

# THE OBJECTUAL DATABASE DESIGN FOR A VIRTUAL STORE

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*Nowadays, the most systems on the Internet are using databases. These databases are relational and normalized. Although the tables of the relational model itself does not have a behaviour in context object, though the diagrams uses different methods. In this article we focus on the database modeling for a virtual store using UML (Unified Modeling Language).*

*Keywords: Database, Virtual store, UML, Business model*

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## **1. Introduction**

For representating and modeling of databases are used several types of diagrams. In the relational world the instructions are not procedural type, still they are result oriented. In the implementation, many times we have to combine programming object to relational databases. UML is a language for visualization, specification, construction and documentation of models. There are no official UML diagrams for modeling data, but we have a scoring system and a data modeling system used and accepted by many CASE tools. The scoring used for data modeling in UML class diagrams comes from other scoring systems used the classical model (entity-relationship).

## **2. Modeling and database design**

### ***2.1. The database modeling***

The database modeling is based more on logical and physical models of databases. A logical model of a database consists of entities, attributes and contains relations between entities that may be required or not (Naiburg E. J., Maksimchuk R. A, 2003).

The logic model is a standardized model, which is 3 normal form (3NF). May contain several elements, which is next to the database, but it does not contain any specific software management system or a database.

In this case, it is not important the important optimization factor, neither the application where the database will be managed. In the center is the building of the model. De-normalization process begins with the physical database model. The group of developers try to optimize the model and seek its implementation.

### ***2.2 The database design***

Until the modeling is focused on presenting a database, it contains the entire design process starting with specification, continuing with business modeling, logical analysis, the physical structure of the database to its implementation and installation.

For example, in the database design in physical modeling there are already set tables, columns and in modeling addition and hardware and the database system structure.

The Database Design includes (Song E., Yin S., Ray I., 2007): the requirements for modeling, the business processes (which may be today or in future), the business activities, the logical models, the physical database model, the links between database and application, developing of the system. After

the design, it comes the implementation itself, which can be done individually or in most cases the group.

### 2.3 UML diagrams for database design

There are many types of UML diagrams that help designer databases in their work. These diagrams can be used for meeting requirements for representation of installation, etc. The most important UML diagrams are as follows (Marcos E., Vela B., Cavero J. M., 2001):

Diagram	Description
Use Case	Use Case shows the behavior of the system or a part of the system and a description of a set of action sequences.
Interactions	Sequence or collaboration diagrams, which represent the interaction of objects in the system.
Activity	Activity diagram is a flow chart of activities that have control flow between activities. It is used to model dynamic aspects of the system and requires a process modeling step.
Statechart	Statechart diagram presents the dynamic of the system state or system objects.
Class	The logical model for the system class.
Database	Database shapes including the database modeling structure and constraints.
Component	The diagram of components shows the dependencies between various software components that comprise a computer system. These dependencies are static or dynamic. The software component has a model with a well defined interface.
Deployment	The deployment diagrams present operating configuration of runtime processing elements and components, processes and objects containing them.

*Table 1 UML diagrams for database design*

### 3. Business modeling for database design

The understanding the functioning of a company and its work it is not an easy problem. It is important to understand what business do they do, what information exists, who are business partners, etc. The current activity is not only important but also the firm's future perspectives. Most of the companies, firms have a standard representation of activities, especially their modeling tools (Avornicului C., Avornicului M., 2010).

We need the following information to create a correct model:

- How do the employees see business?
- What is their opinion to advance the company?
- What does not the company do well?
- What does each individual do?

#### 3.1. The Business Modeling

The first step is the gathering information and the modeling descriptions. We must have an overall idea about the business, only to read only the words themselves.

We always start with the use case diagrams. A business use case diagram represents the most important functions of a business. In the modeling business is very important to identify and shape the roles of coming into contact with the business.

Business model should include views of interior and exterior views to suggest the most important moments of the business. The use case diagrams and use case actors may contain links. Actor can be anyone and anything that comes into contact with the system. It is important to note that one person can play multiple roles and a role can be characterized more people. The actor can be defined as a set of roles which the user uses when interacting with the use cases. It can be a human role, device or any other system hardware. The use case it may be a number of activities that may be useful for players. They involve the interaction between actors and system. In the business modeling, working groups are not only important but also the way they operate. The working mode is the activity diagram. This is a flow chart presenting the control flows between activities. It is used for modeling the dynamic aspects of the system and it requires a process modeling step. Activity diagrams returns to specific use case. Activity diagrams have several purposes (Song E., Yin S., Ray I., 2007):

- understanding the current business;
- understanding and designing of changes;
- discovery of redundancy in the business;
- discovery of the delays in business;
- revealing those activities that affect business;

### ***3.2 Nowadays business model***

By understanding the functioning of today's business systems, we can understand their operation. In this step, it helps to identify the business models having activities that are repeated, they are redundant. If we look at the whole business, we must understand the processes, systems, software, hardware etc. currently there. The essence consists not only in understanding the current business but also in revealing future prospects.

