

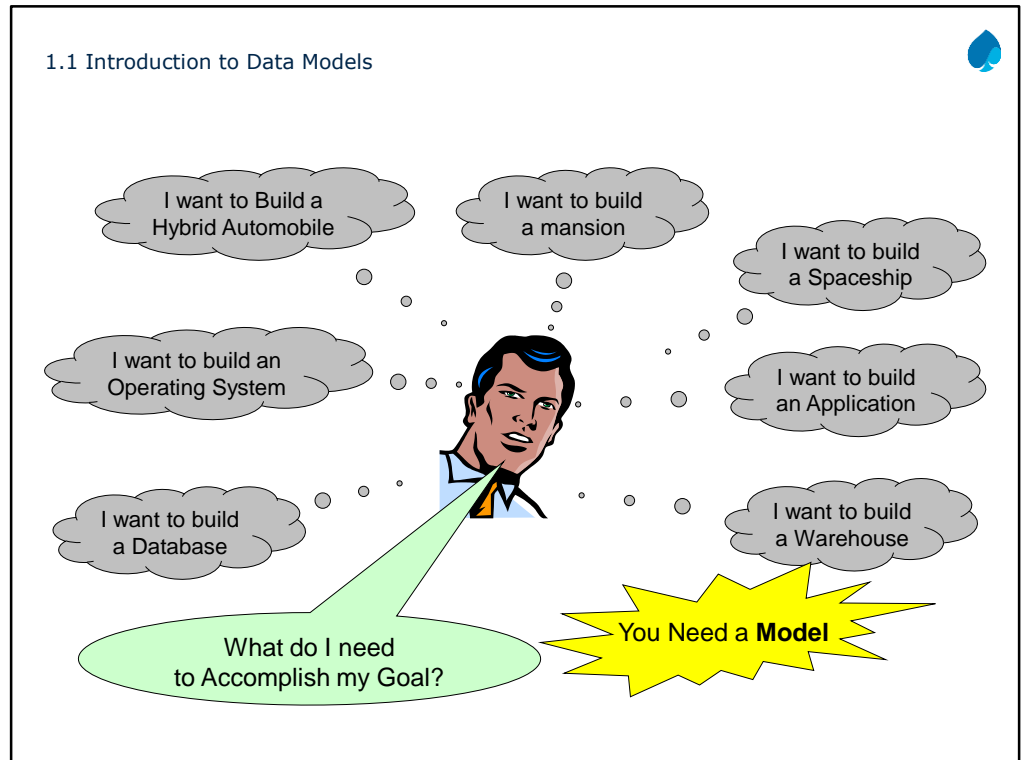
Lesson Objectives

On completion of this lesson on Data Modeling, you will be able to

- State the importance of data modeling
- Identify features of a good data model
- Identify who should be involved in data modeling
- List the database design stages and deliverables
- Explain classification of information



1.1 Introduction to Data Models



1.1.1: Model definition

Definition of a Model



An integrated collection of concepts for describing data, relationships between data, and constraints on the data used by an organization.

A representation of 'real world' objects and events, and their associations.

It attempts to represent the data requirements of the organization that you wish to model

Modeling is an integral part of the design and development of any system.

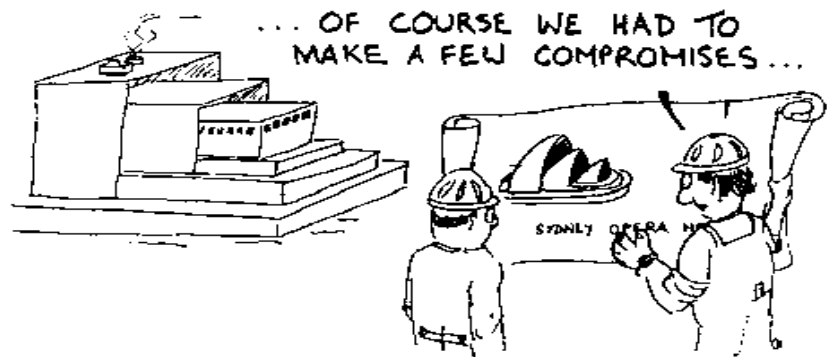
A correct model is essential.

