

# Chapter 11

## Conventional and Non- Conventional Data Modeling

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### ABSTRACT

*The modeling of database applications involves deciding on how to represent the project in real-world objects. The data modeling process corresponds to a set of conceptual tools to describe data, its relationships, its semantics, and constraints of consistency. This process involves the steps related to the identification of requisites, conceptual modeling of data, conventional modeling, and non-conventional modeling of objects, and its relationships. In the conceptual modeling, where there is no need to specify the methods and data flow, objects and their relationships are defined. In conventional modeling, in the mapping of the conceptual model (Entity/Relationship) to the logical model (Relational) conversion rules are applied. However, there are non-conventional resources with the ability to create and use data types based on a grouping of other data types. The user-defined objects can be defined and used like any other data type. This chapter describes the process of mapping the relational model for the object-relational modeling, using a practical application in agricultural context, but it should be noted that the methodology is applicable to any area of knowledge.*

### 1. INTRODUCTION

A database corresponds to a set of related data. This data set represents real-world information. A complex database involves different data types interdependent and interrelated.

For the design of a database data models are used, they correspond to a set of conceptual tools to describe data, relationships among them, data semantics and definition of constraints of consistency.

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In conceptual modeling, the Model Entity/Relationship – E/R is considered generic for database design both conventional and non-conventional. In the so-called conventional databases, the data modeling usually utilized is relational. Since the database is non-conventional, the data modeling involves the management of objects.

In this chapter we address the mapping of the concepts of data model E/R for conventional and non-conventional models, through a practical application in agriculture, using the Oracle 10g Environment. It should be noted that the methodology is applicable to any area of knowledge.

Besides this introductory section, this chapter is organized as follows. Section 2 presents the Data Modeling Process, Section 3 deals with conceptual modeling of data, focusing on the Model Entity/Relationship. Section 4 presents the Relational Model, Section 5 shows the implementations in the object-relational model. Finally, Section 6 shows the final considerations.

## **2. DATA MODELING PROCESS**

The Data Modeling Process is composed of basic steps related with the design of a global schema of the logical database, instantiation of the data and definition DBMS-specific schemas. After the design step, the life cycle includes the implementation and maintenance of database.

Figure 1 shows an overview about the Data Modeling Process, containing the following steps:

1. **Requisites Identification:** It is an informal step, involving interviews with users to identify requisites to be modeled.
2. **Conceptual Data Modeling:** This step is related with the modeling in the Entity Relationship (E/R) Model to specify sets of data called entities, relations among them called relationships and cardinality restrictions, identified by letters N and M, in this case the many-many relationship stands out.

3. **Conventional Modeling:** This step includes the Relational Modeling where a mapping from MER to relations by means of rules of mapping is carried out. The posterior implementation is done in Structured Query Language (SQL).
4. **Non-Conventional Modeling:** This step involves the Object-Relational Modeling which is done by the specification in Structured Query Language. In this case the modeling is related with the objects and their relationships with the Relational Model.

The Data Modeling Process continues with the implementation in DBMS and posterior maintenance in the database.

New data models emerged to comply with data requirements for non-conventional applications. The non-conventional modeling needs adequate concepts, to be able to capture the semantics of data and provide higher abstraction mechanisms. The next sections show the conceptual, relational, and object-relational modeling.

## **3. CONCEPTUAL DATA MODELING**

The data model must reflect the vision that people from an organization have of significant items to the organization's environment. At the time of modeling is possible to find different views of the same object in different departments of the organization.

In the conceptual modeling of data it is possible to obtain the results and conceptual schemes about the essence of a system, or rather, about the business for which it is being developed a database project. In conceptual modeling, procedures or data flow are not represented.

The Entity/Relationship (E/R) is a generic model for a conceptual design of the database. The same can be used to design conventional and non-conventional databases, which describe the real world regardless of the domain of application.

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