Contents

Part I Introduction

1	Introduction to Business Rules	3
	1.1 What Are Business Rules?	3
	1.1.1 Business Rules Are About the Business	7
	1.1.2 Business Rules Concern Both the Structure	
	and the Behavior of the Business	7
	1.2 Motivations for the Business Rules Approach	
	1.3 How Do Business Rule Applications Differ from Traditional	
	Business Applications?	13
	1.4 Why Do We Need a New Methodology?	16
	1.5 Summary and Conclusions	24
	1.6 Further Reading	
2	Business Rules in Practice	
	2.1 Introduction	27
	2.2 Engineering Applications	28
	2.2.1 Alarm Filtering and Correlation	29
	2.2.2 Train Cars Preventive Maintenance	31
	2.3 Financial Services	33
	2.3.1 Mortgage Underwriting	33
	2.3.2 Tax Reporting and Withholding	36
	2.4 Insurance	38
	2.4.1 Policy Underwriting	
	2.4.2 Claim Processing	41
	2.5 Conclusion	43
	2.6 Further Reading	45

xix

xx Contents

Part II Methodology

3	Agile Business Rule Development 49
	3.1 Introduction
	3.2 Core Principles of the ABRD Methodology 50
	3.2.1 A Cycle Approach
	3.2.2 Cycle 1: Harvesting
	3.2.3 Cycle 2: Prototyping
	3.2.4 Cycle 3: Building
	3.2.5 Cycle 4: Integrating 50
	3.2.6 Cycle 5: Enhancing 50
	3.3 Eclipse Process Framework
	3.3.1 OpenUp
	3.3.2 ABRD Structure
	3.3.3 ABRD Roles
	3.3.4 ABRD Work Products
	3.4 Usage Scenario for ABRD
	3.5 Summary and Conclusions
	3.6 Further Reading
4	Rule Harvesting
	4.1 Introduction
	4.2 Rule Discovery
	4.2.1 Classification of Business Rules
	4.2.2 Discovery Activities
	4.3 Rule Discovery: Case Study
	4.4 Rule Analysis
	4.4.1 Analyze Rule Descriptions and Fact Models
	4.4.2 Transforming Rules
	4.4.3 Building Test Scenarios
	4.4.4 Verify Rules Against the Data Models
	4.5 Case Study: Rule Analysis
	4.6 Summary
	4.7 Further Reading
5	Prototyping and Design
	5.1 Introduction
	5.2 Determine Rule Implementation
	5.2.1 Implementing Rules Within the Data Model
	5.2.2 Implementing Rules Within Application Code
	5.2.3 Implementing Rules in GUI
	5.2.4 Implementing Rules in Process Maps
	5.2.5 Implementing Rules in a Rule Engine

Contents xxi

	5.3	Build Models	127
		5.3.1 Java Model	127
		5.3.2 XML Schema	128
		5.3.3 Synchronize with the Data Models	129
	5.4	Building Structures for Rule Development and Execution	130
		5.4.1 Rule Project Structure	130
		5.4.2 Defining Rule Meta Data	132
		5.4.3 Orchestrating Rule Execution	134
	5.5	Prototyping Rules	136
		5.5.1 Purpose of Rule Prototyping	136
		5.5.2 Some Useful Rule Patterns	137
	5.6	Case Study	140
		Communicate Back to Business	142
		Summary	142
		Further Reading	143
Don	4 YYY	Foundations	
гаг	t 111	roundations	
6	Rul	le Engine Technology	147
v		Introduction	147
		The History of Rule-Based Programming	148
		Rule Engines	151
	0.0	6.3.1 The Basics of Production Systems	151
		6.3.2 The JRules Rule Engine	155
	64	Engine Execution Algorithms	161
		6.4.1 The RETE Algorithm	161
		6.4.2 The Sequential Algorithm	168
		6.4.3 The Fastpath Algorithm	172
	6.5	Summary and Conclusions	173
		Further Reading	174
7	Isst	les in Designing Business Rule Applications	177
	7.1	Introduction	177
	7.2	Design Dimensions for Rule Management	178
		7.2.1 Early Versus Late BRMS Tools	178
		7.2.2 Requirements for an Early BRMS Tool	179
		7.2.3 Conclusion	184
	7.3	Design Options for a Business Rule Application	184
		7.3.1 Standalone Applications	186
		7.3.2 Synchronous Client–Server Architecture	187
		7.3.3 Message-Oriented Architectures	189
		7.3.4 Service-Oriented Architectures	191
	7.4	Designing the Integration of Rules into Applications	194
		7.4.1 Rule Engine Deployment Options	196

