

Introduction to Data Modeling

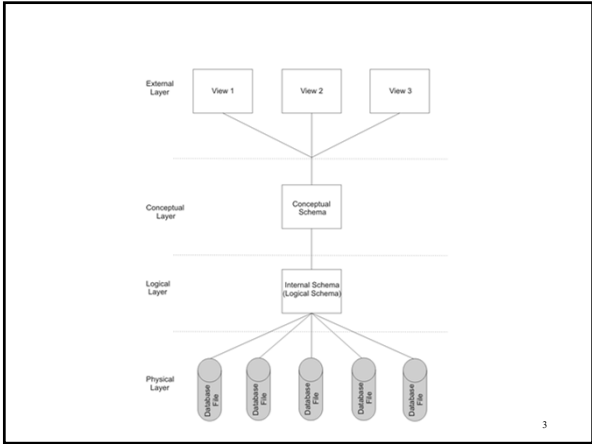
(Chapter 1)

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Data Centric Design

- A *data model* describes how data in an information system is represented and accessed.
 - Independent of any process model
 - Best developed in parallel with the process model(s)
- If only a process model is created, database will be designed to serve only one application system

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Layers of Data Abstraction

- Physical Layer: contains the data files
- Logical Layer: abstraction of the physical layer as represented in the DBMS (e.g. relational)
 - Provides physical data independence
- External Layer: abstraction of the logical layer that contains the user views provided to applications and business users for accessing the data
 - Provides logical data independence
 - Can be ad hoc (SQL queries specify views of the data)
- Conceptual Layer: Highly abstracted planning layer

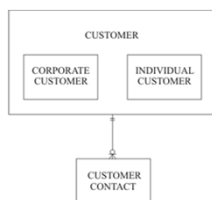
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Types of Data Models

- Conceptual Model
 - High level model that captures *entities and relationships*
 - May or may not include *attributes*
- Logical Model
 - Data model tailored to a particular type of DBMS (relational, object-oriented, object-relational, etc.)
 - Almost always contains attributes
- Physical Model
 - Data model tailored to a particular DBMS (Oracle, MySQL, SQL Server, etc.)
 - Contains physical implementation details

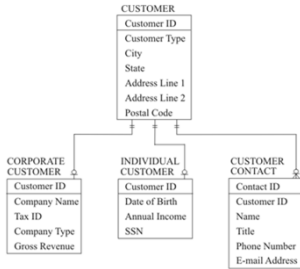
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Conceptual Model Example



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Logical Model Example



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Physical Model Example

CUSTOMER				
CUSTOMER_ID	CUSTOMER_TYPE	CITY	STATE	
1001	C	Baltimore	MD	
1002	I	Alex	MD	
1003	C	New York	NY	
...

CUSTOMER CONTACT				
CONTACT_ID	CUSTOMER_ID	NAME	TITLE	
60001	1001	H.Wheelis	Chairman	
60002	1001	F.Leader	CEO	
60003	1002	M.Choyse	Proprietor	
...

CORPORATE CUSTOMER			
CUSTOMER_ID	COMPANY_NAME	TAX ID	
1001	Bay Hospital	02-1456439	
1003	Acme Industries	02-643952	
...

INDIVIDUAL CUSTOMER			
CUSTOMER_ID	DATE OF BIRTH	ANNUAL INCOME	
1002	04/01/1958	\$65,000	
...

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Importance of Data Modeling

- Documentation of Business Rules
- Visualization
- Illustration of Alternatives
- Foundation for Future Expansion
- Promotion of Common and Standard Structures
- Provisions for Automation

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Measures of a Good Data Model

- Enforcement of Business Rules
- Flexible and Adaptable
- Easily Understood
- Balanced Perspective
- Promotion of Data Reusability
- Data Integration

- Is Elegance Important?

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Data Modeling Participants

- Executive sponsor
- Business user
- Business analyst
- Subject matter expert (SME)
- Data modeler
- Process modeler
- Database administrator (DBA)
- Enterprise architect / application architect
- Operations specialist

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