



Data Modeling

**Toby J. Teorey, Sam S. Lightstone, Tom
Nadeau, H.V. Jagadish**

Data Modeling:

Data Modeling for MongoDB Steve Hoberman, 2014-06-01 Congratulations You completed the MongoDB application within the given tight timeframe and there is a party to celebrate your application s release into production Although people are congratulating you at the celebration you are feeling some uneasiness inside To complete the project on time required making a lot of assumptions about the data such as what terms meant and how calculations are derived In addition the poor documentation about the application will be of limited use to the support team and not investigating all of the inherent rules in the data may eventually lead to poorly performing structures in the not so distant future Now what if you had a time machine and could go back and read this book You would learn that even NoSQL databases like MongoDB require some level of data modeling Data modeling is the process of learning about the data and regardless of technology this process must be performed for a successful application You would learn the value of conceptual logical and physical data modeling and how each stage increases our knowledge of the data and reduces assumptions and poor design decisions Read this book to learn how to do data modeling for MongoDB applications and accomplish these five objectives Understand how data modeling contributes to the process of learning about the data and is therefore a required technique even when the resulting database is not relational That is NoSQL does not mean NoDataModeling Know how NoSQL databases differ from traditional relational databases and where MongoDB fits Explore each MongoDB object and comprehend how each compares to their data modeling and traditional relational database counterparts and learn the basics of adding querying updating and deleting data in MongoDB Practice a streamlined template driven approach to performing conceptual logical and physical data modeling Recognize that data modeling does not always have to lead to traditional data models Distinguish top down from bottom up development approaches and complete a top down case study which ties all of the modeling techniques together This book is written for anyone who is working with or will be working with MongoDB including business analysts data modelers database administrators developers project managers and data scientists There are three sections In Section I Getting Started we will reveal the power of data modeling and the tight connections to data models that exist when designing any type of database Chapter 1 compare NoSQL with traditional relational databases and where MongoDB fits Chapter 2 explore each MongoDB object and comprehend how each compares to their data modeling and traditional relational database counterparts Chapter 3 and explain the basics of adding querying updating and deleting data in MongoDB Chapter 4 In Section II Levels of Granularity we cover Conceptual Data Modeling Chapter 5 Logical Data Modeling Chapter 6 and Physical Data Modeling Chapter 7 Notice the ing at the end of each of these chapters We focus on the process of building each of these models which is where we gain essential business knowledge In Section III Case Study we will explain both top down and bottom up development approaches and go through a top down case study where we start with business requirements and end with the MongoDB database This case study will tie together all of the techniques in the previous seven chapters Nike Senior Data

Architect Ryan Smith wrote the foreword Key points are included at the end of each chapter as a way to reinforce concepts In addition this book is loaded with hands on exercises along with their answers provided in Appendix A Appendix B contains all of the book s references and Appendix C contains a glossary of the terms used throughout the text [The Data Model Resource Book](#) Len Silverston,Paul Agnew,2011-03-21 This third volume of the best selling Data Model Resource Book series revolutionizes the data modeling discipline by answering the question How can you save significant time while improving the quality of any type of data modeling effort In contrast to the first two volumes this new volume focuses on the fundamental underlying patterns that affect over 50 percent of most data modeling efforts These patterns can be used to considerably reduce modeling time and cost to jump start data modeling efforts as standards and guidelines to increase data model consistency and quality and as an objective source against which an enterprise can evaluate data models **Data Modeling, A Beginner's Guide** Andy Oppel,2009-12-21 Essential Skills Made Easy Learn how to create data models that allow complex data to be analyzed manipulated extracted and reported upon accurately Data Modeling A Beginner s Guide teaches you techniques for gathering business requirements and using them to produce conceptual logical and physical database designs You ll get details on Unified Modeling Language UML normalization incorporating business rules handling temporal data and analytical database design The methods presented in this fast paced tutorial are applicable to any database management system regardless of vendor Designed for Easy Learning Key Skills Concepts Chapter opening lists of specific skills covered in the chapter Ask the expert Q A sections filled with bonus information and helpful tips Try This Hands on exercises that show you how to apply your skills Notes Extra information related to the topic being covered Self Tests Chapter ending quizzes to test your knowledge Andy Oppel has taught database technology for the University of California Extension for more than 25 years He is the author of Databases Demystified SQL Demystified and Databases A Beginner s Guide and the co author of SQL A Beginner s Guide Third Edition and SQL The Complete Reference Third Edition **The Data Modeling Handbook** Michael C. Reingruber,William W. Gregory,1994-12-17 This practical field tested reference doesn t just explain the characteristics of finished high quality data models it shows readers exactly how to build one It presents rules and best practices in several notations including IDEFIX Martin Chen and Finkelstein The book offers dozens of real world examples and go beyond basic theory to provide users with practical guidance [Fuzzy Database Modeling](#) Adnan Yazici,Roy George,1999-01-22 Some recent fuzzy database modeling advances for the non traditional applications are introduced in this book The focus is on database models for modeling complex information and uncertainty at the conceptual logical physical design levels and from integrity constraints defined on the fuzzy relations The database models addressed here are the conceptual data models including the ExIFO and ExIFO2 data models the logical database models including the extended NF2 database model fuzzy object oriented database model and the fuzzy deductive object oriented database model Integrity constraints are defined on the fuzzy relations are also addressed A continuing reason for