xxii Contents

		7.4.2 Architecture of the Calling Application	198
		7.4.3 Additional Requirements	202
		7.4.4 Summary	203
	7.5	Reengineering Existing Applications to Externalize	
		Business Rules	204
		7.5.1 Reengineering the Application Layer	205
		7.5.2 Reengineering the Business Layer	207
		7.5.3 Reengineering the Data Layer	209
	7.6	Summary and Discussion	211
		Further Reading	212
0	YD3	AWAGA HOG WALE	215
8		M WebSphere ILOG JRules	215
		Introduction	215
	8.2	Business Rule Management System Main Components	216
		8.2.1 The Concept of Operations	218
		8.2.2 Rule Artifacts	220
	8.3	Rule Studio	221
		8.3.1 Designing the Rule Project Structure	223
		8.3.2 Designing the Business Rule Model	226
		8.3.3 Designing the Business Object Model	
		8.3.4 Orchestrate Rule Execution	231
		8.3.5 Ruleset Testing and Deployment	231
		Rule Team Server	232
		Rule Execution Server	236
		Rule Solutions for Office	239
		Summary	241
	8.8	Further Reading	242
Par	t IV	Rule Authoring	
		-	
9		ues in Rule Authoring	245
		Introduction	245
	9.2	Rule Languages	246
		9.2.1 The Domain of Discourse: Business Object Models	247
		9.2.2 Flavors of Rule Authoring Languages	
	9.3	Rule Coding Strategies and Patterns	
		9.3.1 Coding Constraints and Guidelines	
		9.3.2 Coding Computations and Inferences	264
		9.3.3 Coding Action Enablers	265
		9.3.4 Coding Risk-Assessment Rules	265
		9.3.5 Encoding Business Data Tables	267
	9.4	Organizing Rules During Development	269
		9.4.1 Rule Structures	270
		9.4.2 Design Drivers for an Effective Organization of Rules	271

Contents xxiii

	9.4.3 Best Practices	275
	9.5 Summary and Discussion	280
	9.6 Further Reading	281
	· ·	
10	Rule Authoring Infrastructure in JRules	283
	10.1 Introduction	283
	10.2 Rule Projects	284
	10.2.1 The Structure of Rule Projects in Rule Studio	285
	10.2.2 Rule Project Dependencies	289
	10.2.3 Synchronizing Projects Between Rule Studio	
	and Rule Team Server	291
	10.2.4 Managing Multiple Users	296
	10.3 The Business Object Model	301
	10.3.1 The Basics of the BOM	301
	10.3.2 Verbalization	305
	10.3.3 BOM to XOM Mapping	308
	10.3.4 Refactoring	316
	10.3.5 Enhancing the Rule Authoring Experience	320
	10.4 Best Practices	324
	10.4.1 Best Practices for Organizing Rule Projects	324
	10.4.2 Best Practices for the Design of the BOM	326
	10.5 Discussion	331
	10.6 Further Reading	331
	Č	
11	Rule Authoring in JRules	333
	11.1 Introduction	333
	11.2 Rule Artifacts	334
	11.2.1 IRL and Technical Rules	335
	11.2.2 BAL and Action Rules	341
	11.2.3 Decision Tables	348
	11.2.4 Decision Trees	353
	11.2.5 Score Cards	354
	11.2.6 The Business Rules Language Development	
	Framework	357
	11.3 Rule Execution Orchestration	360
	11.3.1 Ruleset Parameters and Variables	361
	11.3.2 Rule Flows: Basics	365
	11.3.3 Rule Flows: Advanced Concepts	370
	11.4 Best Practices	375
	11.4.1 Best Practice 1: Design the Signature First	375
	11.4.2 Best Practice 2: Rulesets and Ruleflows	377
	11.4.3 Best Practice 3: My Kingdom for an Algorithm	379
	11.4.4 Best Practice 4: Do You Really Need a Custom	
	Language?	384
		•

