Mastering the Requirements Process
Second Edition

Suzanne Robertson
James Robertson
Contents

Preface to the Second Edition xxi
Foreword to the First Edition xxiii
Acknowledgments xxiv

1 What Are Requirements? 1
in which we consider why we are interested in requirements
Requirements Gathering and Systems Modeling 3
Agile Software Development 4
Why Do I Need Requirements? 8
What Is a Requirement? 9
  Functional Requirements 9
  Nonfunctional Requirements 10
  Constraints 10
Evolution of Requirements 11
The Template 11
The Shell 14
The Volere Requirements Process 15

2 The Requirements Process 17
in which we look at a process for gathering requirements and discuss how you might use it
Agility Guide 19
Requirements Process in Context 20
The Process 21
A Case Study 21
  Project Blastoff 22
Trawling for Requirements 24
Prototyping the Requirements 25
Scenarios 25
Writing the Requirements 26
The Quality Gateway 28
Reusing Requirements 29
Reviewing the Specification 29
Iterative and Incremental Processes 30
Requirements Retrospective 31
Your Own Requirements Process 31
In Conclusion 33

VII
3 Project Blastoff

*in which we establish a solid foundation for the requirements, and ensure that the members of the project team all start rowing in the same direction*

Agility Guide 38
IceBreaker 38
Scope, Stakeholders, Goals 40
Setting the Scope 40
  *Domains of Interest* 42
  *First-Cut Work Context* 44
Stakeholders 45
  *The Client* 47
  *The Customer* 48
  *The Users: Get to Know Them* 49
Other Stakeholders 51
  Consultants 52
  Management 52
  Subject Matter Experts 52
  Core Team 52
  Inspectors 53
  Market Forces 53
  Legal 53
  Negative Stakeholders 53
  Industry Standard Setters 53
  Public Opinion 53
  Government 53
  Special-Interest Groups 54
  Technical Experts 54
  Cultural Interests 54
  Adjacent Systems 54
Finding the Stakeholders 54
Goals: What Do You Want to Achieve? 55
  *Keeping Track of the Purpose* 59
Requirements Constraints 60
  *Solution Constraints* 60
  *Project Constraints* 61
Naming Conventions and Definitions 61
How Much Is This Going to Cost? 62
Risks 63
To Go or Not to Go 64
Blastoff Alternatives 65
Summary 65

4 Event-Driven Use Cases

*in which we discuss a fail-safe way of partitioning the work into use cases, and along the way discover the best product to build*

Agility Guide 67
Understanding the Work 67
Use Cases and Their Scope  69
The Work  70
The Context of the Work  70
    The Outside World  72
Business Events  73
    Time-Triggered Business Events  74
Why Business Events and Business Use Cases Are a Good Idea  75
Finding the Business Events  76
Business Use Cases  78
The Role of Adjacent Systems  79
    Active Adjacent Systems  80
    Autonomous Adjacent Systems  83
    Cooperative Adjacent Systems  85
Business Use Cases and Product Use Cases  86
    Actors  89
Summary  90

5 Trawling for Requirements  93
    in which we drag the net through the work area looking for
    requirements, and discuss some useful techniques for doing so
Agility Guide  93
Responsibility  94
    The Requirements Analyst  94
Trawling and Business Use Cases  96
The Role of the Current Situation  98
Apprenticing  101
Observing Structures and Patterns  103
Interviewing the Stakeholders  104
    Asking the Right Questions  106
Getting to the Essence of the Work  107
Solving the Right Problem  109
Innovative Products  110
Business Use Case Workshops  113
    Outcome  114
    Scenarios  115
    Business Rules  115
Creativity Workshops  116
Brainstorming  117
Personas  119
Mind Maps  122
Wallpaper  124
Video and Photographs  124
Wikis, Blogs, and Discussion Forums  125
Document Archeology  126
Some Other Requirements-Gathering Techniques  128
    Family Therapy  128
    Soft Systems and Viewpoints  129
Determining What the Product Should Be  129
    The True Origin of the Business Event  131
Does Technology Matter?  131
Contents • xi

Confidentiality 187
Availability 188
Integrity 188
Auditing 189
... And No More 189
Cultural and Political Requirements: Type 16 190
Legal Requirements: Type 17 192
Sarbanes-Oxley Act 194
Other Legal Obligations 194
Standards 194
Finding the Nonfunctional Requirements 195
Blogging the Requirements 195
Use Cases 195
The Template 197
Prototypes and Nonfunctional Requirements 197
The Client 198
Don’t Write a Solution 199
Summary 201