the limited adoption of fuzzy database systems has been performance There have been few efforts at defining physical structures that accomodate fuzzy information A new access structure and data organization for fuzzy information is introduced in this book

Database Modeling and Design Toby J. Teorey, Sam S. Lightstone, Tom Nadeau, H.V. Jagadish, 2010-08-05 Database Modeling and Design Fourth Edition the extensively revised edition of the classic logical database design reference explains how you can model and design your database application in consideration of new technology or new business needs It is an ideal text for a stand alone data management course focused on logical database design or a supplement to an introductory text for introductory database management This book features clear explanations lots of terrific examples and an illustrative case and practical advice with design rules that are applicable to any SQL based system The common examples are based on real life experiences and have been thoroughly class tested The text takes a detailed look at the Unified Modeling Language UML 2 as well as the entity relationship ER approach for data requirements specification and conceptual modeling complemented with examples for both approaches It also discusses the use of data modeling concepts in logical database design the transformation of the conceptual model to the relational model and to SQL syntax the fundamentals of database normalization through the fifth normal form and the major issues in business intelligence such as data warehousing OLAP for decision support systems and data mining There are examples for how to use the most popular CASE tools to handle complex data modeling problems along with exercises that test understanding of all material plus solutions for many exercises Lecture notes and a solutions manual are also available This edition will appeal to professional data modelers and database design professionals including database application designers and database administrators DBAs new novice data management professionals such as those working on object oriented database design and students in second courses in database focusing on design a detailed look at the Unified Modeling Language UML 2 as well as the entity relationship ER approach for data requirements specification and conceptual modeling with examples throughout the book in both approaches the details and examples of how to use data modeling concepts in logical database design and the transformation of the conceptual model to the relational model and to SQL syntax the fundamentals of database normalization through the fifth normal form practical coverage of the major issues in business intelligence data warehousing OLAP for decision support systems and data mining examples for how to use the most popular CASE tools to handle complex data modeling problems Exercises that test understanding of all material plus solutions for many exercises

Data Modeling Fundamentals Paulraj Ponniah, 2007-06-30 The purpose of this book is to provide a practical approach for IT professionals to acquire the necessary knowledge and expertise in data modeling to function effectively It begins with an overview of basic data modeling concepts introduces the methods and techniques provides a comprehensive case study to present the details of the data model components covers the implementation of the data model with emphasis on quality components and concludes with a presentation of a realistic approach to data modeling It clearly describes how a generic

data model is created to represent truly the enterprise information requirements

Logical Data Modeling Alan Chmura, J. Mark Heumann, 2004-09-29 Logical Data Modeling offers business managers analysts and students a clear basic systematic guide to defining business information structures in relational database terms The approach based on Clive Finkelstein s business side Information Engineering is hands on practical and explicit in terminology and reasoning Filled with illustrations examples and exercises Logical Data Modeling makes its subject accessible to readers with only a limited knowledge of database systems The book covers all essential topics thoroughly but succinctly entities associations attributes keys and inheritance valid and invalid structures and normalization It also emphasizes communication with business and database specialists documentation and the use of Visible Systems Visible Advantage enterprise modeling tool The application of design patterns to logical data modeling provides practitioners with a practical tool for fast development At the end a chapter covers the issues that arise when the logical data model is translated into the design for a physical database

