1. Record Nr. UNINA9910141326703321

Titolo	Service availability : principles and practice / / editors, Maria Toeroe, Francis Tam
Pubbl/distr/stampa	Chichester, West Sussex : , : Wiley, , 2012 [Piscataqay, New Jersey] : , : IEEE Xplore, , [2012]
ISBN	1-280-58856-X 9786613618399 1-119-94137-7 1-119-94136-9
Edizione	[1st edition]
Descrizione fisica	1 online resource (485 p.)
Altri autori (Persone)	ToeroeMaria TamFrancis
Disciplina	620/.00452
Soggetti	Reliability (Engineering)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	List of Contributors xiii -- Foreword xv -- Preface xix -- Acknowledgments xxv -- List of Abbreviations xxvii -- Part I INTRODUCTION TO SERVICE AVAILABILITY -- 1 Definitions, Concepts, and Principles 3 / Francis Tam -- 1.1 Introduction 3 -- 1.2 Why Service Availability? 4 -- 1.2.1 Dossier on Unavailability of Service 4 -- 1.2.2 Issues and Challenges 5 -- 1.3 Service Availability Fundamentals 6 -- 1.3.1 System, Behavior, and Service 6 -- 1.3.2 Dependable Computing Concepts 8 -- 1.3.3 The Meaning of Availability 10 -- 1.4 Achieving Service Availability 13 -- 1.4.1 Following the Framework of Fault Tolerance 13 -- 1.4.2 Redundancy is a Requisite 14 -- 1.4.3 Dealing with Failures 16 -- 1.4.4 Upgrade Matters 19 -- 1.5 Conclusion 20 -- 2 The Birth of the Service Availability Forum 23 / Francis Tam -- 2.1 Introduction 23 -- 2.2 Technology Environment 23 -- 2.3 Business Environment 24 -- 2.3.1 Ecosystem 25 -- 2.3.2 COTS and Open Systems 26 -- 2.4 The Service Availability Forum Era 27 -- 2.5 Concluding Remarks 28 -- Part II THE SA FORUM SYSTEM: SERVICES AND FRAMEWORKS -- 3 Overview of the Service Availability Architecture 33 / Dave Penkler -- 3.1 Introduction 33 -- 3.1.1

