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Tariq Mahmoud

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Internet: www.shaker.de • e-mail: info@shaker.de

Abstract

Nowadays, it becomes more and more essential for the vendors in the markets to tailor their products and software to suit the Small and Medium Enterprises (SME) section since their market share has been enormously raised. The issues related to Business-to-Business (B2B) environment are becoming important challenges to be considered in such area as well.

Talking about system integration among the major market business factors, Web Services seem to be one of the powerful technologies to solve the integration problems. Service-Oriented Architecture and SOA-enabled systems provide powerful applications to be utilized in the SME market. However, the existing architecture of the enterprise's Web has many drawbacks like enormous volumes of unstructured data, growing number of disconnected systems besides the lack of interoperability. Moreover, SOA-based systems lack the semantic documentation of the Web Service interfaces.

Semantic Web Services provide methods to ease the (semi-) automatic discovery, composition, and execution of Web Services. However, these new emerging semantic technologies seem to be inaccurate to be used in terms of semanticizing the consumer requests and the capabilities of the Web Services besides its complexity when non-technical skilled staff is involved.

This dissertation presents a semantic Web Service-based reference architecture that relies mainly on the idea of applying lightweight Resource Description Framework (RDF) semantic statements to Web Services to have an efficient enterprise system solution. In this dissertation, the reference architecture is called "Lightweight Semantic-enabled Enterprise Service-Oriented Architecture (SESOA)". It merges both business processes and SOA concepts to provide an agile and flexible enterprise solution in which business functionalities are mainly implemented using Web Services. Moreover, the ultimate goal behind this work is to upgrade the entire enterprise Web into a medium where the meaning of its associated information can be automatically understood and processed.