaches of integration of the information systems. This data integration of shared semantic description of handled by the services. This integration of the data is more flexible considering the limited number of the concepts used by the services. Therefore, architecture is suggested in order to reduce domain ontologies development and integration complexity. It allows also finding and automatic invocation of the services. Ontologies are integrated without doing major changes in operating mode of web services like HTTP, SOAP. This chapter presents an architecture which is a step towards its automation through the semantic web services without redefining the information system completely.*

## INTRODUCTION

Exchanged information on the Web becomes very important. Information research is therefore vague and slow. XML common language enriched by the metadata was insufficient. In order to satisfy the enormous number of users, it will be necessary to introduce the data semantics concept. This latter al-lows defining the semantic Web project also called "Web 2.0". Web 2.0 uses the Artificial Intelligence (AI) tools especially Knowledge Engineering (KE) where ontology formalism was used.

Moreover, some research works added functional level to the Web. On this level, Web services satisfy interoperability. Therefore, an explicit semantic annotation (Benslimane, Amar Bensaber, & Malki, 2004) is necessary to improve interoperation. In this

case ontologies will be used. Semantic integration of the applications is a very active research field (Izza, Vincent, & Burlat, 2006; Harriche, Hatchabi, & Maiga, 2008). It concerns integration with the data and treatments. Semantic integration by the data requires the design of voluminous and heavy ontology which take into account enormous concept number. Rigorous analysis can establish that service oriented computing represents federative element for the whole approaches. Indeed, service oriented paradigm allows unification during integration of information systems approaches. It includes the integration of shared semantic description of the data handled by the services. This integration of the data (Keita, Catherine & Robert, 2006) is more flexible considering the limited number of the concepts used by the services. This leads us to focus on the semantic Web services, which constitute one of the most effective means to implement systems semantic integration.

In this chapter architecture is suggested for semantic enrichment of SOA. It consists of reduce complexity in the development and the integration of domain ontologies It also ensure finding an automatic invocation of the services, by integrating ontologies without doing major changes in the operating mode of the web services (HTTP, SOAP, WSDL, UDDI). The purposes of the present research work consist of defining interoperable system using web services semantic without using traditional web services and redefining the information system completely.

Web services add a new level of functionality on top of current web, transforming the Web from a distributed source of information to a distributed source of functionality. Current web service technologies based on UDDI[1], WSDL[2] and SOAP[3] provide very limited service automation support. In this context, Web services are enriched using semantic information; automatic location, composition, invocation and interoperation, bring the new concept of Semantic Web Services (Fensel, & Bussler, 2002). The use of web services and

semantic technologies to enhance these services must be evaluated as it reflects to what extent; a given portal exposes its functionality as services accessible over the Web.

This chapter is organised as follows: Section 2 presents the state of the art of the various approaches aiming to satisfy the integration of the information systems. Comparative study of these approaches is performed. Section 3 discusses SWS (Semantic Web Services) technologies. Sections 4 and 5 present our architecture where appears the specification and the semantic description of the VTA[4] case. Sections 6, 7, 8 and 9 describe the four top-level elements for describing several aspects of SWS. These are: ontologies, goals, web services, and mediators. Section 10 discusses open directions. Finally, the last section establishes comparison between our work and existing work and makes suggestions for future works.

## STATE OF ART

Application enterprise integration can be performed on several layers level, mainly on data and treatments[5] level. Based ontologies approaches (Keita, Catherine, & Robert, 2006) represent a framework on which we can validate semantic integration.

Approaches of integration are characterized after selecting layer by using three main relevant activities (Izza, Vincent, & Burlat, 2006) as follows:

- **Description:** represents an activity which semantically describes system information aspects.
- **Discovery:** represents an activity which allows to find information on which functionalities can be provided by the system.
- **Composition:** represents an activity which allows to compare and to combine information, functionalities and processes.

# Related Content

Destination @-Branding of Ten European Capitals Through the Institutional Stems and Commercial Logos
Elena Bocci, Annamaria Silvana de Rosaand Laura Dryjanska (2018). *Encyclopedia of Information Science and Technology, Fourth Edition (pp. 4038-4051).*
www.irma-international.org/chapter/destination--branding-of-ten-european-capitals-through-the-institutional-stems-and-commercial-logos/184112

Personalized Education Resource Recommendation Method Based on Deep Learning in Intelligent Educational Robot Environments
Sisi Liand Bo Yang (2023). *International Journal of Information Technologies and Systems Approach (pp. 1-15).*
www.irma-international.org/article/personalized-education-resource-recommendation-method-based-on-deep-learning-in-intelligent-educational-robot-environments/321133

Arsenic Removal from Drinking Water Using Carbon Nanotubes
Kauser Jahan, Kenneth Sears, Jaimie Reiff, Sarah Dores, Paulina Kruszewskiand Shawn Williams (2015). *Encyclopedia of Information Science and Technology, Third Edition (pp. 2908-2916).*
www.irma-international.org/chapter/arsenic-removal-from-drinking-water-using-carbon-nanotubes/112714

Personalized Course Resource Recommendation Algorithm Based on Deep Learning in the Intelligent Question Answering Robot Environment
Peng Sun (2023). *International Journal of Information Technologies and Systems Approach (pp. 1-13).*
www.irma-international.org/article/personalized-course-resource-recommendation-algorithm-based-on-deep-learning-in-the-intelligent-question-answering-robot-environment/320188

Swarm Intelligence for Automatic Video Image Contrast Adjustment
RR Aparna (2016). *International Journal of Rough Sets and Data Analysis (pp. 21-37).*
www.irma-international.org/article/swarm-intelligence-for-automatic-video-image-contrast-adjustment/156476