

# Table of Contents

<b>1 Coping with Semantic Variety in E-Business.....</b>	<b>1</b>
1.1 Semantic Variety and Ambiguity .....	1
1.2 Research Agenda .....	3
1.3 Research Objectives .....	5
1.4 Business Application Domains.....	8
1.5 Book Structure.....	9

## **Part I: E-Business Integration: Processes, Applications, Standards**

<b>2 Integrating Processes, Applications and Information .....</b>	<b>13</b>
2.1 The Business Case for E-Integration .....	13
2.1.1 The Business Process Paradigm .....	14
2.1.2 Process Integration .....	14
2.1.3 Business Processes and Information Technology.....	15
2.2 Application Integration.....	16
2.2.1 Networks for Application Integration.....	16
2.2.2 Business Applications.....	17
2.2.3 Intercompany Document Exchange – EDI .....	18
2.2.4 Supply Chain Management .....	20
2.2.5 Electronic Markets.....	22
2.3 Information Integration.....	26
2.3.1 Information Concept and Typology.....	26
2.3.2 Integration Levels .....	28
2.3.3 Integration Methods.....	29
<b>3 E-Business Standards .....</b>	<b>31</b>
3.1 Definition.....	31
3.2 An E-Business Standards Typology .....	32
3.2.1 Formatting Technical and Business Information.....	32
3.2.2 Levels of E-Business Standardization .....	33
3.2.3 Standards Typology Model .....	39
3.3 Technical Standards.....	41
3.4 Syntactic Standards.....	41

3.5 Semantic Standards.....	44
3.5.1 Identification Standards.....	46
3.5.2 Classification Standards .....	49
3.5.3 Catalog Exchange Formats.....	55
3.5.4 Transaction Standards .....	58
3.6 Process Standards .....	62
3.7 Semantic Variety .....	64
3.7.1 Application Scope of E-Business Semantics.....	64
3.7.2 Semantic Heterogeneity.....	65
3.7.3 Criteria for Standards Selection.....	68
3.7.4 E-Business Diffusion and Standard Adoption.....	70
<b>4 Case Study: Designing ebXML – The Work of UN/CEFACT .....</b>	<b>79</b>
4.1 Background – UN/CEFACT’s B2B Goal.....	79
4.1.1 The ebXML Vision à la UN/CEFACT .....	80
4.1.2 The ebXML Scenario .....	81
4.1.3 The Role of Large Companies/Organizations/Industries .....	82
4.1.4 How SMEs Will Benefit.....	84
4.2 The ebXML Initiative (1999-2001).....	84
4.3 The Transition Period (2001-2004) .....	87
4.4 A Critical Evaluation of ebXML .....	88
4.4.1 Did ebXML Fulfill Its Promise?.....	89
4.4.2 The Successful Elements of ebXML .....	90
4.4.3 Why Didn’t the ebXML Elements Dealing with Business Semantics Succeed?.....	91
4.5 Conclusion .....	92

## **Part II: Knowledge Management Technologies**

<b>5 Ontology Engineering.....</b>	<b>97</b>
5.1 Ontologies in Computer Science .....	97
5.1.1 Structure .....	98
5.1.2 Types of Ontologies .....	100
5.2 Representation .....	102
5.2.1 Logical Representation .....	102
5.2.2 Ontology Languages.....	104
5.2.3 Visualization.....	107
5.3 Ontology Mismatches.....	109
5.3.1 Types of Mismatch .....	109
5.3.2 Basic Resolution Approaches.....	112
5.4 Engineering Techniques .....	112
5.4.1 Creation .....	113

---

5.4.2 Coordination .....	115
5.4.3 Merging .....	123
<b>6 Advanced Knowledge Creation Techniques.....</b>	<b>125</b>
6.1 Methods from Artificial Intelligence .....	125
6.1.1 Ontology Inference and Ontology Reasoning .....	126
6.1.2 Machine Learning.....	127
6.1.3 Knowledge Evolution.....	129
6.2 Ontology Mapping Disambiguation .....	132
6.2.1 Ratings- and Context-Based Approaches .....	132
6.2.2 Community-Based Approaches .....	136
<b>7 Semantic Web Programming Frameworks .....</b>	<b>139</b>
7.1 Rationale.....	139
7.2 Basic Framework Features .....	140
7.3 Advanced Framework Features .....	141
7.4 Framework Examples .....	142
 <b>Part III: E-Business Integration with Semantic Technologies</b>	
<b>8 A Methodology for Semantic E-Business Integration .....</b>	<b>153</b>
8.1 Semantic Synchronization .....	153
8.1.1 Synchronization in E-Business Processes .....	154
8.1.2 Semantic References.....	155
8.2 Adaptive Semi-automated Semantic Referencing .....	156
8.2.1 Step 1: Conversion.....	157
8.2.2 Step 2: Matching and Mapping .....	158
8.2.3 Step 3: Deducing New Knowledge.....	160
8.2.4 Step 4: Storage.....	160
8.2.5 Steps 5 and 6: Reference Provision .....	160
8.2.6 Steps 7 and 8: Intelligence Collection .....	161
8.3 Context Sensitivity .....	162
8.3.1 Ratings.....	162
8.3.2 Context Definition .....	163
8.3.3 Context Description.....	165
8.3.4 Determination .....	166
8.4 Comprehensive Semantic Support.....	171
<b>9 Access Control for E-Business Integration.....</b>	<b>173</b>
9.1 Rationale.....	173
9.2 Scenario .....	174
9.3 History-Based Access Control.....	176

9.3.1 Histories.....	176
9.3.2 Operations.....	178
9.3.3 Rules.....	179
9.4 Security Architecture.....	181
9.4.1 Architecture Overview .....	181
9.4.2 Workflow.....	182
9.5 Modeling Access to Standards.....	183
9.6 Related Work.....	190
9.7 Conclusion.....	191
<b>10 Case Study: An Application for Dynamic Semantic E-Business Integration – The ORBI Ontology Mediator.....</b>	<b>193</b>
10.1 E-Business Integration Scenarios .....	193
10.1.1 User Interface .....	194
10.1.2 Browser Plug-In for Web-Based E-Business Applications .....	196
10.1.3 Web-Service-Based Application Integration.....	197
10.2 Use Cases.....	200
10.2.1 Administrator Activities .....	200
10.2.2 User Activities .....	201
10.2.3 Expert User Activities .....	202
10.2.4 System Activities.....	203
10.3 Web Service Functionality .....	204
10.3.1 Core Functions.....	205
10.3.2 Advanced Functions .....	205
10.3.3 Support Functions.....	206
10.4 Class Model for Reference Management .....	207
10.5 Implementation.....	208
10.5.1 Technology.....	208
10.5.2 System Architecture .....	208
10.5.3 System Functionality .....	210
10.5.4 External Systems Adapters.....	213
10.6 System Evaluation .....	215
10.7 Discussion.....	218
<b>11 Business Integration – Past, Present and Beyond.....</b>	<b>221</b>
11.1 Technical Challenges.....	222
11.2 Business Challenges .....	223
11.3 Conceptual Challenges .....	224
<b>List of Abbreviations .....</b>	<b>227</b>
<b>List of Figures .....</b>	<b>231</b>

**List of Tables .....235**

**References.....237**

**Index.....263**



<http://www.springer.com/978-3-540-75229-5>

Ontologies-Based Business Integration

Rebstock, M.; Janina, F.; Paulheim, H.

2008, XIII, 268 p., Hardcover

ISBN: 978-3-540-75229-5