Add the notes here.

1.1.2: Importance of a Correct Model
To design and implement system correctly



■ Essentiality of a Correct Model

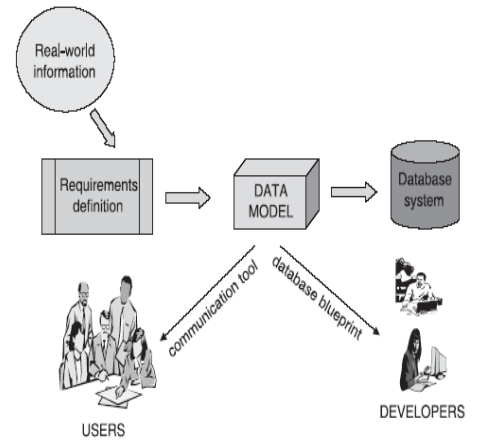


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1.1.3: Introduction to Data Models

What is Data Modeling?

Data modeling is a technique for exploring the data structures needed to support an organization's information need. It would be a conceptual representation or a replica of the data structure required in the database system. A data model focuses on which data is required and how the data should be organized. At the conceptual level, the data model is independent of any hardware or software constraints.



1.1.4: Need of data models Why Use Data Modeling?



Data Consistency

- Example of inconsistent data

- For

Name	Address	City	State	ZIP	Phone	Email
John Doe	123 Easy Street	SF	CA	94134	(415) 555-1956	jdoe@abcnetwork.com
J. Doe	123 Easy St.	San Fran	CA	94134	5551956	jdoe@abcnetwork.com

Add the notes here.

1.1.4: Need of data models Why Use Data Modeling? Contd..



Scalability

- A sound data model will provide for scaling.
- This means that customers can continue to add records to the database, and the model will not run into problems.

Customer

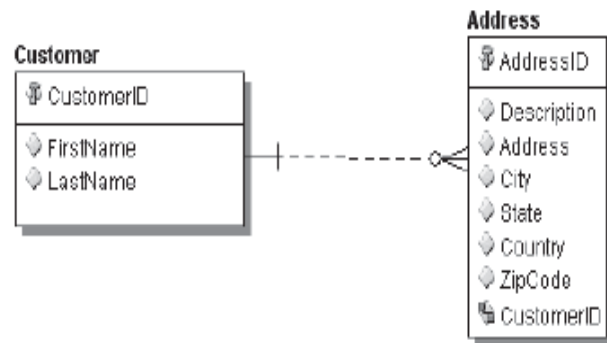
CustomerID
FirstName
LastName
Address
City
State
Country
ZipCode

A simple customer entity containing address data

Add the notes here.

1.1.4: Need of data models Why Use Data Modeling? Contd..

Scalability Contd.



Add the notes here.

1.1.4: Need of data models Why Use Data Modeling? Contd..



Leverage

- Data model serves as a blueprint for the database system.

Conciseness

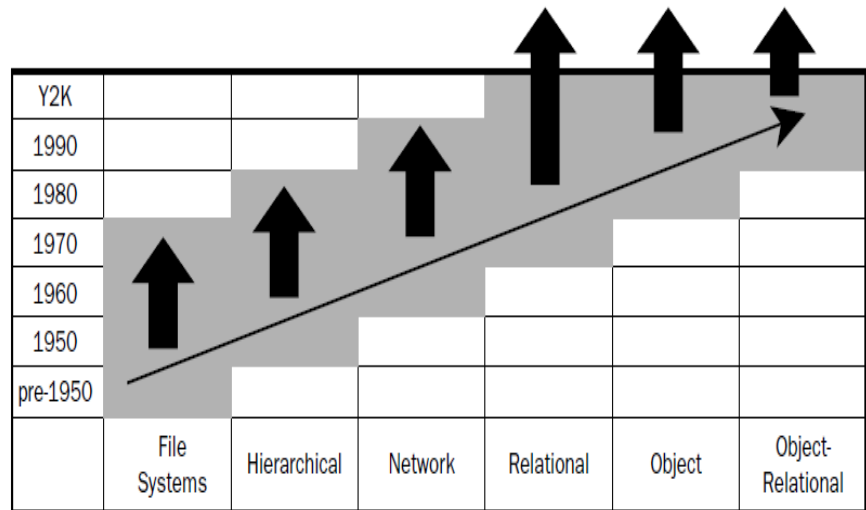
- Data model functions as an effective communication tool for discussions with the users.