Fit Criteria 203
in which we show how measuring a requirement makes it unambiguous, understandable, and, importantly, testable
Agility Guide 203
Why Does Fit Need a Criterion? 204
Scale of Measurement 206
Rationale 206
Fit Criteria for Nonfunctional Requirements 208
Product Failure? 209
Subjective Tests 210
Look and Feel Requirements 211
Usability and Humanity Requirements 212
Performance Requirements 213
Operational Requirements 214
Maintainability Requirements 215
Security Requirements 215
Cultural and Political Requirements 216
Legal Requirements 216
Fit Criteria for Functional Requirements 217
Test Cases 218
Use Cases and Fit Criteria 218
Fit Criterion for Project Purpose 219
Fit Criteria for Solution Constraints 219
Summary 220

Writing the Requirements 223
in which we turn the requirements into written form
Agility Guide 223
Turning Potential Requirements into Written Requirements 225
Knowledge Versus Specification 225
Contents

Project Issues 252
18 Open Issues 252
19 Off-the-Shelf Solutions 253
20 New Problems 254
21 Tasks 254
22 Migration to the New Product 254
23 Risks 254
24 Costs 255
25 User Documentation and Training 256
26 Waiting Room 256
27 Ideas for Solutions 257
Summary 257

11 The Quality Gateway 259
*in which we prevent unworthy requirements becoming part of the specification*
Agility Guide 260
Requirements Quality 261
Using the Quality Gateway 262
Testing Completeness
  *Are There Any Missing Components?* 264
  *Meaningful to All Stakeholders?* 265
Testing Traceability 265
Consistent Terminology 267
Relevant to Purpose? 268
Testing the Fit Criterion 270
Viable within Constraints? 272
Requirement or Solution? 273
Customer Value 274
Gold Plating 275
Requirements Creep
  *Requirements Leakage* 278
Implementing the Quality Gateway 279
  *Alternative Quality Gateways* 280
Summary 281

12 Prototyping the Requirements 283
*in which we use simulations to help find requirements*
Agility Guide 285
Prototypes and Reality 286
Low-Fidelity Prototypes 288
High-Fidelity Prototypes 292
Storyboards 294
Object Life History 296
The Prototyping Loop
  *Design and Build* 298
  *Testing in the User Environment* 299
  *Analyzing the Results* 300
Summary 301
13 Reusing Requirements
in which we look for requirements that have already been written and explore ways to reuse them

What Is Reusing Requirements? 303
Sources of Reusable Requirements 306
Requirements Patterns 307
  Christopher Alexander's Patterns 308
A Business Event Pattern 309
  Context of Event Response 310
  Processing for Event Response 311
  Data for Event Response 312
Forming Patterns by Abstracting 313
  Patterns for Specific Domains 314
  Patterns Across Domains 315
Domain Analysis 317
Trends in Reuse 318
  Reuse and Objects 318
  Reuse Is Now a Job? 318
Summary 319

14 Reviewing the Specification
in which we decide whether our specification is correct and complete, and set the priorities of the requirements

Agility Guide 322
Reviewing the Specification 323
Inspections 323
Find Missing Requirements 324
Have All Business Use Cases Been Discovered? 325
  1. Define the Scope 326
  2. Identify Business Events and Non-Events 326
  3. Model the Business Use Case 328
  4. Define the Business Data 328
  5. CRUD Check 330
  6. Check for Custodial Processes 331
    Repeat Until Done 331
Customer Value 332
Prioritizing the Requirements 333
  Prioritization Factors 333
  When to Prioritize 334
  Requirement Priority Grading 335
  Prioritization Spreadsheet 335
Conflicting Requirements 337
Ambiguous Specifications 339
Risk Analysis 340
  Project Drivers 340
  Project Constraints 341
  Functional Requirements 341
Contents • xv

Measure the Required Effort 342
Summary 342

15 Whither Requirements? 345

in which we consider some other issues for the requirements

Adapting the Process 345
What About Requirements Tools? 347
Mapping Tools to Purpose 348
Publishing the Requirements 350
  Contractual Document 351
  Management Summary 351
  Marketing Summary 352
  User Review 352
  Reviewing the Specification 353
Requirements Traceability 353
  Tracing a Business Event 353
Dealing with Change 357
  Changes in the World 358
  Requirements Feedback 358
Requirements Retrospective 360
  What to Look For 360
  Running the Retrospective 360
  Retrospective Report 362
Your Notebook 363
The End 363

