THE REALIZING OF A DATA CUBE USING MICROSOFT SQL SERVER 2005 FOR IMMOBILIZED ASSETS

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Abstract:

The intelligence businesses begin from the solving of data centralization in a context of a huge data volume but and an inefficiency of the classical methods. So, the cube represents the solution through the data are organised and structured in an hierarchic and multidimensional arrangement and OLAP instruments and Data Mining are technologies what put in values the data getting in the multidimensional structures.

Key words: OLAP cube, data deposit, data source, data warehouse.

JEL classification: M15, M21

The conceptual modeling of the data deposits begins with dimensional models which group the data in the relational tables in schemes of star or snowflakes type, which comprise quantitative data from the aggregate transactions tables, mainly referring to the time unity (day) then after other criteria (customer, product, service, kind of transaction, etc.)¹".

The creation of an OLAP cube bases on the multidimensional data structure. We also have to have in mind the multidimensional scheme that has to be the support for OLAP analysis. Here we define the data source, the facts table and the dimensions. The measure is the result of some combinations among many columns, as the type of expressions. The memorizing options are:

- MOLAP memorizes both data and aggregations in multidimensional structures;
- ROLAP the data are memorized in the relational data basis beside the aggregations memorization;
- HOLAP the data are memorized in the relational data basis, but the aggregations in the multidimensional structures;

For the managers to have support for their future approaches, it is important to be created an OLAP cube for the corporal immobilizations belonging to a company. The realization of an informatics application shows the data analysis with the help of an OLAP cube and of the results that appear as different and complex reports.

1. The creation of the transactional data basis

The cube is compound of data stocked in a transactional data basis; this will administrate the evidence of the immobilized assets. The name of the data basis is IMOB, the projects bear the name IMMOBILIZATIONS. Here are parts of their creation:

¹ Dorin Zaharie și colectivul, *Sisteme informatice pentru asistarea deciziei*, Editura Dual Tech, București, 2001

New Project				
Project types:		Templates:		
Business Intelli Other Project 1	gence Projects Types	Visual Studio installed tem Analysis Services Project Integration Services Project Report Model Project My Templates Search Online Templates	plates Import Analysis Services 9.0 Datab. Report Server Project Wizard Report Server Project	
Create a new Analysis Services project				
Name:	IMOBILIZARI			
Location:	C:\Documents and Settings\CopiiiAM\My Documents\Visual Studio 2005\projects			
Solution Name:	IMOBILIZARI Create directory for solution			

Figure no.1. The creation of the project and of the data source

With the administration environment Management Studio, the integration with Visual Studio 2005 and Microsoft .NET Common Language Runtime help us create and operate the applications more rapidly and efficiently. For creating and developing the Data Warehouse, Microsoft SQL Server 2005 offers several components, such as:

- Business Intelligence Development Studio²
- SQL Server Management Studio³

The necessity for some decisions more rapid and informed, the necessity of the increase of the productivity and flexibility of the personnel responsible for development and the pressure of reducing the IT budgets found solutions using Microsoft SQL Server 2005. It offers increased security, scalability and availability for the company's data and the analytical applications.

SQL Server 2005 offers an integrated solution of management and data analysis, which helps the companies:

- Develop, implement and administrate more sure, scalable applications
- Maximize the IT productivity by reducing the complexity of the applications' creation, implementation and administration for the data bases
- Select data on many platforms, applications and approaches in order to facilitate the connection between the intern and extern systems.
- Control the costs without sacrificing the performance, the availability, the scalability or the security

For the application we proposed to implement, there was necessary the commuting between

Business Intelligence Development Studio and SQL Server Management Studio, for every stage. Thus, the IMOM transactional data basis contains the following tables:

- facts_movement_MF, which refer to:
- > The movement of the immobilized assets
- Stock value
- liquidations
- PV_entrance

² http://www.microsoft.com/romania/servere/sql/default.mspx

³ Idem

- PV_exit
- Administrations

- Time (with the following hierarchy: year, month, term and season). The structure of the table facts_movement_MF can be seen in the figure no.2:

Table -	dbo.Table_1*	Summary		
	Column Name	Data Type	Allow Nulls	
Data_	doc	datetime		
Den_N	٩F	nchar(30)		
Dnf		bigint	~	
Val_in	ventar	float	~	
Amort	izare	float	~	
Cod_c	jestionar	int	~	
💡 Nr_inv	/entar	bigint		
	Choose Name			2 🔽
Enter a name for the table: Fapte_miscare_MF OK Cancel				
olumn F	Properties			
🖂 (Ger	neral)			
(Nam	ne)	Nr_inver	ntar	
Allov		No		
Defa	r rype ult Value or Biodioc	Digina		
Dora	ale value or binding	•		

Figure no.2 The creation of the table facts movement MF

Figure no.3 represents the composition of the IMOB data basis in Microsoft SQL Server 2005



Figure no.3 The structure of IMOB data basis

2. Defining the Data Source

In order to define a data source, the views, the dimensions and the cubes beside Business Intelligence Development Studio (BIDS), we also use Microsoft SQL Server 2005, Data Base Engine and Microsoft SQL Server 2005 Analysis Services compounds.

The creation of the IMMOBILIZATIONS project is of the type SQL Server Analysis Services; it is realized with the help of BIDS following a standard template project Analysis Services (AS). Our project represents a collection of interdependent objects. The projects exist within a solution, named by us IMMOBILIZATIONS. The component part *Solution Explorer* contains arborescent views over the objects in a solution. A solution can have several objects and every project contains one or more articles. Every project has in its structure folders for every kind of object.

