

Chapter 1

Applying Semantic SOA Based Model to Business Applications

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ABSTRACT

Nowadays, it becomes more and more critical and essential for the vendors in the business-related markets to tailor their products and software to meet the needs of the Small and Medium Businesses (SMB) since their market share has been enormously raised and the issues related to the Business-to-Business (B2B) environment are becoming great challenges to be considered. The semantic Service-Oriented Architecture (SOA)-based model involves Semantic Web Services to be applied in business environments in order to have a consistent framework that makes the data understandable for both humans and machines. The ultimate goal for using the authors' proposed model is to transfer the enterprise Web into a medium through which data and applications can be automatically understood and processed. The main components of the proposed model and the vision of applying it to one of the business solutions will be illustrated in order to show how these components can work together to overcome the traditional SOA-based solutions weakness.

INTRODUCTION AND PROBLEM DEFINITION

Large scale, dynamics, and heterogeneity of Web Services may hinder any attempt for understanding their semantics and hence outsourcing them.

This calls for techniques to organize the Web Services in a way that they can be efficiently understood and outsourced. The Web becomes a very helpful environment to share and extract the information from multiple sources that were not accessible previously. Web data had designed in a way that it is understandable for humans and

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one of the main obstacles which have to be considered in such context is the lack of semantics that is critical to enable machines understanding and automatically processing the data which they can now only display.

A lot of companies moved their entire information infrastructures towards the Web platform by applying SOA-based solutions, offering a unified and standardized access for customers, suppliers and employees to the information and services offered by those companies (Brehm et al., 2008) (Cardoso, Hepp & Lytras, 2007).

Web-Service-enabled SOA solutions are completely depending on common Web Service (WS) technologies that allow interoperability by using standards like Universal Description Discovery and Integration (UDDI) (Clement et al., 2004), Web Service Description Language (WSDL) (Christensen et al., 2001), Simple Object Access Protocol (SOAP) (Mitra, 2003), etc.

Federated Enterprise Resource Planning (FERP) system is one of the Web-Service-enabled SOA solutions and it is developed by the Very Large Business Applications (VLBA) Department in Carl von Ossietzky University of Oldenburg (Brehm, Lübke & Marx-Gómez, 2007). It is based completely on standards. It allows the separation of local and remote functions whereby no local resources are wasted for unnecessary components. Furthermore, in FERP, single components are executable on small computers, which subsides the installation and maintenance costs by decreasing the degree of local system complexity (Brehm, Lübke & Marx-Gómez, 2007).

Since FERP is a SOA solution, it depends on typical Web Service technologies that allow interoperability by using standards like UDDI, WSDL, SOAP, etc. and it is based on the idea that business functionality is separated and published as services. In addition, this approach has some fundamental advantages that can be summarized as follows:

- Relying on standards provides a high degree of flexibility and offers an adaptable implementation;
- It becomes eventually possible to switch from a particular service to a different one without adaptations;
- The high ability of reusing the functionality.

According to this, FERP approach offers a solution to the problem of standards by avoiding the central point of integration which was often a bottleneck in the previous solutions, also it reduces the number of point-to-point adapters because each interface is based on WSDL and it can communicate with every other WSDL-enabled interface. What it does not solve is the problem of making the semantic documentation of such interfaces.

Moreover, SOA-based solutions lack (semi)-automatic service discovery, (semi)-automatic service composition, data and process interoperability. This means that nowadays the existing architecture of the enterprise Web has many defects such as lack of interoperability, massive unstructured data and an increasing number of various systems waiting to be linked (Hu et al., 2008). To address these problems, new approaches are being proposed and developed, and Semantic Web Services appears to be one of the soundest solutions as an important step on the road towards making the data understandable for both humans and machines in an automated manner.

On the one hand, Semantic Web is an evolving extension of the World Wide Web in which the semantics of information and services on the Web are well defined, making it possible for the Web to understand and satisfy the requests of people and machines to use the Web content (Berners-Lee, Hendler & Lassila, 2001). And on the other hand, research and industry have realized that the Semantic Web can facilitate the integration and interoperability of intra- and inter-business processes and systems, as well as enable the creation

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