## **4. Case Study: Creating a database for a virtual store**

In this part we deal with database design for a virtual store in Târnăveni, Mures county. The company is dealing with buying and selling computer parts.

A person can see components existing categories to rank and order them online on the Internet. To order our products, the person must register on the site. Insert an email address and password that is stored in databases. A person can order more products. Products will be sent by post or by Cargus (courier) and payment is made on receipt of goods. The administrator can introduce new products that can modify existing information products.

Project purpose:

- reduce human error;
- increase efficiency;
- national coverage (the Internet);

The emphasis is on quality of service and not on human resources management, the bill payment or other processes.

### ***4.1. Business model use case***

First part of business modeling is the use business model. It reflects the views of the outside and their contact with services. The outside actors are the business actors. After negotiating with the company, the first step is to identify business actors (Song E., Yin S., Ray I., 2007).

This is a very simple model and it shows us which business actor belongs to which use case. These actors do not relate to all who come into contact with services. For example, Ms. Florica involved in the cleaning company will not be considered in this model, although it contributes indirectly to the company's reputation.

During discussions, new players may appear coming in contact with the company, such as carriers, insurance companies and other corporate stakeholders. Of course, we have many sites use case, but they

must be verified, it will remain only those that are important in terms of business. Figure 1 shows a business use case possible.

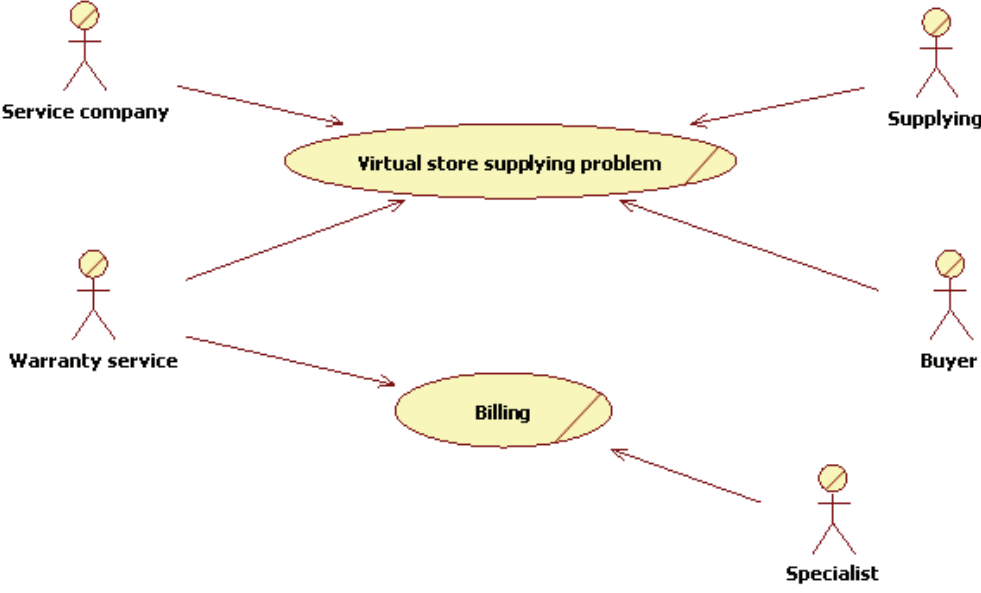


Figure 1 Business model use case

Improving of use case model can be done through a business model for each process. The charts shows business activities and have people who belong to departments. In a business it is extremely important to look at things in terms of business actors. Because of this, the activity diagrams do not contain internal business functions. Business process ends when the players transfer the business management within the system (records manager – business worker) (Avornicului C., Avornicului M., 2010).

4.2. The design database using UML

In that part we design the model database. StarUML CASE tool is used. In the first phase of building the necessary classes. Figure 2 contains the necessary classes.