Appendix A Volere Requirements Process Model 365

in which we present, for your reference, the complete Volere Requirements Process

The Volere Requirements Process Model 365
  Making This Work for You 366
  Finding More Information 367
Define Blastoff Objectives (Process Notes 1.1.1) 371
Plan Physical Arrangements (Process Notes 1.1.2) 371
Communicate with Participants (Process Notes 1.1.3) 372
Determine Project Purpose (Process Notes 1.2.1) 374
Determine the Work Context (Process Notes 1.2.2) 374
Do First-Cut Risk Analysis (Process Notes 1.2.3) 375
Identify the Stakeholders (Process Notes 1.2.4) 376
Partition the Context (Process Notes 1.2.5) 377
Consider Non-Events (Process Notes 1.2.6) 377
Define Business Terminology (Process Notes 1.2.7) 377
Define Project Constraints (Process Notes 1.2.8) 378
Identify Domains of Interest (Process Notes 1.2.9) 378
Write Blastoff Report (Process Notes 1.3.1) 380
Review Blastoff Results (Process Notes 1.3.2) 380
Hold Follow-Up Blastoff (Process Notes 1.3.3) 381
Make Initial Estimate (Process Notes 1.3.4) 382
Review Current Situation (Process Notes 2.1.1) 385
Apprentice with the User (Process Notes 2.1.2) 385
Determine Essential Requirements (Process Notes 2.1.3) 386
Brainstorm the Requirements (Process Notes 2.1.4) 386
Interview the Users (Process Notes 2.1.5) 387
Do Document Archaeology (Process Notes 2.1.6) 388
Make Requirements Video (Process Notes 2.1.7) 389
Run Use Case Workshop (Process Notes 2.1.8) 389
Build Event Models (Process Notes 2.1.9) 390
Build Scenario Models (Process Notes 2.1.10) 391
Run Creativity Workshop (Process Notes 2.1.11) 391
Study the Adjacent Systems (Process Notes 2.2.1) 393
Define Use Case Boundary (Process Notes 2.2.2) 393
Gather Business Event Knowledge (Process Notes 2.3.1) 395
Choose Appropriate Trawling Techniques (Process Notes 2.3.2) 395
Ask Clarification Questions (Process Notes 2.4) 396
Identify Potential Requirements (Process Notes 3.1) 399
Identify Functional Requirements (Process Notes 3.2) 399
Identify Composite Requirements (Process Notes 3.3) 400
Formalize Requirement (Process Notes 3.4) 400
Formalize System Constraints (Process Notes 3.5) 400
Identify Nonfunctional Requirements (Process Notes 3.6) 401
Write Functional Fit Criteria (Process Notes 3.7) 401
Write Nonfunctional Fit Criteria (Process Notes 3.8) 402
Define Customer Value (Process Notes 3.9) 402
Identify Dependencies and Conflicts (Process Notes 3.10) 403
Review Requirement Fit Criteria (Process Notes 4.1) 405
Review Requirement Relevance (Process Notes 4.2) 406
Review Requirement Viability (Process Notes 4.3) 406
Identify Gold-Plated Requirements (Process Notes 4.4) 406
Review Requirement Completeness (Process Notes 4.5) 406
Plan the Prototype (Process Notes 5.1) 408
Build Low-Fidelity Prototype (Process Notes 5.2.1) 410
Build High-Fidelity Prototype (Process Notes 5.2.2) 410
Test High-Fidelity Prototype with Users (Process Notes 5.3.1) 413
Test Low-Fidelity Prototype with Users (Process Notes 5.3.2) 413
Identify New and Changed Requirements (Process Notes 5.3.3) 414
Evaluate Prototyping Effort (Process Notes 5.3.4) 414
Conduct Private Individual Reviews (Process Notes 6.1.1) 417
Conduct Separate Meetings with Groups (Process Notes 6.1.2) 417
Facilitator Reviews Facts (Process Notes 6.1.3) 417
Hold Retrospective Review Meeting (Process Notes 6.2.1) 420
Produce Retrospective Report (Process Notes 6.2.2) 420
  Retrospective Report on Requirements Specification 420
Identify Filtration Criteria (Process Notes 6.3.1) 423
Select Relevant Requirement Types (Process Notes 6.3.2) 423
Add New Filtration Criteria (Process Notes 6.3.3) 423
Identify Missing Requirements (Process Notes 7.1.1) 427
Identify Customer Value Ratings (Process Notes 7.1.2) 427
Identify Requirement Interaction (Process Notes 7.1.3) 428
Identify Prototyping Opportunity (Process Notes 7.1.4) 428
Find Missing Custodial Requirements (Process Notes 7.1.5) 429
Look for Likely Risks (Process Notes 7.2.1) 431
Quantify Each Risk (Process Notes 7.2.2) 431
Identify Estimation Input (Process Notes 7.3.1) 434
Estimate Effort for Events (Process Notes 7.3.2) 434
Estimate Requirements Effort (Process Notes 7.3.3) 435
Design Form of Specification (Process Notes 7.4.1) 437
Assemble the Specification (Process Notes 7.4.2) 437
Dictionary of Terms Used in the
Requirements Process Model 437

