
Contents at a Glance

Part I Introduction to Master Data Management

- | | | |
|---|--|----|
| 1 | Overview of Master Data Management | 5 |
| 2 | MDM: Overview of Market Drivers and Key Challenges | 25 |
| 3 | MDM Applications by Industry | 55 |

Part II Architectural Considerations

- | | | |
|---|--|-----|
| 4 | MDM Architecture Classifications, Concepts,
Principles, and Components | 79 |
| 5 | Data Management Concerns of MDM Architecture:
Entities, Hierarchies, and Metadata | 111 |
| 6 | MDM Services for Entity and Relationships
Resolution and Hierarchy Management | 141 |
| 7 | Master Data Modeling | 167 |

Part III Data Security, Privacy, and Regulatory Compliance

- | | | |
|----|---|-----|
| 8 | Overview of Risk Management for Master Data | 195 |
| 9 | Introduction to Information Security and Identity Management | 215 |
| 10 | Protecting Content for Secure Master Data Management | 239 |
| 11 | Enterprise Security and Data Visibility
in Master Data Management Environments | 259 |

Part IV Implementing and Governing Master Data Management

- | | | |
|----|--|-----|
| 12 | Building a Business Case and Roadmap for MDM | 285 |
| 13 | Project Initiation | 311 |
| 14 | Entity Resolution: Identification, Matching, Aggregation,
and Holistic View of the Master Objects | 329 |

15	Beyond Party Match: Merge, Split, Party Groups, and Relationships	351
16	Data Synchronization, MDM System Testing, and Other Implementation Concerns	367
17	Master Data Governance	399

Part V Master Data Management: Markets, Trends, and Directions

18	MDM Vendors and Products Landscape	429
19	Where Do We Go from Here?	441

Part VI Appendixes

A	List of Acronyms	457
B	Glossary	461
	Index	467

Contents

Forewords	xix
Acknowledgments	xxiii
Introduction	xxvii

Part I Introduction to Master Data Management

1 Overview of Master Data Management	5
Master Data Management (MDM)	5
Defining Master Data	6
Why Master Data Management Now?	7
Challenges of Creating and Managing Master Data	10
Defining Master Data Management	12
Master Data Management for Customer Domain:	
Customer Data Integration (CDI)	14
Evolution of MDM and CDI	16
Other MDM Variants: Products, Organizations, Hierarchies	18
Challenges of MDM Implementation for Product Domain	19
Introduction to MDM Classification Dimensions	20
Key Benefits of Master Data Management	21
References	23
2 MDM: Overview of Market Drivers and Key Challenges	25
Market Growth and Adoption of MDM	26
MDM Growth and Customer Centricity	27
Business and Operational Drivers of MDM	29
Improving Customer Experience	31
Improving Customer Retention and Reducing Attrition Rates	31
Growing Revenue by Leveraging Customer Relationships	32
Improving Customer Service Time:	
Just-in-Time Information Availability	33
Improving Marketing Effectiveness	34
Reducing Administrative Process Costs and Inefficiencies	35
Reducing Information Technology Maintenance Costs	35
MDM Challenges	35
Senior Management Commitment and Value Proposition	38
Customer Centricity and a 360-Degree View of a Customer	38
Challenges of Selling MDM Inside the Enterprise	39
Socializing MDM as a Multidimensional Challenge	41
Technical Challenges of MDM	42
Implementation Costs and Time-to-Market Concerns	43

Data Quality, Data Synchronization, and Integration Challenges	45
Data Visibility, Security, and Regulatory Compliance	47
Challenges of Global MDM Implementations	51
References	53
3 MDM Applications by Industry	55
Industry Views of MDM	56
Commercial Sector	57
Financial Services, Banking, and Insurance	57
Telecommunications Industry	60
Healthcare Services Ecosystem	61
Hospitality and Gaming Industry	63
Manufacturing and Software	64
Pharmaceutical Industry	66
Shipping and Logistics	67
Airlines	67
Retail Sales	68
Public Sector	69
Social Services	70
Law Enforcement, Border Protection, and Intelligence Agencies	71
References	74

Part II Architectural Considerations

4 MDM Architecture Classifications, Concepts, Principles, and Components	79
Architectural Definition of Master Data Management	79
Evolution of Master Data Management Architecture	81
MDM Architectural Philosophy and Key Architecture Principles	84
Enterprise Architecture Framework: A Brief Introduction	86
MDM Architecture Viewpoints	89
Services Architecture View	90
Architecture Viewpoints of Various MDM Classification Dimensions	98
Reference Architecture Viewpoint	105
References	109
5 Data Management Concerns of MDM Architecture: Entities, Hierarchies, and Metadata	111
Data Strategy	112
Guiding Principles of Information Architecture	112
Data Governance	114

