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Implementation of OLAP (On-Line Analytical Processing) On Car Parts Sale of Mercedes Benz (Case Study: PT. Mass Sarana Motorama)

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Abstract— PT. Mass Sarana Motorama is a company that is engaged in the commercial, which is the provider of Mercedes Benz auto parts. In the course of its business, PT. Mass Sarana Motorama is currently using OLTP systems experiences some problems. Disadvantages are contained in the OLTP system PT. Mass Sarana Motorama is the lack of applications that can process their sales data into a usable information for decision making. In addition, PT. Mass Sarana Motorama also requires an application that is able to perform data analysis of various categories of sales and sales data show that can be viewed by year, month, and day. In the absence of such an application is made the company difficult to analyze their sales. Based on the above constraints, to support the business activities of PT. Mass Sarana Motorama to be more effective and efficient, it takes an OLAP applications (On-Line Analytical Processing) to suit the needs of PT. Mass Sarana Motorama. Development of OLAP applications (On-Line Analytical Processing) is designed by using UML (Unified Modeling Language) and comprising the steps of prototyping method listen to the customer (user needs analysis), build and revise mock-ups, and customer test drives mock-up. Making these applications using Delphi programming language with Borland Delphi 6 Personal applications, ContourCubeX as OLAP library and XAMPP as a database application. With the output or end result of the application of OLAP (On-Line Analytical Processing) in the form of sales figures which can be viewed by the categories of sales, can help continuity and facilitate enterprise business process analyzes sales data in the future.

1. INTRODUCTION

A. Preliminary

PT. Mass Sarana Motorama is a private company engaged in the field of automotive and spare parts provider. The company uses a data warehouse for storing the information in the business process. So far, PT. Mass Sarana Motorama face some problems related sales system. This problem according to the results of interviews the author on November 25, 2013 by top manager spare parts PT. Mass Sarana Motorama named Mr. Jitohawan is the absence of an application to analyze the information in the data warehouse of spare parts so that the top manager of PT. Mass Sarana Motorama have difficulty in analyzing sales of spare parts. This condition requires that the top manager spare part analysis of indirect and direct sales aspect manually for the next new top managers can make

informed decisions on the results of the analysis refers to the sale. By doing the analysis manually, which takes time to be longer which is about 2-3 days. In addition, there is another problem is the lack of applications that are able to display information from the aspect of the sale of spare parts in more detail by year, month, and day.

Data warehouse has a very important role for the company, especially for top managers of the company. Some companies engaged in the business process using the data warehouse as a beginning information for decision-making in running the business. That decision-making include the purchase of goods, provision of warehouse stock and so forth. Top managers responsible for overall management of the consequences of the decision. Top manager in charge of planning activities and strategies in general and direct the course of the company. The expertise of the peak level managers is conceptual, meaning that expertise to create and formulate concepts that will be implemented by the level below it. To plan the activities and strategy of the company in the future, it takes an initial information stored in a data warehouse.

OLAP stands for On-Line Analytical Processing. Basically OLAP is a special method to analyze the data contained in the data storage medium and then create reports according to user requirement. OLAP is able to display the data in a table that is dynamic, that will automatically summarize the data into several different data slices.

Referring to the background and existing problems, the author will make a research with the title "Implementation of OLAP (On-Line Analytical Processing) On Sale Car Parts of Mercedes Benz" (Case Study: PT. Mass Sarana Motorama).

B. Research Question

Based on the background of the above problems, the formulation of the problem is "How to implement OLAP techniques into an application that is able to analyze aspects of direct and indirect sales at PT. Mass Sarana Motorama?"

C. Research Purposes

The general objective of this research is to implement OLAP into a computerized application that has a function in accordance with the requirement of PT. Mass Sarana Motorama.

II. LITERATURE REVIEW

A. OLAP (On-Line Analytical Processing)

OLAP stands for On-Line Analytical Processing. Basically OLAP is a special method to analyze the data contained in the data storage media (database) and then make a report in accordance with user demand. For this purpose, the data in the form of information is made in a special format to provide the data to the group. It was named after the model cube. OLAP can be considered as a substitute for the tedious reporting process.

OLAP displays the data in a table that is dynamic, that will automatically summarize the data into several slices of different data and allow the user to interactively perform calculations and create a report format. Users can not only be informed, but also summarize and analyze the data. OLAP is divided into 3 types, namely MOLAP, ROLAP, and HOLAP [1].



Fig. 1. OLAP Architecture

In OLAP there are several analysis techniques like slice and dice, rotate, and drill up and down commonly used. Here is an explanation of each of these terms:

1) Slice and Dice

Slice operation performs a selection on one dimension of the given cube, resulting in a subcube. Dice operation defines a subcube by performing a selection on two or more dimension [2].

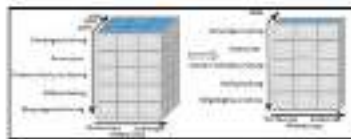


Fig. 2. OLAP Slicing



Fig. 3. OLAP Dicing

2) Rotate (Pivot)

Pivot (also called rotate) is a visualization operation that rotates the data axes in view to provide an alternative data presentation [2].

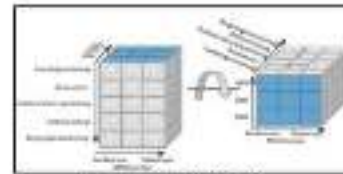


Fig. 4. OLAP Pivoting

3) Drill Up and Down

Roll up operation (also called the drill up operation by some vendor) perform aggregation on a data cube, either by climbing up a concept hierarchy for a dimension or by dimension reduction.