xxiv Contents

		Discussion	386 387
Par	t V	Rule Deployment	
12		es in Deploying Rules	391
		Introduction	391
	12.2	Integration and Deployment Considerations	392
		12.2.1 Transaction Support	392
		12.2.2 Scalability	394
		12.2.3 Data Access	397
		12.2.4 Ruleset Hot Deployment	400
	12.3	Decision Service Integration	402
		12.3.1 Service Implementation	404
		12.3.2 Messaging Deployment	405
		12.3.3 Service Component Architecture	406
		12.3.4 Embedding Rule Engines Using Low-Level Rule	
		Engine API: JSR94	408
	12.4	Ruleset Deployment	413
		12.4.1 Building the Ruleset	414
		12.4.2 Loading the Ruleset in Execution Server	416
	12.5	Summary	417
		Further Reading	418
13	Depl	oying with JRules	419
		Introduction	420
	13.2	Reminder on the Concepts of Operation	420
	13.3	Integration with JRules Engine	424
		13.3.1 Deploying with the Rule Engine API	424
		13.3.2 JSR94: JRules Specifics	426
		13.3.3 Monitoring and Tracing Rule Execution	427
		13.3.4 Resource Pooling	427
	13.4	Deploying with the Rule Execution Server	428
		13.4.1 Using RES Session API	431
		13.4.2 JMS Deployment	433
		13.4.3 SCA Component	434
		13.4.4 Monitoring and Decision Warehouse	435
		13.4.5 Transparent Decision Service	437
	13.5	Rule Team Server	441
	15.5	13.5.1 Physical Deployment	441
		13.5.2 Queries	442
	13.6	Summary	443
		Further Reading	444
	15.7	I di dici reading	444

Contents xxv

Part VI Rule Testi	ing
--------------------	-----

14	Issue	es with Rule Testing and Performance	447
	14.1	Introduction	448
	14.2	Rule Testing	448
		14.2.1 Unit Testing	449
		14.2.2 Component Testing	453
		14.2.3 Functional Testing	454
		14.2.4 Regression Testing	456
	14.3	Performance Testing	456
		14.3.1 Multiple Performance Dimensions	458
		14.3.2 Patterns of Data Materialization	460
		14.3.3 Accessing Data from Within the Rules	460
		14.3.4 Pattern Matching Performance	461
		14.3.5 Some Guidelines on Keywords	462
	14.4	Continuous Testing	463
		Semantic Consistency Checking	465
	14.6	Tracing and Logging Rule Applications	467
		Summary	468
	14.8	Further Reading	469
15	Rule	Testing with JRules	471
		Introduction	472
		15.1.1 Semantic Consistency Checking	472
		15.1.2 Semantic Queries	474
		15.1.3 Rule Coverage	475
	15.2	Rule Testing	476
		15.2.1 Unit Test	476
		15.2.2 Decision Validation Service	477
		15.2.3 DVS Customization	488
	15.3	Performance Tuning	492
		15.3.1 Ruleset Parsing	492
		15.3.2 Execution Algorithms	494
		15.3.3 Rule Execution Improvement	496
	15.4	Summary	499
	15.5	Further Reading	499
Par	t VII	Rule Governance	
16	Dala	Governance	503
10		Introduction	503
		Need for Governance	504
	10.2	16.2.1 IT and Rusiness Governance	504

xxvi Contents

		16.2.2 How to Start Developing Rule Governance	505
		16.2.3 What Are the Main Processes in Rule Governance?	506
	16.3	Defining Rule Governance	506
		16.3.1 Create the Business Rules Management Group	507
		16.3.2 Identify Stakeholders	508
		16.3.3 Ruleset Owning Groups	512
		16.3.4 Rule Life Cycle	513
	16.4	Rule Change Process	515
		16.4.1 Scope of Change	517
		16.4.2 Rule Authoring Subprocess	518
		16.4.3 Rule Testing Subprocess	519
		16.4.4 Rule Deployment Subprocess	519
		Summary	520
	16.6	Further Reading	521
17		Governance with JRules	523
		Introduction	523
	17.2	JRules and Rule Governance	524
		17.2.1 Defining Roles in Rule Team Server	524
		17.2.2 Rule Life Cycle	526
		17.2.3 Ruleset Baseline and Versioning	529
		17.2.4 Deeper Changes	532
	17.3	The Rule Change Management Process	534
		17.3.1 Process Implementation	535
		17.3.2 RTS and Workflow Integration	538
		17.3.3 Getting Rule Status Modification Event from RTS	539
		17.3.4 Getting the List of Rules from RTS	540
	17.4	Summary	542
	17.5	Further Reading	542
Part	VIII	Epilogue	
18	Enile	-	<i>- 1</i> -
10	10 1	It Is About Poorle Process and Taskinslagu	545
	10.1	It Is About People, Process, and Technology	545
		Success – and Failure – Factors	546
	18.3	Where to from Here	548
Bibl	iogra	phy	551
Inda			