

Contents

Part I Cloud Computing

1 Intelligent Web Data Management of Multi-tenant Data Middleware	3
1.1 Introduction	3
1.1.1 Background	3
1.1.2 Challenges and Contributions	4
1.2 Related Work and Emerging Techniques	4
1.2.1 Software as a Service Maturity Model	4
1.2.2 Software as a Service Data Models	6
1.3 Requirements	9
1.3.1 Criteria of Multi-tenant Data Middleware	9
1.3.2 Requirements of Multi-tenant Data Middleware	10
1.4 Architecture	10
1.4.1 SQL Interceptor	10
1.4.2 SQL Parser	10
1.4.3 SQL Restorer	11
1.4.4 SQL Router	12
1.4.5 Data Node	12
1.4.6 Cache	13
1.4.7 Tenant Context	14
1.5 Evaluation	14
1.5.1 Cost Analysis	14
1.6 Discussion	15
1.6.1 Extensibility	15
1.6.2 Scalability	17
1.6.3 Disaster Recovery	18
1.7 Conclusions	19
References	19

2 Intelligent Web Data Management of NoSQL Data	
Warehouse	21
2.1 Introduction	21
2.1.1 Background	21
2.1.2 Challenges and Contributions	22
2.2 Related Works and Emerging Techniques	23
2.2.1 Slowly Changing Dimensions of RDBMS	24
2.2.2 Slowly Changing Dimensions of NoSQL	27
2.2.3 MapReduce Framework	29
2.3 Requirements	30
2.4 Architecture	30
2.4.1 Deployment Architecture	31
2.4.2 Capture-Map-Reduce Procedure	31
2.4.3 Log-Based Capture	32
2.4.4 MapReduce	33
2.5 Evaluation	34
2.5.1 Redundancy Rate	35
2.5.2 Storage Space	36
2.5.3 Query Time of Track of History	38
2.5.4 Execution Time of Creation	39
2.6 Discussion	40
2.6.1 Effective Lifecycle Tag	40
2.6.2 Cell with Effective Lifecycle Tag	41
2.6.3 Extreme Data Storage Principles	41
2.7 Conclusions	43
References	43

Part II Social Networking

3 Intelligent Web Data Management of Social Question	
Answering	47
3.1 Introduction	47
3.1.1 Background	47
3.1.2 Challenges and Contributions	47
3.2 Related Work and Emerging Techniques	48
3.2.1 Social Question Answering	48
3.2.2 Multi-tenancy	49
3.2.3 NoSQL Storage	52
3.2.4 RESTful Web Service	52
3.3 Requirements	53
3.4 Architecture	53

- 3.4.1 Helper Recommendation Algorithm 53
- 3.4.2 Help Feed Propagation Method 55
- 3.4.3 Multi-tenancy 56
- 3.4.4 Data Customizing of Tenants 57
- 3.4.5 RESTful Web Service API 58
- 3.5 Evaluation 59
 - 3.5.1 High Success Ratio 59
 - 3.5.2 Propagation Time 61
 - 3.5.3 Propagation Space 61
 - 3.5.4 Data Customizing of Tenants 62
- 3.6 Discussions 63
 - 3.6.1 Preprocessing of Successful Knowledge Base 63
 - 3.6.2 Expert Discovery 63
- 3.7 Conclusions 63
- References 63
- 4 Intelligent Web Data Management of Content Syndication and Recommendation 65**
 - 4.1 Introduction 65
 - 4.1.1 Background 65
 - 4.1.2 Challenges and Contributions 66
 - 4.2 Related Work and Emerging Techniques 66
 - 4.2.1 RSS Specification 66
 - 4.2.2 RSS Products 67
 - 4.2.3 Feed Synchronization 67
 - 4.2.4 RSS Recommendation 68
 - 4.3 Requirements 68
 - 4.4 Architecture 69
 - 4.4.1 Source Listener 69
 - 4.4.2 Feed Search 70
 - 4.4.3 Feed Recommendation 70
 - 4.4.4 OAuth2-Authorization RESTful Feed Sharing APIs 71
 - 4.5 Evaluation 72
 - 4.5.1 Low Latency of Search 72
 - 4.5.2 Incremental Synchronization 74
 - 4.5.3 User Experience 74
 - 4.6 Discussions 76
 - 4.6.1 RSS Feeds Storage 76
 - 4.6.2 Interaction with Social Networking Website 76
 - 4.7 Conclusions 76
 - References 76