Background and Business Context 33 -- 3.1.2 Goals and Requirements 34 -- 3.1.3 Service Availability Architecture Scope and Presentation 36 -- 3.2 HA Concepts Applied 39 -- 3.2.1 To Be or Not to Be High Availability Aware 39 -- 3.2.2 HA Aware Application Perspective 42 -- 3.3 Architecture 43 -- 3.3.1 Basic Architectural Model 43 -- 3.3.2 The AIS Services and Frameworks Architecture 47 -- 3.3.3 Service Dependencies 58 -- 3.4 Open Issues 59 -- 3.4.1 The Optional Features Issue 60 -- 3.4.2 Integrated AIS Service API 60 -- 3.4.3 Common Low Level Communication Facility Interface 60 -- 3.4.4 Common Distributed Process Management Interface 61 -- 3.4.5 System Trace Service 61 -- 3.4.6 Diagnostics Framework 61 -- 3.4.7 Overload Control Framework 61 -- 3.5 Conclusion 62 -- 4 The SA Forum Information Model: The Heart of Control and Monitoring 63 / Maria Toeroe.
4.1 Introduction 63 -- 4.2 Background 64 -- 4.2.1 Management Models Out There 64 -- 4.2.2 The SA Forum Needs 65 -- 4.3 The SA Forum Information Model 67 -- 4.3.1 Overview of the SA Forum Solution 67 -- 4.3.2 Administrative and Management Aspects 80 -- 4.3.3 Application Information Models 81 -- 4.3.4 Open Issues and Recommendations 81 -- 4.4 Conclusion 83 -- 5 Consistent and High Level Platform View 85 / Maria Toeroe -- 5.1 Introduction 85 -- 5.2 Hardware Platform Interface 86 -- 5.2.1 Background 86 -- 5.2.2 Overview of the Hardware Platform Interface 87 -- 5.2.3 The HPI Model 88 -- 5.2.4 HPI Capability Discovery 93 -- 5.2.5 Error Handling and Administrative Operations 94 -- 5.2.6 Open Issues and Conclusions 95 -- 5.3 Platform Management Service 96 -- 5.3.1 The Conception of PLM 96 -- 5.3.2 Overview of the SA Forum Platform Management 97 -- 5.3.3 The PLM Information Model 98 -- 5.3.4 Tracking of PLM Entities 107 -- 5.3.5 Administrative and Management Aspects 110 -- 5.3.6 Service Interaction 118 -- 5.3.7 Open Issues and Conclusions 120 -- 5.4 Cluster Membership Service 121 -- 5.4.1 Background 121 -- 5.4.2 Overview of the Cluster Membership Service 122 -- 5.4.3 CLM Configuration: The Bootstrap Trap 125 -- 5.4.4 Are You a Member? 126 -- 5.4.5 Administrative and Management Aspects 127 -- 5.4.6 Service Interaction 129 -- 5.4.7 Open Issues 130 -- 5.4.8 Recommendation 131 -- 5.5 Conclusion 131 -- 6 Model Based Availability Management: The Availability Management Framework 133 / Maria Toeroe -- 6.1 Introduction 133 -- 6.2 Background 134 -- 6.2.1 Error Detection and Repair 134 -- 6.2.2 Fault Zones and Error Escalation 135 -- 6.2.3 Separation of Services from Serving Entities 136 -- 6.2.4 Service Provisioning Roles 136 -- 6.2.5 Delicacies of Service State Replication 137 -- 6.3 The Availability Management Framework 138 -- 6.3.1 Overview of the SA Forum Solution 138 -- 6.3.2 Components and Component Service Instances 139 -- 6.3.3 The AMF Information Model 148 -- 6.3.4 Redundancy Models 167.
6.3.5 The AMF Administrative Interface 176 -- 6.3.6 Interactions Between AMF and Other AIS Services 187 -- 6.3.7 Open Issues 190 -- 6.3.8 Recommendation 191 -- 6.4 Conclusion 191 -- 7 Communication and Synchronization Utilities 193 / Maria Toeroe and Sayandeb Saha -- 7.1 Introduction 193 -- 7.2 Event Service 194 -- 7.2.1 Background: Event Service Issues, Controversies, and Problems 194 -- 7.2.2 Overview of the SA Forum Event Service 195 -- 7.2.3 Event Service Architecture and Model 196 -- 7.2.4 User Perspective 200 -- 7.2.5 Administrative and Management Aspects 201 -- 7.2.6 Service Interactions 201 -- 7.2.7 Open Issues and Recommendations 202 -- 7.3 Message Service 202 -- 7.3.1 Need for Reliability and Load Distribution 202 -- 7.3.2 Overview of the SA Forum Message Service 203 -- 7.3.3 Message Service Architecture and Model 205 -- 7.3.4

