



Data Modeling: Logical Database Design



dwdb101-ver1

Instructor Resources From The Sideris Training Portal

3 Days

General Description

This guidebook, and its companion volume which follows, provide a solid basis from which one can successfully implement relational database, multidimensional data warehouse and business intelligence (BI) technologies. The principal objective of this initial course volume is to convey a practical and common sense guide to the theory and concepts of data modeling. Using these sophisticated techniques one can create an elegant logical design of a database. Within this course we discuss not only the premier modeling theories from the best industry experts but also present the practical and real-world experience of the past 20-years of Sideris data design practitioners.

The methodologies discussed are applicable to any relational database environment, including IBM DB2, the Oracle database, Microsoft SQL Server, the open-source MySQL and PostgreSQL databases as well as other RDBMS platforms. They are also applicable to other database technologies, such as object databases and legacy IMS and IDMS databases. Finally, while we use the free Oracle SQL Developer Data Modeler product as a demonstration modeling tool, one can complete the exercises of this course and apply the techniques learned using any other popular data model diagramming tool, such as IBM InfoSphere Data Architect, CA ErWin Data Modeler, Embarcadero ER/Studio and others.

Target Audience

The primary target audiences for this course are:

- Business analysts
- Data modelers, data analysts and data architects
- Senior application designers and developers
- Database administrators

Prerequisites

No mandatory prerequisites exist for this course. However a basic knowledge of computer systems, business systems requirements and database technologies is helpful.

Next Courses

If your implementation database platform is the Oracle database, then you may wish to consider one of the following courses next, depending upon your job role and area of interest:

- ORACLE DATABASE 11G R2: SQL FUNDAMENTALS – COMPLETE LIBRARY
- ORACLE DATABASE 11G R2: ADMINISTRATION I

Pages

390

Duration

3 days

Instructor Resources

Instructor resources from the [Sideris Training Portal](#). There is no substitute for a subject matter expert. Sideris custom print courseware combined with our online resources make distance-learning and virtual training more effective than ever. Download the instructor resources for this courseware and see how your instructor presentations improve!

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Objectives

In the workshop exercises you will build an increasingly complex series of data models, and will critique and correct other models. A summary of the detailed objectives of this textbook are:

- A review of model-based design, including process modeling, physical data modeling and other modeling techniques which relate to logical data modeling.
- A comparison of data modeling concepts and theories, including top-down data modeling, bottom-up data modeling, data normalization, object-oriented and semantic modeling.
- Hints, tips and guidelines in identifying entities, attributes and relationships which should appear within a data model.
- Review the popular commercial data modeling tools commonly in use today.
- The benefits of building a conceptual data model in advance of the logical model.
- Learn to find and fix well-known mistakes which can exist in relationship definitions, finding missing attributes and correcting erroneous attribute definitions.
- Review a recommended strategy for unique identifiers.
- Using semantic modeling constructs and techniques such as supertypes, subtypes, generalization, specialization, constraints, lattices and arcs.
- Using object-oriented modeling techniques such as domains, attribute classes, extended types and abstraction of attributes.
- Time-dependency and state-dependency within a data model.
- Explore classic structures and modeling patterns, including many-to-many recursion.
- Steps and available options for engineering a physical data model from a logical model.
- Reverse engineering and forward engineering of a physical data model into an implementation relational database.

Contents

DATA MODELING THEORY & CONCEPTS

- ABOUT MODEL-BASED DESIGN
- ABOUT DATA MODELING
- ABOUT DATA MODEL DIAGRAMS
- ADVANCED MODELING METHODOLOGIES

- IDENTIFYING ENTITIES
- IDENTIFYING ATTRIBUTES
- IDENTIFYING RELATIONSHIPS
- A SIMPLE MODELING SCENARIO

BUILDING AN INITIAL DATA MODEL

- PRINCIPLES OF DATA MODELING
- BUILDING THE MODEL

DRAWING A MODEL USING SOFTWARE ENGINEERING TOOLS

- ABOUT DATA MODELING TOOLS
- DRAWING A DATA MODEL DIAGRAM

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INCREASING THE ACCURACY OF THE MODEL

- STARTING WITH A CONCEPTUAL MODEL
- SUPPLEMENTING THE REQUIREMENTS
- REFINING THE RELATIONSHIP DEFINITIONS

FINDING & FIXING ATTRIBUTE MISTAKES

- CAPTURING MISSING ATTRIBUTE DETAILS
- CHARACTER
- NUMERIC
- DATE
- CORRECTING ATTRIBUTE DEFINITIONS
- UNIQUE IDENTIFIERS
- UNIT OF MEASURE ATTRIBUTES

SEMANTIC & OBJECT ORIENTED MODELING OF ENTITIES & RELATIONSHIPS

- DEFINING SUPERTYPES & SUBTYPES
- ENTITY NAME PROBLEMS
- NAMING STANDARDS
- SPECIALIZATION & GENERALIZATION
- SUBTYPE CONSTRAINTS
- DEFINING RELATIONSHIP ARCS

SEMANTIC & OBJECT ORIENTED MODELING OF DOMAINS & TYPES

- DEFINING DOMAINS
- DEFINING TYPES
- COLLECTION TYPES

TIME-DEPENDENCY & STATE-DEPENDENCY

- ABOUT TIME & STATE
- TIME-DEPENDENT SUB-MODEL
- PERSON / INDIVIDUAL ROLES SUB-MODEL

CLASSIC STRUCTURES & PATTERNS

- MASTER-DETAIL-DETAIL
- M:N RECURSION (BILL-OF-MATERIALS)
- ORGANIZATION UNIT HIERARCHY
- ENTITY LOCATIONS
- ENTITY CONTACTS

LOGICAL / PHYSICAL MODEL TRANSFORMATION

- ABOUT PHYSICAL DATA MODELS
- PHYSICAL RELATIONAL TRANSFORMATION
- MODEL TRANSFORMATION EXAMPLE
- AUTOMATIC TRANSFORMATION
- SUPERTYPE TRANSFORMATION

RDBMS IMPLEMENTATION OF THE PHYSICAL MODEL

- REVERSE ENGINEER A PHYSICAL MODEL
- ABOUT THE RELATIONAL DATABASE
- RELATIONAL DATABASE OBJECTS
- FORWARD ENGINEER A PHYSICAL MODEL

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