Mastering Data Modeling John Carlis, 2000-11-10 Data modeling is one of the most critical phases in the database application development process but also the phase most likely to fail A master data modeler must come into any organization understand its data requirements and skillfully model the data for applications that most effectively serve organizational needs Mastering Data Modeling is a complete guide to becoming a successful data modeler Featuring a requirements driven approach this book clearly explains fundamental concepts introduces a user oriented data modeling notation and describes a rigorous step by step process for collecting modeling and documenting the kinds of data that users need Assuming no prior knowledge Mastering Data Modeling sets forth several fundamental problems of data modeling such as reconciling the software developer s demand for rigor with the users equally valid need to speak their own sometimes vague natural language In addition it describes the good habits that help you respond to these fundamental problems With these good habits in mind the book describes the Logical Data Structure LDS notation and the process of controlled evolution by which you can create low cost user approved data models that resist premature obsolescence Also included is an encyclopedic analysis of all data shapes that you will encounter Most notably the book describes The Flow a loosely scripted process by which you and the users gradually but continuously improve an LDS until it faithfully represents the information needs Essential implementation and technology issues are also covered You will learn about such vital topics as The fundamental problems of data modeling The good habits that help a data modeler be effective and economical LDS notation which encourages these good habits How to read an LDS aloud in declarative English sentences How to write a well formed syntactically correct LDS How to get users to name the parts of an LDS with words from their own business vocabulary How to visualize data for an LDS A catalog of LDS shapes that recur throughout all data models The Flow the template for your conversations with users How to document an LDS for users data modelers and technologists How to map an LDS to a relational schema How LDS differs from other notations and why Story interludes appear throughout the book illustrating

real world successes of the LDS notation and controlled evolution process Numerous exercises help you master critical skills In addition two detailed annotated sample conversations with users show you the process of controlled evolution in action

Signal, 1993 **Data Modeling Made Simple** Steve Hoberman, 2009 Read today's business headlines and you will see that many issues stem from people not having the right data at the right time Data issues don't always make the front page yet they exist within every organisation We need to improve how we manage data and the most valuable tool for explaining validating and managing data is a data model This book provides the business or IT professional with a practical working knowledge of data modelling concepts and best practices This book is written in a conversational style that encourages you to read it from start to finish and master these ten objectives Know when a data model is needed and which type of data model is most effective for each situation Read a data model of any size and complexity with the same confidence as reading a book Build a fully normalised relational data model as well as an easily navigatable dimensional model Apply techniques to turn a logical data model into an efficient physical design Leverage several templates to make requirements gathering more efficient and accurate Explain all ten categories of the Data Model Scorecard Learn strategies to improve your working relationships with others Appreciate the impact unstructured data has and will have on our data modelling deliverables Learn basic UML concepts Put data modelling in context with XML metadata and agile development *Data Modeling Essentials* Graeme Simsion, Graham Witt, 2004-12-03 *Data Modeling Essentials* Third Edition covers the basics of data modeling while focusing on developing a facility in techniques rather than a simple familiarization with the rules In order to enable students to apply the basics of data modeling to real models the book addresses the realities of developing systems in real world situations by assessing the merits of a variety of possible solutions as well as using language and diagramming methods that represent industry practice This revised edition has been given significantly expanded coverage and reorganized for greater reader comprehension even as it retains its distinctive hallmarks of readability and usefulness Beginning with the basics the book provides a thorough grounding in theory before guiding the reader through the various stages of applied data modeling and database design Later chapters address advanced subjects including business rules data warehousing enterprise wide modeling and data management It includes an entirely new section discussing the development of logical and physical modeling along with new material describing a powerful technique for model verification It also provides an excellent resource for additional lectures and exercises This text is the ideal reference for data modelers data architects database designers DBAs and systems analysts as well as undergraduate and graduate level students looking for a real world perspective Thorough coverage of the fundamentals and relevant theory Recognition and support for the creative side of the process Expanded coverage of applied data modeling includes new chapters on logical and physical database design New material describing a powerful technique for model verification Unique coverage of the practical and human aspects of modeling such as working with business specialists managing change and resolving conflict **Data Modeling**

Made Simple with PowerDesigner Steve Hoberman, George McGeachie, 2011 Annotation This book will provide the business or IT professional with a practical working knowledge of data modelling concepts and best practices and how to apply these principles with PowerDesigner You will build many PowerDesigner data models along the way increasing your skills in first the fundamentals and later in the book the more advanced features of PowerDesigner The book contains six sections Section I introduces data modelling along with its purpose and variations Also included is an explanation of the important role of a data modelling tool the key features required of any data modelling tool and an introduction to the essential features of PowerDesigner Section II explains all of the components on a data model including entities data elements relationships and keys and describes how to create and manage these objects in PowerDesigner Also included is a discussion of the importance of quality names and definitions for your objects Section III dives into the relational and dimensional subject area logical and physical data models and describes how PowerDesigner supports these models and the connections between them Learn how to get information into and out of PowerDesigner and improve the quality of your data models with a cross reference of key PowerDesigner features with the Data Model Scorecard Section IV contains a PowerDesigner workshop designed to consolidate everything for you Section V focuses on additional PowerDesigner features some of which have already been introduced which make life easier for data modellers Section VI discusses PowerDesigner topics beyond data modelling including the XML physical model and the other types of model available in PowerDesigner it also discusses the role of PowerDesigner in data management using the DAMA Data Management Body of Knowledge DAMA DMBOK framework

