

Contents

1	Introduction	1
1.1	Multilevel Business Processes	1
1.2	Contributions	6
1.3	Outline	8
2	Background	11
2.1	Multilevel Modeling	11
2.2	Business Process Modeling	12
2.2.1	Data- and Artifact-Centric Modeling	12
2.2.2	Variability and Flexibility	13
2.2.3	Behavior-Consistent Specialization	14
2.2.4	Business Process Model Abstraction	15
2.3	Business Process Automation	15
2.4	Business Process Intelligence	16
2.5	Modeling Languages	17
I	Modeling	19
3	Multilevel Object Core	21
3.1	Hetero-Homogeneous Data Modeling	21
3.2	Multilevel Objects	25
3.3	Multilevel Relationships	41
3.4	The Finer Points of Multilevel Objects	53
4	Multilevel Business Artifacts	57
4.1	Multilevel Objects with Life Cycle Models	57
4.1.1	Simple Level Hierarchies	58
4.1.2	Parallel Level Hierarchies	67
4.2	Multilevel Business Artifact Relationships	71
4.2.1	Multilevel Coherence	71
4.2.2	Arbitrary Relationship Levels	75

4.3	Multilevel Predicates for Synchronization	76
4.3.1	Vertical Synchronization	76
4.3.2	Horizontal Synchronization	97
4.3.3	Hybrid Synchronization	102
5	Hetero-Homogeneous Business Process Models	105
5.1	Multilevel Business Artifact Hierarchies	105
5.1.1	Concretization with Simple Hierarchies	106
5.1.2	Concretization with Parallel Hierarchies	119
5.1.3	Incremental Evolution through Reflection	120
5.2	Process Model Hierarchies within Levels	124
5.2.1	Business Process Variants	124
5.2.2	Incremental Evolution through Mutation	127
6	XML Representation	131
6.1	Multilevel Business Artifacts in XML	131
6.1.1	Simple Hierarchies	132
6.1.2	Parallel Hierarchies	142
6.2	Multilevel Relationships in XML	145
6.3	Multilevel Predicates in State Chart XML	146
II	Data Analysis	169
7	Multilevel Business Process Automation	171
7.1	Multilevel Business Process Management System	171
7.1.1	Multilevel Business Artifact Database	172
7.1.2	XQuery-based Interpreter for State Chart XML	176
7.1.3	Event Processor	179
7.2	Application Development	187
7.3	Event Logs	188
8	Multilevel Business Process Intelligence	197
8.1	Data Analysis with Multilevel Business Artifacts	197
8.1.1	Flow Analysis	198
8.1.2	Aggregation of Measures	199
8.2	Hetero-Homogeneous Data Analysis	207
8.3	Multilevel Synchronization over Performance Data	210

Contents	XI
9 Conclusion	213
9.1 Summary	213
9.2 Discussion	214
9.3 Future Work	216
References	219



<http://www.springer.com/978-3-658-11083-3>

Multilevel Business Processes

Modeling and Data Analysis

Schütz, C.

2015, XXIV, 232 p. 42 illus., Softcover

ISBN: 978-3-658-11083-3