Part III Monitoring

5 Intelligent Web Data Management of Infrastructure and Software Monitoring 81

5.1 Introduction 81

5.1.1 Background 81

5.1.2 Challenges and Contributions 82

5.2 Related Work and Emerging Techniques 83

5.2.1 Cloud Monitoring Categories 83

5.2.2 Cloud Monitoring Methods. 84

5.2.3 Cloud Monitoring Methods. 87

5.2.4 Cloud Web Service Monitoring in the Cloud 87

5.2.5 Aspect-Oriented Programming. 88

5.3 Requirements 89

5.3.1 Hierarchy of Resource Entity Models. 89

5.3.2 Requirements of Monitoring 89

5.4 Architecture 90

5.4.1 Cloud Monitoring Architecture 90

5.4.2 Manager-Agent Architecture 91

5.5 Evaluation 92

5.5.1 Virtualization Monitoring 93

5.5.2 Service Availability Monitoring. 93

5.5.3 Performance Monitoring Module via SNMP 94

5.5.4 Application Monitoring 96

5.5.5 User Experience Tracker 97

5.5.6 Over-Commit Monitoring. 97

5.6 Discussions. 98

5.6.1 Monitoring Client of AOP Service. 101

5.6.2 Monitoring Server of AOP Service 101

5.7 Conclusions 102

References 103

6 Intelligent Web Data Management of WebSocket-Based Real-Time Monitoring 105

6.1 Introduction 105

6.1.1 Background 105

6.1.2 Challenges and Contributions 105

6.2 Related Work and Emerging Techniques 106

6.2.1 Networking of Intelligent Building 106

6.2.2 Classical Monitoring Methods. 108

6.2.3 Storage of Monitoring Data 110

6.3 Requirements 111

6.4 Architecture 112

6.4.1 Overview of System Architecture 112

6.4.2 WSN of Intelligent Buildings 112

- 6.5 Evaluation 117
 - 6.5.1 Fast Loading. 118
 - 6.5.2 Low Latency 119
 - 6.5.3 High Concurrency 120
 - 6.5.4 Low Consumption. 120
- 6.6 Discussions. 121
 - 6.6.1 Redundancy Rate 121
 - 6.6.2 Storage Space 121
 - 6.6.3 Query Time 122
- 6.7 Conclusions 123
- References 124

Part IV Literature Management

- 7 Intelligent Web Data Management of Literature Validation 127**
 - 7.1 Introduction 127
 - 7.1.1 Background 127
 - 7.1.2 Challenges and Contributions 127
 - 7.2 Related Work and Emerging Techniques 128
 - 7.2.1 Literature Bibliography Acquisition 128
 - 7.2.2 DOI Content Negotiation and Resolver 129
 - 7.2.3 Bibliographic Model 130
 - 7.3 Requirements 131
 - 7.4 Architecture 131
 - 7.4.1 Bibliography Acquisition Architecture 132
 - 7.4.2 DOI Content Negotiation Proxy 133
 - 7.5 Evaluation 134
 - 7.5.1 DOI Content Service 134
 - 7.5.2 DOI Resolver Proxy 136
 - 7.5.3 DOI Presentation. 138
 - 7.5.4 BibTeX Parser 139
 - 7.5.5 Bibliography Validation Service 139
 - 7.5.6 BibModel Transformation Engine 140
 - 7.5.7 Terminal UI 141
 - 7.6 Discussions. 141
 - 7.6.1 Bibliographic Model—BibModel. 142
 - 7.6.2 Transformation from BibModel
to Bibliographic Records 143
 - 7.7 Conclusions 145
 - References 146
- 8 Intelligent Web Data Management of Literature Sharing. 147**
 - 8.1 Introduction 147
 - 8.1.1 Background 147
 - 8.1.2 Challenges and Contributions 148

- 8.2 Related Architecture and Emerging Techniques 149
 - 8.2.1 Emerging Web Technologies 149
 - 8.2.2 Literature Sharing 149
- 8.3 Requirements 150
- 8.4 Architecture 151
 - 8.4.1 Hierarchical Model of Bookmarklet 151
 - 8.4.2 System Architecture 151
 - 8.4.3 Literature Sharing Process 152
- 8.5 Evaluation 153
 - 8.5.1 Bookmarklet Versus Third-Party Platform 154
 - 8.5.2 WebSocket Versus FlashSocket 154
 - 8.5.3 NoSQL Versus RDBMS 156
- 8.6 Discussions 157
 - 8.6.1 Bookmarklet 157
 - 8.6.2 Cloud DOI Resolver 158
 - 8.6.3 Cloud Storage Engine 159
 - 8.6.4 Scopus API 159
 - 8.6.5 Academic Exchange WebSocket Server 160
 - 8.6.6 Sidebar 160
 - 8.6.7 Academic Exchange WebSocket Client 161
- 8.7 Conclusions 162
- References 162



<http://www.springer.com/978-3-319-30191-4>

Intelligent Web Data Management: Software
Architectures and Emerging Technologies

Ma, K.; Abraham, A.; Yang, B.; Sun, R.

2016, XIV, 162 p. 108 illus., 78 illus. in color., Hardcover

ISBN: 978-3-319-30191-4