Data Modeling Essentials Graeme C. Simsion, Graham C. Witt, 2001 This essential guide focuses on data quality and why the data model is so important plus includes essential material on developing a real model and covers organization of the modeling task and managing compromises

Patterns of Data Modeling Michael Blaha, 2010-06-01 Best selling author and database expert with more than 25 years of experience modeling application and enterprise data Dr Michael Blaha provides tried and tested data model patterns to help readers avoid common modeling mistakes and unnecessary frustration on their way to building effective data models Unlike the typical methodology book Patterns of Data Modeling provides advanced techniques for those who have mastered the basics Recognizing that database representation sets the path for software determines its flexibility affects its quality and influences whether it succeeds or fails the text focuses on databases rather than programming It is one of the first books to apply the popular patterns perspective to database systems and data models It offers practical advice on the core aspects of applications and provides authoritative coverage of mathematical templates antipatterns archetypes identity canonical models and relational database design

Developing High Quality Data Models Matthew West, 2011-02-07 Developing High Quality Data Models provides an introduction to the key principles of data modeling It explains the purpose of data models in both developing an Enterprise Architecture and in supporting Information Quality common problems in data model development and how to develop high

quality data models in particular conceptual integration and enterprise data models The book is organized into four parts Part 1 provides an overview of data models and data modeling including the basics of data model notation types and uses of data models and the place of data models in enterprise architecture Part 2 introduces some general principles for data models including principles for developing ontologically based data models and applications of the principles for attributes relationship types and entity types Part 3 presents an ontological framework for developing consistent data models Part 4 provides the full data model that has been in development throughout the book The model was created using Jotne EPM Technologys EDMVisualExpress data modeling tool This book was designed for all types of modelers from those who understand data modeling basics but are just starting to learn about data modeling in practice through to experienced data modelers seeking to expand their knowledge and skills and solve some of the more challenging problems of data modeling Uses a number of common data model patterns to explain how to develop data models over a wide scope in a way that is consistent and of high quality Offers generic data model templates that are reusable in many applications and are fundamental for developing more specific templates Develops ideas for creating consistent approaches to high quality data models

Data Modeler's Workbench Steve Hoberman, 2002-04-22 A goldmine of valuable tools for data modelers Data modelers render raw data names addresses and salestotals for instance into information such as customer profiles andseasonal buying patterns that can be used for making criticalbusiness decisions This book brings together thirty of the mosteffective tools for solving common modeling problems The authorprovides an example of each tool and describes what it is why itis needed and how it is generally used to model data for bothdatabases and data warehouses along with tips and warnings Blanksample copies of all worksheets and checklists described areprovided in an appendix Companion Web site features updates on the latest tools andtechniques plus links to related sites offering automatedtools

Data Modeling Essentials Graeme C. Simson, 1994 Data Modeling Essentials is a comprehensive guide to data modeling for commercial information systems Data modeling is presented as a design activity which offers opportunities for creativity and innovation

A Methodology for Client/server and Web Application Development Roger Fournier, 1999 Bring discipline and power to all your Web C S projects Roger Fournier s A Methodology for Client Server and Web Application Development shows you how to impose needed discipline on even the most complex Web and client server development projects Fournier s start to finish methodology walks you step by step through every phase survey analysis design construction implementation and beyond Master powerful techniques for delivering finished software faster including iterative incremental development prototyping timeboxing and joint facilitated user sessions With extensive examples checklists and worksheets Fournier demonstrates how to Build an enterprise architecture with true scalability and flexibility Leverage object oriented programming techniques to the fullest Establish an effective testing process Promote reusability with DCOM ActiveX TM CORBA and JavaBeans TM components Implement technology infrastructures that support Web and C S development Discover specific ways to mitigate

the risks that lead so many Web and client server projects to fail Learn how to improve communication with users design databases and Web database access more effectively plan for user training and data conversion and much more There are no silver bullets but this book s systematic best practices approach tips and techniques will help you take charge of your Web and client server development and deliver business results faster than ever before **Ordinal Data Modeling** Valen E. Johnson,James H. Albert,2000-12-15 Ordinal Data Modeling is a comprehensive treatment of ordinal data models from both likelihood and Bayesian perspectives A unique feature of this text is its emphasis on applications All models developed in the book are motivated by real datasets and considerable attention is devoted to the description of diagnostic plots and residual analyses Software and datasets used for all analyses described in the text are available on websites listed in the preface

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Data Modeling Introduction

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