



Fakultät II - Informatik, Wirtschafts- und Rechtswissenschaften
Department für Informatik

Lightweight Semantic-enabled Enterprise Service-Oriented Architecture

Dissertation

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Tariq Mahmoud

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Zusammenfassung

Heutzutage wird es für Anbieter am Markt immer wichtiger Ihre Produkte und ihre Software auf die Bedürfnisse Klein- und mittlerer Unternehmen (KMU) zuzuschneiden, da deren Marktanteile enorm gestiegen sind. Dies gilt ebenso für die Erfüllung der Anforderungen aus dem Business-to-Business (B2B) Bereich, die zur wichtigen Herausforderung wird.

Betrachtet man das Thema Systemintegration neben anderen wichtigen Marktfaktoren, scheinen Webservices eine der wichtigen Technologien für die Lösung von Integrationsproblemen zu sein. Service-orientierte Architekturen und SOA-fähige Systeme bieten leistungsstarke Applikationen für den KMU-Markt. Jedoch haben bestehende Architekturen im Unternehmensweb viele Nachteile wie enorm große Datenmengen, eine wachsende Zahl unverbundener Systeme sowie einen Mangel an Interoperabilität. Weiterhin fehlen den SOA-basierten Systemen semantische Dokumentationen für die Webservice-Schnittstellen.

Semantische Webservices bieten Methoden, die (teil-) automatische Suche, Komposition und Ausführung von Webservices zu vereinfachen. Jedoch erscheinen diese neu entstehenden semantischen Technologien aufgrund der Komplexität für nicht-technische Nutzer ungeeignet zu sein, die Kundenanfragen und Webserviceleistungen semantisch zusammenzuführen.

Diese Dissertation liefert eine semantische Webservice-basierte Referenzarchitektur, die im Wesentlichen auf der Idee basiert, semantische Ausdrücke mit dem leichtgewichtigen Resource Description Framework (RDF) auf Webservices anzuwenden, um effiziente Unternehmenssystemlösungen zu erhalten. In der Dissertation wird diese Referenzarchitektur "Lightweight Semantic-enabled Enterprise Service-Oriented Architecture (SESOA)" genannt. Sie vereint Geschäftsprozesse und SOA-Konzepte, um eine agile und flexible Unternehmenslösung zu schaffen, deren Geschäftsfunktionalitäten im Wesentlichen auf Webservices basieren. Darüber hinaus ist das wesentliche Ziel dieser Arbeit, das gesamte Unternehmensweb zu einem Medium zu gestalten, in dem die Bedeutung der verwalteten Informationen automatisch verstanden und verarbeitet werden.

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.

Table of Contents

List of Abbreviations and Acronyms	VI
List of Figures.....	IX
List of Tables.....	XII
1 Introduction.....	1
1.1 Motivation.....	2
1.2 Problem Definition	2
1.2.1 General Problem Definition	4
1.2.2 Problems of Existing Approaches	6
1.3 Thesis Statement.....	10
1.4 Thesis Structure	13
2 Main Related Concepts and Technologies.....	17
2.1 Distributed Computing	17
2.2 Web Services	19
2.2.1 Web Service-enabled SOA.....	20
2.2.2 Service Discovery	21
2.3 Business Process Management.....	22
2.4 Workflows	24
2.5 Semantic Web Pyramid	26
2.6 Summary.....	29
3 Service-Oriented Architecture	31
3.1 Service-Oriented Architecture Concept.....	31
3.1.1 Motivation behind SOA	31
3.1.2 Architectural Considerations.....	33
3.1.3 Web Service Technology	35
3.2 Enterprise SOA and Other Architectures	39
3.2.1 Enterprise Architecture	39
3.2.2 Software Architecture	40
3.3 Summary.....	41
4 Research Methods.....	43
4.1 Design Science.....	43
4.1.1 DSRM Process Model.....	43
4.1.2 Information Systems Research Framework	47
4.2 Service Design Process.....	50
4.2.1 Top-Down Approach.....	50
4.2.2 Bottom-Up Approach.....	51
4.2.3 Middle-Out approach	51
4.3 Summary.....	53
5 Conception and System Requirements	55
5.1 Definition of Lightweight Semantic-enabled Enterprise SOA.....	55
5.2 Semantic Support of Web Services	56
5.3 Requirement Definition	59
5.3.1 General System Requirements	59
5.3.2 Core Functional Requirements.....	60

5.3.3 Business Case Requirements.....	73
5.3.4 Non-Functional Requirements	75
5.4 Summary.....	77
6 Reference Architecture of Semantic-enabled Enterprise SOA.....	79
6.1 Semantic-enabled Enterprise SOA	79
6.1.1 The Layered Architecture.....	79
6.1.2 Architecture Overview	81
6.1.3 The Component-based Architecture.....	85
6.2 Web Services Registration.....	105
6.3 Web Service Validation	107
6.4 Web Service Evaluation	108
6.4.1 Security Protocol for the Evaluation of Web Services.....	108
6.4.2 Web Service Evaluation within SEAOA	113
6.5 Main System Interactions	114
6.6 Business Case Architecture	117
6.7 Summary of System Outcomes	119
7 Prototypical Implementation and Evaluation	121
7.1 General Overview of the Prototype Architecture	121
7.1.1 Choice of the Adopted Technologies	121
7.1.2 The Selling Process Prototypical Considerations.....	126
7.1.3 System Configurations	127
7.2 SESOA Implementation	128
7.2.1 SESOA Web Application.....	129
7.2.2 Validation Services	140
7.3 The Business Case Web Application.....	144
7.3.1 WF and WCF	145
7.3.2 SPARQL Queries	147
7.3.3 Implementation Details	149
7.4 Evaluation	164
7.4.1 Corporate Environmental Management Information Systems.....	165
7.4.2 On-Demand Business Intelligence	174
7.4.3 CeWeColor AG & Co.	177
7.5 Summary.....	179
8 Conclusion and Outlook	181
8.1 Research Summary	181
8.2 Future Work Directions	182
8.2.1 Security Pattern	182
8.2.2 Web Services Recommendation System.....	184
8.3 Wrap Up.....	184
References	187
Publications	209