



Mastering Data Modeling: A User-Driven Approach

By John Carlis

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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.

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Editorial Review

From the Inside Flap

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This book teaches you the first step of creating software systems: learning about the information needs of a community of strangers. This book is necessary because that step--known as data modeling--is prone to failure.

This book presumes nothing; it starts from first principles and gradually introduces, justifies, and teaches a rigorous process and notation for collecting and expressing the information needs of a business or organization.

This book is for anyone involved in the creation of information-management software. It is particularly useful to the designers of databases and applications driven by database management systems.

In many regards, this book is different from other books about data modeling. First, because it starts from first principles, it encourages you to question what you might already know about data modeling and data-modeling notations. To best serve users, how should the process of data modeling work? To create good, economical software systems, what kind of information should be on a data model? To become an effective data modeler, what skills should you master before talking with users?

Second, this book teaches you the process of data modeling. It doesn't just tell you what you should know; it tells you what to do. You learn fundamental skills, you integrate them into a process, you practice the process, and you become an expert at it. This means that you can become a "content-neutral modeler," moving gracefully among seemingly unrelated projects for seemingly unrelated clients. Because the process of modeling applies equally to all projects, your expertise becomes universally applicable. Being a master data modeler is like being a master statistician who can contribute to a wide array of unrelated endeavors: population studies, political polling, epidemiology, or baseball.

Third, this book does not focus on technology. Instead, it maintains its focus on the process of discovering and articulating the users' information needs, without concern for how those needs can or should be satisfied by any of the myriad technological options available. We do not completely ignore technology; we frequently mention it to remind you that during data modeling, you should ignore it. Users don't care about technology; they care about their information. The notation we use, Logical Data Structures (LDS), encourages you to focus on users' needs. We think a data modeler should conceal technological details from users. But historically, many data modelers are database designers whose everyday working vocabulary is steeped in technology. When technologists talk with users, things can get awkward. In the worst case, users quit the conversation, or they get swept up in the technological details and neglect to paint a complete picture of their technology-independent information needs. Data modeling is not equivalent to database design.

Another undesirable trend: historically, many organizations wrongly think that data modeling can be done only by long-time, richly experienced members of the organization who have reached the status of "unofficial archivist." This is not true. Modeling is a set of skills like computer programming. It can be done by anyone equipped with the skills. In fact, a skilled modeler who is initially unfamiliar with the organization but has access to users will produce a better model than a highly knowledgeable archivist who is unskilled at

modeling.

This book has great ambitions for you. To realize them, you cannot read it casually. Remember, we're trying to foster skills in you rather than merely deliver knowledge to you. If you master these skills, you can eventually apply them instinctively.

Study this book the way you would a calculus book or a cookbook. Practice the skills on real-life problems. Work in teams with your classmates or colleagues. Write notes to yourself in the margins. An ambitious book like this, well, we didn't just make it up. For starters, we are indebted to Michael Senko, a pioneer in database systems on whose work ours is based. Beyond him, many people deserve thanks. Most important are the many users we have worked with over the years, studying data: Gordon Decker; George Bluhm and others at the U. S. Soil Conservation Service; Peter O'Kelly and others at Lotus Development Corporation; John Hanna, Tim Dawson, and other employees and consultants at US WEST, Inc.; Jim Brown, Frank Carr, and others at Pacific Northwest National Laboratory; and Jane Goodall, Anne Pusey, Jen Williams, and the entire staff at the University of Minnesota's Center for Primate Studies. Not far behind are our students and colleagues. Among them are several deserving special thanks: Jim Albers, Dave Balaban, Leone Barnett, Doug Barry, Bruce Berra, Diane Beyer, Kelsey Bruso, Jake Chen, Paul Chapman, Jan Drake, Bob Elde, Apostolos Georgopoulos, Carol Hartley, Jim Held, Chris Honda, David Jefferson, Verlyn Johnson, Roger King, Joe Konstan, Darryn Kozak, Scott Krieger, Heidi Kvinge, James A. Larson, Sal March, Brad Miller, Jerry Morton, Jose Pardo, Paul Pazandak, Doug Perrin, John Riedl, Maureen Riedl, George Romano, Sue Romano, Karen Ryan, Alex Safonov, Wallie Schmidt, Stephanie Sevcik, Libby Shoop, Tyler Sperry, Pat Starr, Fritz Van Evert, Paul Wagner, Bill Wasserman, George Wilcox, Frank Williams, Mike Young, and several thousand students who used early versions of our work. Thanks also go to Lilly Bridwell-Bowles of the Center for Interdisciplinary Studies of Writing at the University of Minnesota. Several people formally reviewed late drafts of this book and made helpful suggestions: Declan Brady, Paul Irvine, Matthew C. Keranen, David Livingstone, and David McGoveran. And finally, thanks to the helpful and patient people at Addison-Wesley. Paul Becker, Mariann Kourafas, Mary T. O'Brien, Ross Venables, Stacie Parillo, Jacquelyn Doucette, the copyeditor, Penny Hull, and the indexer, Ted Laux.