User Perspective 207 -- 7.3.5 Administrative and Management Aspects 210 -- 7.3.6 Service Interaction 210 -- 7.3.7 Open Issues and Recommendations 211 -- 7.4 Checkpoint Service 212 -- 7.4.1 Background: Why Checkpoints 212 -- 7.4.2 Overview of the SA Forum Checkpoint Service 213 -- 7.4.3 Checkpoint Service Model 215 -- 7.4.4 User Perspective 217 -- 7.4.5 Administrative and Management Aspects 220 -- 7.4.6 Service Interaction 221 -- 7.4.7 Open Issues 222 -- 7.4.8 Recommendation 222 -- 7.5 Conclusion 223 -- 7.5.1 Common Issue: Entity Names 223 -- 7.5.2 Conclusion 223 -- 8 Services Needed for System Management 227 / Maria Toeroe -- 8.1 Introduction 227 -- 8.2 Log Service 228 -- 8.2.1 Background: Data, Data, and More Data 228 -- 8.2.2 Overview of the SA Forum Solution 229 -- 8.2.3 The LOG Information Model 231 -- 8.2.4 User Perspective 232 -- 8.2.5 Administrative and Management Aspects 233 -- 8.2.6 Service Interaction 233 -- 8.2.7 Open Issues and Recommendations 235 -- 8.3 Notification Service 236 -- 8.3.1 Background: Issues, Controversies, and Problems 236 -- 8.3.2 Overview of the SA Forum Notification Service 237 -- 8.3.3 User Perspective 239.
8.3.4 Correlation of Notifications 241 -- 8.3.5 Administrative and Management Aspects 243 -- 8.3.6 Service Interaction 244 -- 8.3.7 Open Issues and Recommendation 246 -- 8.4 Information Model Management Service 247 -- 8.4.1 Background: Issues, Controversies, and Problems 247 -- 8.4.2 Overview of the SA Forum IMM Solution 249 -- 8.4.3 The Object Manager API 251 -- 8.4.4 The Object Implementer API 255 -- 8.4.5 IMM XML File 258 -- 8.4.6 Administrative and Management Aspects 258 -- 8.4.7 Service Interaction 258 -- 8.4.8 Open Issues 260 -- 8.4.9 Recommendation 261 -- 8.5 Conclusion 262 -- 9 Model-Based Software Management: The Software Management Framework 265 / Maria Toeroe -- 9.1 Introduction 265 -- 9.2 Background 266 -- 9.3 Software Management a la Carte 268 -- 9.3.1 Overview of the SA Forum Solution 268 -- 9.3.2 Entity Types File: Is It Eaten or Drunk by SMF? 271 -- 9.3.3 The Upgrade Campaign and Its Specification 273 -- 9.3.4 Upgrade Campaign Execution Status and Failure Handling 279 -- 9.3.5 Administrative and Management Aspects 285 -- 9.3.6 User Perspective 288 -- 9.3.7 Service Interaction 289 -- 9.3.8 Open Issues 291 -- 9.3.9 Recommendation 292 -- 9.4 Conclusion 294 -- 10 Combining the Services 297 / Maria Toeroe -- 10.1 Introduction 297 -- 10.2 Application Design and Development 297 -- 10.3 Application Platform Design 299 -- 10.4 Operation and Maintenance 301 -- Part III SA FORUM MIDDLEWARE IN ACTION -- 11 SA Forum Programming Model and API Conventions 305 / Francis Tam -- 11.1 Introduction 305 -- 11.2 Programming Model 306 -- 11.2.1 AIS Area Service Interfaces 306 -- 11.2.2 Real-Time Support 306 -- 11.2.3 Naming Conventions and Type Definitions 308 -- 11.2.4 Usage Model and Library Life Cycle 309 -- 11.2.5 Tracking 311 -- 11.3 Making Sense of the API Specifications 312 -- 11.3.1 Structure of Service API Specification 314 -- 11.3.2 Administration API 315 -- 11.4 Practical Topics 316 -- 11.4.1 Interacting with POSIX 316 -- 11.4.2 Allocating and Freeing Memory 319.
11.4.3 Handling Pointers 319 -- 11.4.4 Finding Out Implementation Limits 320 -- 11.4.5 When an Area Service is Unavailable 321 -- 11.4.6 Backward Compatibility 322 -- 11.5 Concluding Remarks 322 -- 12 SA Forum Java Mappings: Specifications, Usage, and Experience 325 / Robert Hyerle and Jens Jensen -- 12.1 Introduction 325 -- 12.2 Background 325 -- 12.2.1 Early Exploration of Java Mappings in Hewlett / Packard 325 -- 12.2.2 Java in Ericsson 326 -- 12.2.3 The SA Forum Java Mapping Initiative 327 -- 12.3 Understanding the Java Mappings 328 -- 12.3.1 Java Application Integration Architecture 328

