

Table of Contents

Abstract	V
Acronyms.....	XIII
List of Figures	XV
List of Tables.....	XIX
Listings.....	XXI
1 Introduction.....	1
1.1 Motivation.....	1
1.2 Research Objectives.....	2
1.3 Chapter Overview	5
1.4 A Word on Category Theory.....	7
Part I: Electronic Commerce and the Internet of Products	9
2 The Economics of E-Economies.....	11
2.1 Fundamentals	11
2.1.1 Gallery of Economics	11
2.1.2 From Economy to E-Economy	22
2.1.3 From Commerce to E-Commerce.....	25
2.1.4 Electronic Commerce Busines Models	27
2.1.5 Electronic Commerce Pricing Models.....	30
2.1.6 Markets vs. Electronic Markets	31
2.1.7 Macroeconomic Implications of Electronic Markets	34
2.1.8 Implications on Welfare.....	37
2.2 E-Commerce Process Modeling.....	39
2.2.1 BPMN-based E-Commerce Process Model	39
2.2.2 π Calculus-based E-Commerce Process Model	41
2.2.3 System Theoretical Market Model.....	43
2.3 Chapter Summary	44

3	The Internet of Products and The Triple Bottom Line	47
3.1	Market-based Categories	47
3.1.1	Basics of Category Theory	48
3.1.2	Category of Supply	51
3.1.3	Category of Demand	53
3.1.4	Category of Markets	54
3.1.5	Functors between Demand, Supply, and Markets	56
3.1.6	Functor Category of Markets	57
3.2	The Internet of Products	59
3.2.1	Semantic Product Retrieval Benchmark	61
3.2.2	Toward Total Commerce	67
3.2.3	Reverse Commerce in the IoP	71
3.3	The Triple Bottom Line	72
3.3.1	The Category 3BL	72
3.3.2	The IoP Impact on the 3BL	74
3.3.3	3BL Impact Analysis Criticism	78
3.4	Chapter Summary	79

Part II: Technologies and Paradigms of the Internet of Products.....83

4	Foundations of Semantic Product Query Systems	85
4.1	Semantic and Web 2.0 Principles	85
4.1.1	The Internet of Things	85
4.1.2	Ontologies	90
4.1.3	Taxonomies	94
4.1.4	Faceted Classification	96
4.1.5	Folksonomies	98
4.1.6	Section Summary	102
4.2	Semantic Product Models and Classification	103
4.2.1	Origins of Product Modeling	103
4.2.2	Semantic Product Models	104
4.2.3	Product Model Persistence	109
4.2.4	Product Configurators	112
4.2.5	Product Classification	113
4.2.6	Section Summary	117

4.3	Distributed SPQS Technologies and Paradigms	117
4.3.1	Component-based Software Engineering.....	117
4.3.2	Service-oriented Software Engineering	120
4.3.3	Agent-oriented Software Engineering	124
4.3.4	Cloud-based Software Engineering	128
4.3.5	Section Summary	135
4.4	Quality Assurance in SPQS	137
4.4.1	Software Measurement Definition	137
4.4.2	Measurement Objects in Business Software	137
4.4.3	Measurement Subjects of Business Software Evaluation	140
4.4.4	Measurement Results of Software Quality Assurance.....	142
4.4.5	Measurement Resources of Software Measurement	143
4.4.6	Measurement Repercussions of E-Business Software Improvement.....	144
4.4.7	Detailed Measurement Process BMP for Business Software Quality Assurance	145
4.4.8	Section Summary	146
4.5	Chapter Summary	146

Part III: S-PDL and SPS as Technological Backbone of the Internet of Products 149

5	Semantic Product Description Language.....	151
5.1	Hierarchy-based Product Descriptions.....	151
5.2	Semantic Product Description.....	153
5.2.1	Explicit vs. Implicit Semantics	156
5.2.2	Category-based Fundamentals of Semantic Product Descriptions	157
5.2.3	Product attributes	159
5.2.4	Internationalization of Product Descriptions	160
5.2.5	Matching Product Descriptions with Queries	160
5.2.6	Query Refinement through Semantic Operators	162
5.2.7	Localization of Product Descriptions.....	166
5.2.8	Attribute Handlers	169
5.3	BNF of the S-PDL	171
5.4	S-PDL Schema	173

5.5	Chapter Summary	175
6	Semantic Product Servers	177
6.1	SPS Implementation.....	177
6.2	SPS Client Interfaces	178
6.3	SPS Catalog	178
6.4	SPS Execution Environment and Reference Architecture	179
6.5	Dynamic Binding.....	181
6.5.1	Mapping Functors to Software	186
6.5.2	Memoized Functors	187
6.5.3	Memoization and Memory Utilization.....	190
6.6	Query Matching	193
6.7	SPS Deployment	195
6.8	Chapter Summary	197
7	Validation and Applications	201
7.1	SPS Prototypes and Applications.....	201
7.1.1	ArbiterOne	201
7.1.2	eVoces	204
7.1.3	EscapeMisery.....	205
7.1.4	SpotCrowd.....	205
7.2	System Performance and Caching	207
7.2.1	Optimal Query Caching.....	208
7.2.2	Hybrid Cloud Storage Framework.....	214
7.3	Chapter Summary	222
8	Conclusion	225
8.1	Summary	225
8.2	Future Work	226

9	Appendix.....	231
9.1	Appendix A: Transport Efficiency Analysis.....	231
9.1.1	Triangle Inequality-based Model.....	231
9.1.2	Ellipse-based Model	233
9.1.3	Segments-based Model	235
9.2	Appendix B: S-PDL Template Generation	238
9.3	Appendix C: The KULI Model of E-Commerce Maturity.....	242
10	Bibliography.....	245

<http://www.springer.com/978-3-658-00904-5>

The Internet of Products

An Approach to Establishing Total Transparency in
Electronic Markets

Neumann, R.

2013, XXI, 263 p. 78 illus., Softcover

ISBN: 978-3-658-00904-5