Data Stewardship and Ownership	116
Data Quality	117
Data Quality Tools and Technologies	119
Managing Data in the Data Hub	120
Data Zone Architecture Approach	120
Operational and Analytical MDM and Data Zones	126
Loading Data into the Data Hub	127
Data Synchronization	129
Overview of Business Rules Engines	130
Data Delivery and Metadata Concerns	132
Enterprise Information Integration and Integrated Data Views	138
References	139
6 MDM Services for Entity and Relationships	
Resolution and Hierarchy Management	141
Architecting an MDM System for Entity Resolution	141
Recognizing Individuals, Groups, and Relationships	142
MDM and Party Data Model	146
Entity Groupings and Hierarchies	147
Challenge of Product Identification, Recognition, and Linking	149
MDM Architecture for Entity Resolution	150
Key Services and Capabilities for Entity Resolution	151
Entity Resolution and MDM Reference Architecture	152
Entity Recognition, Matching, and Generation of Unique Identifiers	155
Matching and Linking Services and Techniques	156
Aggregating Entity Information	160
Data Hub Keys and Life-Cycle Management Services	162
Key Management and Key Generation Service	163
Record Locator Services	164
References	165
7 Master Data Modeling	167
Importance of Data Modeling	167
Predominant Data Modeling Styles	168
MDM Data Modeling Requirements	175
Data Modeling Styles and Their Support for Multidomain MDM	188
Approach 1: The “Right” Data Model	189
Approach 2: Metadata Model	190
Approach 3: Abstract MDM-Star Model	190
References	192

Part III Data Security, Privacy, and Regulatory Compliance

8	Overview of Risk Management for Master Data	195
	Risk Taxonomy	195
	Regulatory Compliance Landscape	198
	Integrated Risk Management: Benefits and Challenges	199
	Regulatory Compliance Requirements	
	and Their Impact on MDM IT Infrastructure	200
	The Sarbanes-Oxley Act	202
	Gramm-Leach-Bliley Act Data Protection Provisions	204
	Other Regulatory/Compliance Requirements	205
	Key Information Security Risks and Regulatory Concerns	210
	Identity Theft	210
	GLBA, FCRA, Privacy, and Opt-Out	212
	Key Technical Implications of Data Security	
	and Privacy Regulations on MDM Architecture	213
	References	214
9	Introduction to Information Security and Identity Management	215
	Traditional and Emerging Concerns of Information Security	215
	What Do We Need to Secure?	215
	End-to-End Security Framework	218
	Traditional Security Requirements	218
	Emerging Security Requirements	221
	Overview of Security Technologies	225
	Confidentiality and Integrity	225
	Network and Perimeter Security Technologies	228
	Secure HTTP Protocols/SSL/TLS/WTLS	229
	Application, Data, and User Security	230
	Integrating Authentication and Authorization	233
	SSO Technologies	233
	Web Services Security Concerns	235
	Authentication	235
	Data Integrity and Confidentiality	235
	Attacks	235
	WS-Security Standard	236
	Putting It All Together	236
	References	237
10	Protecting Content for Secure Master Data Management	239
	Data Security Evolution	239
	Emerging Information Security Threats	240
	Regulatory Drivers for Data Protection	242
	Risks of Data Compromise	243
	Technical Implications of Data Security Regulations	244

Data Security Overview	245
Layered Security Framework	246
Data-in-Transit Security Considerations	248
Data-at-Rest Protection	249
Enterprise Rights Management	252
ERM Processes and MDM Technical Requirements	254
ERM Use Case Examples	255
References	257
11 Enterprise Security and Data Visibility	
in Master Data Management Environments	259
Access Control Basics	259
Groups and Roles	260
Roles-Based Access Control (RBAC)	262
Policies and Entitlements	264
Entitlements Taxonomy	265
Transactional Entitlements	267
Entitlements and Visibility	267
Customer Data Integration Visibility Scenario	268
Policies, Entitlements, and Standards	269
XACML	270
Integrating MDM Solutions with Enterprise Information Security	272
Overview of Key Architecture Components	
for Policy Decision and Enforcement	273
Integrated Conceptual Security and Visibility Architecture	274
References	280

Part IV Implementing and Governing Master Data Management

12 Building a Business Case and Roadmap for MDM	285
Importance of the MDM Business Case	
and the Current State of the Problem	285
MDM Sponsorship Scenarios and Their Challenges	286
Business Strategy–Driven MDM	286
IT Strategy–Driven MDM	287
What MDM Stakeholders Want to Know	288
Business Processes and MDM Drivers	288
Benefits and Their Estimation	289
Traditional Methods for Estimation of Business Benefits	289
Economic Value of Information as	
MDM Business Case Estimation Technique	292
Importance of the MDM Roadmap	296
Basic MDM Costs	297
MDM Roadmap Views	298
Conclusion	307
References	308