Appendix B  Volere Requirements Specification Template 451

a guide for writing a rigorous and complete
requirements specification

Contents 451

Project Drivers 451
Project Constraints 451
Functional Requirements 451
Nonfunctional Requirements 451
Project Issues 452
Preamble 452
Volere 452
Requirements Types 453
Testing Requirements 453
Requirements Shell 454
1 The Purpose of the Project 454
1a The User Business or Background of the Project Effort 454
1b Goals of the Project 455
2 The Client, the Customer, and Other Stakeholders 456
2a The Client 456
2b The Customer 456
2c Other Stakeholders 457
3 Users of the Product 457
3a The Hands-On Users of the Product 457
3b Priorities Assigned to Users 458
3c User Participation 459
3d Maintenance Users and Service Technicians 459
4 Mandated Constraints 460
4a Solution Constraints 460
4b Implementation Environment of the Current System 461
4c Partner or Collaborative Applications 462
4d Off-the-Shelf Software 462
4e Anticipated Workplace Environment 463
4f Schedule Constraints 464
4g Budget Constraints 465
5 Naming Conventions and Definitions 465
5a Definitions of All Terms, Including Acronyms, Used in the Project 465
5b Data Dictionary for Any Included Models 466
6 Relevant Facts and Assumptions 467
6a Facts 467
6b Assumptions 467

7 The Scope of the Work 468
7a The Current Situation 468
7b The Context of the Work 469
7c Work Partitioning 470

8 The Scope of the Product 472
8a Product Boundary 472
8b Product Use Case List 472
8c Individual Product Use Cases 473

9 Functional and Data Requirements 473
9a Functional Requirements 473
9b Data Requirements 475

10 Look and Feel Requirements 476
10a Appearance Requirements 476
10b Style Requirements 476

11 Usability and Humanity Requirements 477
11a Ease of Use Requirements 477
11b Personalization and Internationalization Requirements 479
11c Learning Requirements 479
11d Understandability and Politeness Requirements 480
11e Accessibility Requirements 481

12 Performance Requirements 482
12a Speed and Latency Requirements 482
12b Safety-Critical Requirements 483
12c Precision or Accuracy Requirements 484
12d Reliability and Availability Requirements 484
12e Robustness or Fault-Tolerance Requirements 485
12f Capacity Requirements 485
12g Scalability or Extensibility Requirements 486
12h Longevity Requirements 486

13 Operational and Environmental Requirements 487
13a Expected Physical Environment 487
13b Requirements for Interfacing with Adjacent Systems 487
13c Productization Requirements 488
13d Release Requirements 489

14 Maintainability and Support Requirements 489
14a Maintenance Requirements 489
14b Supportability Requirements 490
14c Adaptability Requirements 490

15 Security Requirements 491
15a Access Requirements 491
15b Integrity Requirements 492
15c Privacy Requirements 492
15d Audit Requirements 493
15e Immunity Requirements 493

16 Cultural and Political Requirements 494
16a Cultural Requirements 494
16b Political Requirements 494
Appendix C  Function Point Counting:
A Simplified Introduction  507

in which we look at a way to accurately measure the size
or functionality of the work area, with a view toward using
the measurement to estimate the requirements effort

Measuring the Work  507
A Quick Primer on Counting Function Points  509

  Scope of the Work  509
  Data Stored by the Work  510
  Business Use Cases  511
Counting Function Points for Business Use Cases  512

  Counting Input Business Use Cases  512
  Counting Output Business Use Cases  514
  Counting Time-Triggered Business Use Cases  515
Counting the Stored Data  517

  Internal Stored Data  517
  Externally Stored Data  518
Adjust for What You Don't Know  520
What's Next After Counting Function Points?  521