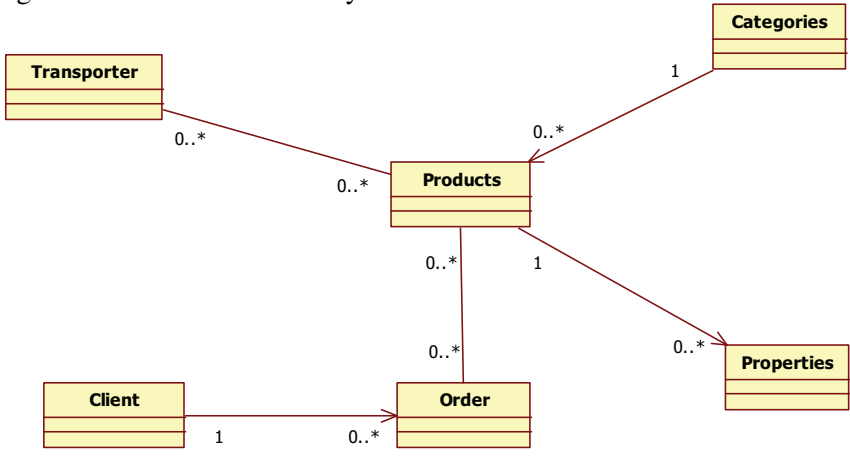
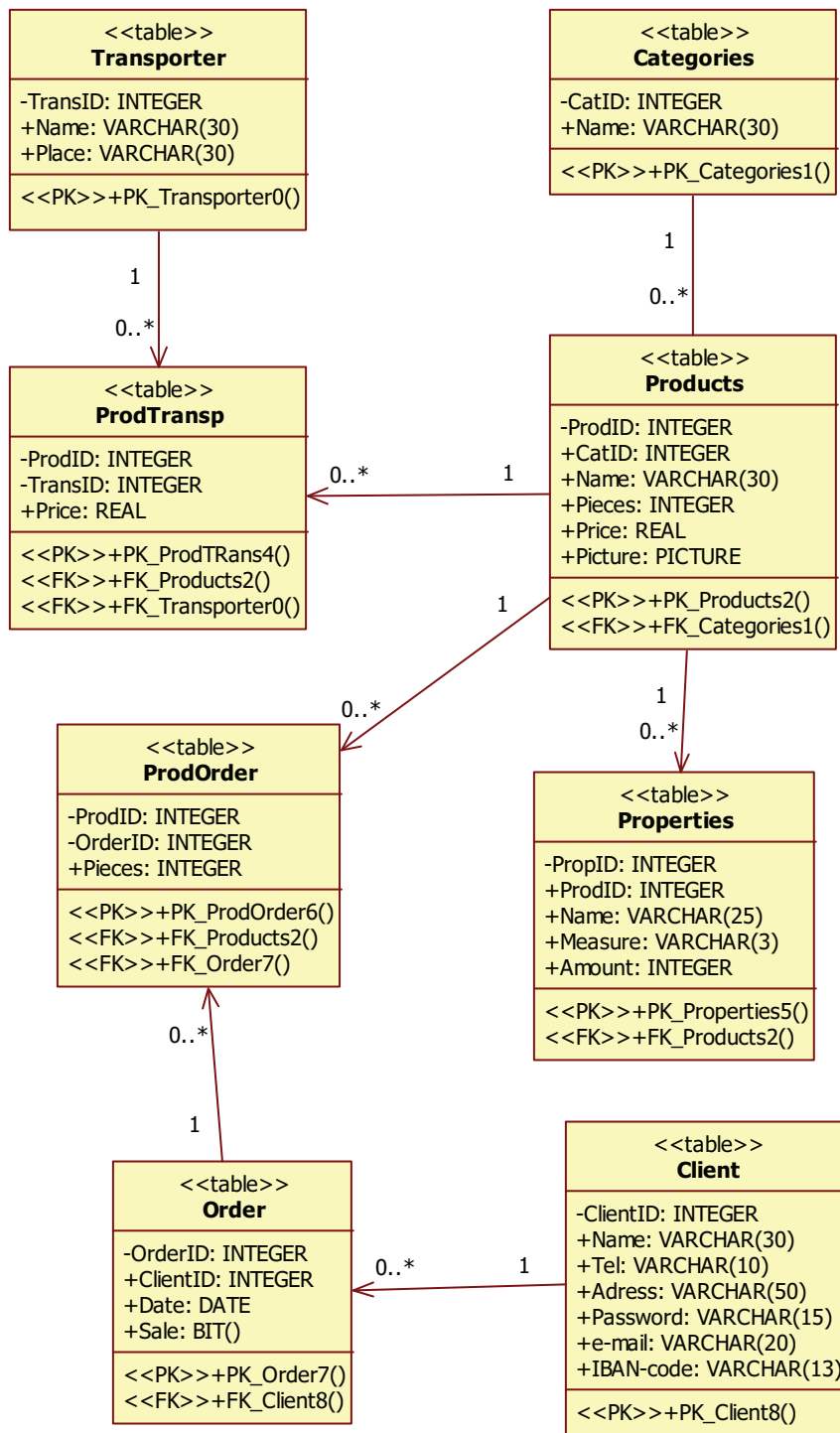


Figure 2 Class diagram for the shop

The following chart contains tables with all attributes.



**Figure 3 Tables with attributes for virtual store**

The database will be implemented in MS SQL Server, Oracle, etc.

## 5. Conclusions

Even if in UML there are no diagrams for modeling data, we have a scoring system and modeling data used these are supported by many CASE tools. The scoring used for data modeling in UML class diagrams comes from other scoring systems used the classical model (entity-relationship). Using UML diagrams, we can easily achieve a database that can be used in a virtual store. This paper presents such a database, which is used successfully in a virtual store.

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