13	Project Initiation	311
	Implementation Begins	311
	Addressing the Complexity of MDM Projects	312
	Scope Definition	316
	Business Processes	317
	Lines of Business and Functions	317
	Customer Touch Points, Product Types, and Account Types	318
	Levels of Aggregation and Relationship Types	318
	Entities and Attributes	319
	Systems and Applications in Scope	320
	MDM Data Hub Solution Architecture	320
	Data Hub Architecture Styles	320
	Phased Implementation of Customer Data Hub	325
	Artifacts That Should Be Produced	
	in the Project Initiation Phase	326
	Project Work Streams	326
	References	327
14	Entity Resolution: Identification, Matching, Aggregation, and Holistic View of the Master Objects	329
	Holistic Entity View and a 360-Degree View of a	
	Customer: Frequently Used Terms and Definitions	331
	Reasons for False Positives in Party Matching	332
	Reasons for False Negatives in Party Matching	333
	Attributes and Attribute Categories Commonly	
	Used for Matching and Identification	333
	Identity Attributes	334
	Discriminating Attributes	335
	Record Qualification Attributes	337
	Customer Identification, Matching Process, and Models	339
	Minimum Data Requirements	339
	Matching Modes	340
	Defining Matching Rules for Customer Records	341
	Effect of Chaining	344
	Break Groups and Performance Considerations	346
	Similarity Libraries and Fuzzy Logic	
	for Attribute Comparisons	348
	Summary of Data-Matching Requirements and Solutions	348
	References	350
15	Beyond Party Match: Merge, Split, Party Groups, and Relationships	351
	Merge and Split	351
	Merge	351
	Split	354

Relationships and Groups	355
Direct Business Relationships with an Individual	355
Households and Groups	360
Relationship Challenges of	
Institutional Customers and Contacts	361
Relationship Challenges of Institutional Customers	362
Need for Persistent Match Group Identifiers	365
Additional Considerations for Customer Identifiers	365
References	366
16 Data Synchronization, MDM System Testing,	
and Other Implementation Concerns	367
Goals of Data Synchronization	367
Technology Approach to Use Case Realization	368
MDM Data Hub with Multiple Points	
of Entry for Entity Information	369
Considerations for the Transaction Hub Master Model	372
Batch Processing	376
Synchronization and Considerations	
for Exceptions Processing	379
Testing Considerations	381
Testing of MDM Data and Services	381
Testing MDM Services	385
Creation and Protection of Test Data	388
Considerations for the MDM Application and Presentation Layers	389
Data Hub Management, Configuration,	
and Administration Applications	390
Reporting	393
Additional Technical and Operational Concerns	393
Environment and Infrastructure Considerations	393
Deployment	395
Considerations for the MDM Data Hub	
Data Model and Services	395
References	397
17 Master Data Governance	399
Basics of Data Governance	399
Introduction to and History of Data Governance	399
Definitions of Data Governance	400
Data Governance Frameworks, Focus Areas,	
and Capability Maturity Model	401
Data Governance for Master Data Management	404
Data Quality Management	405
Data Quality Processes	407
Master Data Governance Policies for Data Quality	409
Master Data Governance Metrics for Information Quality	410
The Existing Approaches to Quantifying Data Quality	410

Information Theory Approach to Data Quality for MDM	412
The Use of Matching Algorithm Metrics	417
How to Make Data Governance More Focused and Efficient	421
Agile Data Governance	421
Overlaps with Business Requirements	
Generated by Departments and Business Functions	421
Overlaps with the Enterprise IT	421
Data Governance and Data Governance Frameworks	422
Processes and Metrics	422
Data Governance Software	422
Data Governance and Edward Deming Principles	422
Conclusion	423
References	423

Part V Master Data Management: Markets, Trends, and Directions

18 MDM Vendors and Products Landscape	429
MDM Market Consolidation	430
Major MDM Vendors	431
IBM	431
Oracle	433
Informatica	434
SAP	436
SAS DataFlux	436
Tibco	437
Dun & Bradstreet Purisma	438
Acxiom	439
References	440
19 Where Do We Go from Here?	441
Review of the Key Points Covered in the Preceding Chapters	441
A Brief Summary of Lessons Learned	441
Main Reasons MDM Projects Fail	445
Review of the Key Reasons for MDM Project Failure	446
MDM Guiding Principles	448
Master Data Management: Trends and Directions	449
MDM Market Trends	450
MDM Technical Capabilities Trends	451
References	453

Part VI Appendixes

A List of Acronyms	457
B Glossary	461
Index	467