The defining of the data source supposes the defining of the information as a succession of characters at the data source, the way in which the connection to the data source is made, the name of the server and of the AS project.

3. Defining of the Data Source View

In order to see a project, it is necessary to have a view of the data source. This means a single unified view of the meta data in the specified tables with data basis. The content of a source appears in *Data Source View Designer* from BIDS. It contains:

- 1. a diagram (with the graphic representation of the tables and the relations among them)
- 2. the tables (arborescent structure)
- 3. sub diagrams (for data subsets)

An example can be seen in the figure no.4:



Figure no.4 The content of IMOB data source, viewed with Data Source View Designer

4. Defining and displaying of the cube

From Business Intelligence Development Studio we use *Cube Wizard* for defining and displaying of the initial cube:

1. the defining of the initial cube

- 2. the seeing of the cube properties and dimensions
- 3. the carrying on an AS project
- 4. the navigation through the displayed cube

🤪 Cube Wizard		
Select Data Source View Select the data source view that will provide		
Available data source views: IMOB	 Tables: dbo.Fapte_miscare_MF dbo.Gestionari dbo.PV_iesire dbo.PV_intrare dbo.Timp 	

Figure no.5 Page Select Data Source in Cube Wizard

The next step in generating the cube is the automatic detection of the facts tables and dimensions tables. Then we have to identify and revise some elements of the working variant, choosing 3 facts tables and 4 dimensions tables, this is a different option against *Wizard*. This is the point where the assistant signals out the apparition of improper selections; there is the possibility of a remediation.

🍯 Cube Wizard 📃 🗖 🗙				
Identify Fact and Dimension Tables Identify fact and dimension tables in the data source view specify a time dimension table.	v. You can also			
Time dimension table: Timp Tables Diagram		~		
Name	🔳 Fact	Dimension		
🎯 dbo.Fapte_miscare_MF	~			
🙋 dbo.Gestionari		Image: A start of the start		
😥 dbo.PV_jesire	~			
😥 dbo.PV_intrare	~			
🙋 dbo. Timp				

Figure no.6 Page Identify Fact and Dimension Tables

The selection of the time period can be seen in the below figure:

_			1		
0	Cube Wizard				
	Select Time Periods Time dimension hierard	5 hies are created ba	sed on selected	columns.	
	Time table columns:				
	Time Property Name		Time Table Co	lumns	^
	Year		Anul		
	Half Year		Sem		
	Quarter		Sezon		
	Trimester		Trim		
	Month		Luna		
	Date		Data_doc		~
	Ten Days				
	Week				
	Hour				
	Minute				
	Second				
	Undefined Time				
	Is Holiday				~
		< Back	Next >	Finish >>	Cancel

Figure no.6 The selection of the time period in Cube Wizard

The stage of the selection of the measures included into the cube:

📮 Cube Wizard 📃 🗖 🔀				
Select Measures Select the measures that you want to include in the cube.				
Available measures:				
Measure Groups/Measures	Source Columns			
🔽 📶 Fapte Miscare MF				
🗹 🔐 Dnf	dbo_Fapte_miscare_MF.Dnf			
🗹 🔐 Val Inventar	dbo_Fapte_miscare_MF.Val_inventar			
🗹 📷 Amortizare	dbo_Fapte_miscare_MF.Amortizare			
🔽 📷 Fapte Miscare MF Count	dbo_Fapte_miscare_MF			
V Iesire				
🔽 🔐 Val Iesire	dbo_PV_iesire.Val_iesire			
🔽 📷 PV Iesire Count	dbo_PV_iesire			
🔽 📶 PV Intrare				
🔽 📲 Val Int	dbo_PV_intrare.Val_int			
🗹 🔐 PV Intrare Count	dbo_PV_intrare			
<back next=""> Finish >>1 Cancel</back>				

Figure no.7 The selection of the measures included in the IMOB cube

The detection of the hierarchies and seeing of the new dimensions can be seen in the following figure:

🔪 Cube Wizard	
Review New Dimensions Review the structure of the new dimensions and change the structure if necessary.	
New dimensions:	
Image: Sectionari Image: Sectionari <t< td=""><td></td></t<>	

Figure no.8 Image from seeing the new dimensions of the cube

The ending of the application is done with the naming of the cube step.

🤪 Cube Wizard 🔚 💽	Solution Explorer
Completing the Wizard Name the cube, review its structure, and then click Finish to save the cube.	ImoBilizari Data Sources MoB.ds MoB.ds
Cube name: MOE Preview: MoB Measure groups Mill Fapte Miscare MF Mill PV Issire Mill PV Intrare Dimensions Mill Gestionari Mill Gestionari Mill PV Intrare	Data Source Views Data Source Views MoB.dsv Dimensions Dimensins Dimensions Dimensions Dimens
< Back Next > Finish Cancel	

Figure no.9 The application of the cube name : IMOB The final result : the IMOB cube



Figure no.10 The IMOB cube

Conclusions:

Within the cube, we have calculated members, which are the result of the execution of some calculated expressions at their defining. The defining of the calculated members is memorized into the cube, but their values are calculated when interrogation takes place.

When displaying strategic data necessary for the decisional process we invoke a class of OLAP instruments specialized in systems of business analysis.

The data warehouses contain pieces of information which when treated with systems of OLAP instruments, after E.F.Codd rules, can help for:

- static analysis based on historical data;
- dynamic analysis of drill-down type, based on historical data
- contemplative analysis
- template analysis

From the perspective of the business management, the assistance of taking decision in business supposes that from a huge volume of existent data, be selected, analyzed and viewed only the relevant and significant data.

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