Drill down is the reverse of roll up. It navigates from less detailed data to more detailed data. Drill down can be realized by either stepping down a concept hierarchy for a dimension or introducing additional dimensions [2].

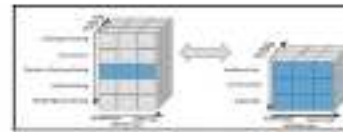


Fig. 5. OLAP Drill Up and Down

An OLAP systems typically adopts either a star or a snowflake model as a subject-oriented database design [2].

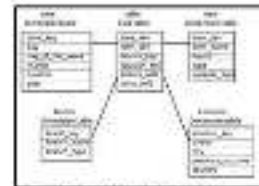


Fig. 6. OLAP Star Schema

III. ANALYSIS AND RESULTS

A. Identification Problem

There are some problems faced by PT. Mass Sarana Motorama:

- 1) There is no application to analyze the information in the data warehouse of so that the top manager have to analyze the data manually
- 2) There is no application that able to display the information of spare parts sales based of on year, month, and day.

B. Build and Revise Mock-up

**1) Analysis and Flow of Process System
Analysis of Current System**

The system is currently running at Mass Sarana Motorama is as follows:

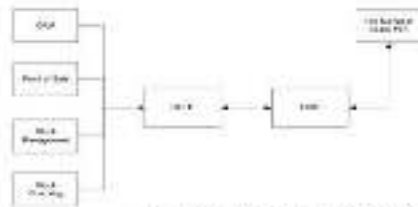


Fig. 7. Scheme of Current System

Analysis System Which Will Created

The system that will be made are as follows:

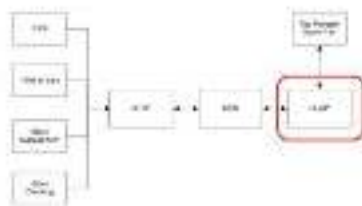


Fig. 8. Scheme System Will Be Made

In a case study of PT. Mass Sarana Motorama, dimension and measure that will be used are as follows:

1. Dimension

Dimension is divided into three parts, namely the dimension of time, the dimensions of sales, and dimensions of spare parts.

a. Time Dimension

Time dimension has three sub, including: year, month, and day. This is the concept of time dimension:



Fig. 8. Concept of Time Dimension

b. Sales Dimension

Sales dimension has two sub, including: selling category and buyer category. This is the concept of sales dimension:

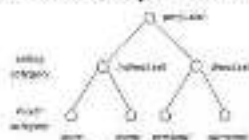


Fig. 9. Concept of Sales Dimension

c. Spare Part Dimension

Spare Part dimension has three sub, including: high price, medium price and low price. This is the concept of spare part dimension:

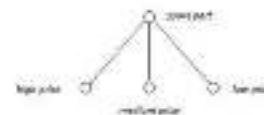


Fig. 10. Concept of Spare Part Dimension

2. Measure

There are three measure in the OLAP applications, the value of quantity, price value, and total value.

2) UML Design

Use Case Diagram

Use case diagrams describe the interaction of the actors in the system application OLAP (On-Line Analytical Processing). Use case diagrams in OLAP applications (On-Line Analytical Processing) consists of a single actor, the top manager of spare parts.

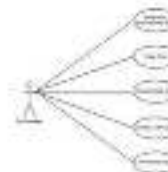


Fig. 11. Use Case Diagram

C. Customer Test Drives Mock-up/Implementation and Testing of Mock-up)

Implementation of OLAP Application

In the process of implementation of OLAP applications, there are several steps taken, among them:

1. Designing the user interface of applications. To create an user friendly application, it takes a user interface that is easy to use and understandable by the user.
2. Create a database connection configuration in the program. This configuration is made so that the application can connect to the OLAP database is used as a data center that will be processed by OLAP applications later.
3. Writing program code using Borland Delphi 6 Personal applications.

The steps in the configuration is as follows:



Fig. 12. Database Query Syntax

The next step is to determine or define the field names that exist in the appropriate dimensions. Existing dimensions, namely:

- 1) Outside dimension is the fact that is not activated.
- 2) Horizontal is the time dimension that defines the period of the sale.
- 3) Vertical is the fact that the active dimension.
- 4) Fact is a measure dimension that states the value of the sale.



Fig. 13. Cube Dimension and Fact

After the above process is completed, the next step is to write a program in buttons on the OLAP tools, serves as OLAP techniques are used to analyze the data.



Fig. 14. ToolsOLAP

Here is an explanation of each button:

- 1) Swap Button
- 2) Expand Button
- 3) Collapse Button
- 4) Print Button

After the process of making the application is completed, while the display of OLAP applications are:



Fig. 15. OLAP Application

IV. CONCLUSION

From the discussions that have been described in the previous chapter, it can be concluded that the OLAP application which is able to analyze sales data and present the output in the form of sales figures that can be seen from the various categories of sales, is expected to complete the OLTP system that is currently running that business process PT. Mass Sarana Motorama become more effective and efficient.

V. LIMITATIONS

Based on the above problem formulation, the discussion of the problem will be limited to:

1. Research using prototype model system development.
2. The application is intended only for the top manager of the company.
3. The development of this application does not discuss the security of the data.
4. Authors use libraries CoctouCubeX so OLAP program code can not be seen because of the encryption process.
5. Making an application only displays the results or information in the form of a query or report.
6. Making an application does not use a database normalization, but rather use the ODS with the concept of star schema.

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