Data Quality

- Data model acts as a bridge from real-world information to database storing relevant data content.

Add the notes here.

1.2 The Evolution of Database Modeling



1.3 Features of a Good Data Model



Completeness

- Ensure that every piece of information required for a System is recorded and maintained.

Non-Redundant

- One fact should be recorded only once. Repetition may result in inconsistency and increased storage requirements.

Adherence to Business Rules

- The collected data is to be recorded by considering all business rules. It should not violate any rule.

Add the notes here.

Features of a Good Data Model (contd.)



Communication

- A model should present the data in a manner understandable to all stakeholders.

Integration

- A good model is compatible with the existing and future systems.

Avoid Conflicting Objectives

- A good model can strike a good balance between groups with different sets of requirements.

Add the notes here.

1.4 Who should be involved in data modeling?



System users, owners, and/or sponsors of business

- To verify that the model meets their requirements.

Business specialists (subject matter experts or SMEs)

- To verify the accuracy and stability of the business rule and processes.

Data modeler

Process modelers

- To ensure that he will design the model correctly and will not miss out on any important requirement.
- To ensure that they will use the model correctly.

Add the notes here.

Who should be Involved in Data Modeling? (contd.)



Physical database designer (or DBA)

- To understand the difference between logical and physical model
- To design database to achieve the required performance

Systems integration manager and enterprise architect

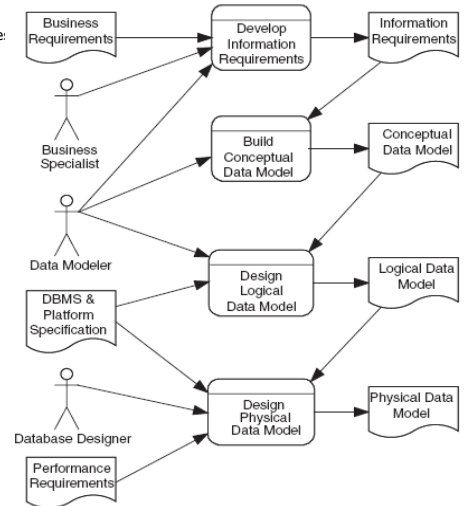
- To understand how the new database will fit into existing system.
- To think beyond current project.

Add the notes here.

1.5 Database design stages and deliverables

A data modeling process goes through various stages and produce the following deliverables:

- Conceptual Model
- Logical Model
- Physical Data Model



Add the notes here.

1.6 Classification of information

**Conceptual**

- Information Content - General Ideas
- Human Concept of Application Domain
- Data System as Understood by Users

Logical

- Details of whole information Content
- Reference to specific Database Software
- No Details of Hardware/Software

Physical

- Details at Level of Internal data storage
- Intricacies of Specific Database
- Details of Physical implementation

Add the notes here.

SUMMARY

- In this module, you learned about the following:
 - What is Data Modeling
 - Why data modeling is important
 - What makes a data model Good
 - Team involved in Data Modeling
 - Various database design stages & Deliverables
 - Classification of Information
 - Cost & benefit of Data Modeling
 - Challenges of Data Modeling

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Review Question

❖ Question 1: At the conceptual level, the data model is independent of any hardware or software constraints.

- True/False

❖ Question 2: _____ means one fact should be recorded only once

- A. Conciseness
- B. Non-redundant
- C. Completeness

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