How to Use This Book

To study this book rather than merely read it, you need to understand a bit about what kind of information it contains. The information falls into eight categories.

Introduction and justification. Chapters 1 and 2 define the data-modeling problem, introduce the LDS technique and notation, and describe good habits that any data modeler should exhibit. Chapters 22 and 24 justify in more technical detail some of the decisions we made when designing the LDS technique and notation.

Definitions. Chapter 4 defines the vocabulary you need to read everything that follows. Chapter 13 defines things more formally--articulating exactly what constitutes a syntactically correct LDS. Chapter 23 presents a formal definition of our Logical Data Structures in a format we especially like--as an LDS.

Reading an LDS. Chapter 3 describes how to translate an LDS into declarative sentences. The sentences are typically spoken to users to help them understand an in-progress LDS. Chapter 5 describes how to visualize and annotate sample data for an LDS.

Writing an LDS. Chapter 13 describes the syntax rules for writing an LDS. Chapter 14 describes the guidelines for naming the parts of an LDS. Chapter 15 describes some seldom-used names that are part of any LDS. Chapter 16 describes how to label parts of an LDS. (Labels and names differ.) Chapter 17 describes how to document an LDS.

LDS shapes and recipes. Chapter 7 introduces the concept of shapes and tells how your expertise with them can make you a master data modeler. Chapters 8 through 12 give an encyclopedic, exhaustive analysis of the shapes you will encounter as a data modeler. Chapter 26 describes some recipes--specific applications of the shapes to common problems encountered by software developers and database designers.

Process of LDS development. Chapters 6 and 21 give elaborate examples of the process of LDS development. Chapter 18 describes a step-by-step script, called The Flow, that you follow in your conversations with users. Chapters 19 and 20 describe steps you can take to improve an in-progress LDS at any time--steps that do not fit into the script in any particular place because they fit in every place. Considered as a whole, Chapters 18 through 20 describe the process of controlled evolution, the process by which you guide the users through a conversation that gradually improves the in-progress LDS. "Controlled" implies that the conversation is organized and methodical. "Evolution" implies that the conversation yields a continuously, gradually improving data model.

Implementation and technology issues. Chapter 22 describes in detail the forces that compel us to exclude constraints from the LDS notation. Many of these forces stem from implementation issues. Chapter 25 describes a technique for creating a relational schema from an LDS.

Critical assessment of the LDS technique and notation. Chapter 24 describes the decisions we made in designing the LDS technique and notation and

From the Back Cover

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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.

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About the Author

John Carlis is on the faculty in the Department of Computer Science at the University of Minnesota. For the past twenty years he has taught, consulted, and conducted research on database systems, particularly in data modeling and database language extensions. Visit his homepage at www.cs.umn.edu/~carlis.

Joseph Maguire is an independent consultant and the creator of the forthcoming Web site www.logicaldatastructures.com. For the past 18 years he has been an employee or consultant for many companies, including Bachman Information Systems, Digital, Lotus, Microsoft, and US WEST.

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Users Review

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John McDole:

Book is to be different for every single grade. Book for children until finally adult are different content. As it is known to us that book is very important usually. The book Mastering Data Modeling: A User-Driven Approach had been making you to know about other expertise and of course you can take more information. It is very advantages for you. The e-book Mastering Data Modeling: A User-Driven Approach is not only giving you far more new information but also to become your friend when you truly feel bored. You can spend your spend time to read your reserve. Try to make relationship with the book Mastering Data Modeling: A User-Driven Approach. You never truly feel lose out for everything in case you read some books.

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