-- 12.3.2 Naming 329 -- 12.3.3 Package Structure 330 -- 12.3.4 The Underlying Objects 330 -- 12.3.5 Types 331 -- 12.3.6 Parameters, Exceptions, and Method Signatures 332 -- 12.3.7 Factories, Callbacks, and Life-cycles 333 -- 12.3.8 Callbacks and the Selection Object in Java 334 -- 12.4 Using the Java Mappings 335 -- 12.4.1 Integrating AIS Services with Java Applications 335 -- 12.4.2 Integrating AIS Services with Containerized Java Applications 342 -- 12.4.3 AIS Services in Mixed Language and Mixed Implementation Environments 343 -- 12.5 Going Further 343 -- 12.5.1 The Java Mapping Roadmap 343 -- 12.5.2 Related Java Standards and Other References 344 -- 13 SA Forum Middleware Implementations 347 / Mario Angelic and Ulrich Kleber -- 13.1 Introduction 347 -- 13.1.1 OpenHPI 347 -- 13.1.2 OpenSAF 348 -- 13.2 The OpenHPI Project 348 -- 13.2.1 Overview of the OpenHPI Solution 348 -- 13.2.2 User Perspective 351 -- 13.2.3 OpenHPI Tools 353 -- 13.2.4 Open Issues and Recommendations 354 -- 13.3 The OpenSAF Project 355 -- 13.3.1 Background 355 -- 13.3.2 OpenSAF Architecture 356 -- 13.3.3 SA Forum Compliant Services 360 -- 13.3.4 OpenSAF Infrastructure Services 364 -- 13.3.5 Managing OpenSAF 365 -- 13.3.6 Deploying OpenSAF 367 -- 13.4 Conclusion 368 -- 14 Integration of the VideoLAN Client with OpenSAF: An Example 371 / Anik Mishra and Ali Kanso -- 14.1 Introduction 371 -- 14.2 Going Under the Hood: The VLC Workflow 372.
14.3 Integrating VLC with OpenSAF 373 -- 14.3.1 Nonproxied-Non-SA-Aware Integration 374 -- 14.3.2 SA-Aware VLC Integration 379 -- 14.3.3 SA-Aware VLC with Service Continuity 384 -- 14.4 Summary and Conclusion 387 -- 15 Migration Paths for Legacy Applications 391 / Mario Angelic -- 15.1 Introduction 391 -- 15.2 Reasons for Migration 392 -- 15.2.1 Benefits for System Owners 392 -- 15.2.2 Benefits for ISVs 392 -- 15.3 Integration Criteria 393 -- 15.3.1 Main Factors 393 -- 15.3.2 Easy Management 394 -- 15.3.3 Streamlined Architecture 396 -- 15.3.4 Code Quality 397 -- 15.3.5 Integration Levels 397 -- 15.4 How to Migrate 399 -- 15.4.1 Availability Integration 399 -- 15.4.2 Manageability Integration 409 -- 15.5 Open Issues 413 -- 15.6 Conclusion 413 -- 16 Overcoming Complexity: Formal Modeling Techniques at the Rescue 415 / Maria Toeroe and Ferhat Khendek -- 16.1 Introduction 415 -- 16.2 Background 416 -- 16.2.1 The Model-Based Approach 416 -- 16.2.2 Starting Points in the Specifications 417 -- 16.3 Model-Based Software Management 419 -- 16.3.1 Configuration Model 419 -- 16.3.2 Configuration Generation 420 -- 16.3.3 Upgrade Campaign Generation 424 -- 16.3.4 Analytical Models and How They Can Help 427 -- 16.4 Conclusion 428 -- 17 Conclusion 431 -- 17.1 Summary 431 -- 17.2 The Future 433 -- References 435 -- Index 443.

Sommario/riassunto

Our society increasingly depends on computer-based systems; the number of applications deployed has increased dramatically in recent years and this trend is accelerating. Many of these applications are expected to provide their services continuously. The Service Availability Forum has recognized this need and developed a set of specifications to help software designers and developers to focus on the value added function of applications, leaving the availability management functions for the middleware. A practical and informative reference for the Service Availability Forum specifications, this book gives a cohesive explanation of the founding principles, motivation behind the design of the specifications, and the solutions, usage scenarios and limitations that a final system may have. Avoiding complex mathematical explanations, the book takes a pragmatic approach by discussing issues that are as close as possible to the daily software design/development by practitioners, and yet at a level that still takes

in the overall picture. As a result, practitioners will be able to use the specifications as intended. . Takes a practical approach, giving guidance on the use of the specifications to explain the architecture, redundancy models and dependencies of the Service Availability (SA) Forum services. Explains how service availability provides fault tolerance at the service level. Clarifies how the SA Forum solution is supported by open source implementations of the middleware. Includes fragments of code, simple example and use cases to give readers a practical understanding of the topic. Provides a stepping stone for applications and system designers, developers and advanced students to help them understand and use the specifications.