DATA MART DEVELOPMENT FOR PT.JUSINDO SUMBER PRAKARSA INVENTORY DIVISION

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ABSTRACT

Inventory Division is a unit in PT.Jusindo Sumber Prakarsa which handles storage of raw material to be used for production. The management has a problem in changing the transactional data into information needed in the periodic reporting and analysis for business decision-making procurement, reduction of the goods and the price adjustment. The analysis process is still done manually with the help of Microsoft Excel.The management has a problem in changing transactional data into strategic information due to limitations in understanding of Microsoft Excel that causes a long time to do the analysis.

Software data marts built to solve existing problems so as to facilitate the management in analyzing the data and preparing reports for business decision making becomes easier, because with the help of tools will simplify the analysis process becomes more dynamic and displays information from multiple viewpoints in different businesses. Software development of data marts using techniques data staging ETL(Extract, Transform, Load) with tools SSIS(SQL Server Integration Service), form schema data marts are used is star schema and using techniques OLAP pivoting, roll up , drill down and slice and dice.

Based on test results system testing with blackbox method and user acceptance testing with interview, it could be concluded that the software has been built to facilitate the management in transforming transaction data into information needed in the periodic reporting and analysis for business decision-making companies from various aspects, subjects and viewpoints in different businesses.

Keywords : Data Mart, ETL, OLAP

1. INTRODUCTION

PT. Jusindo Source Initiative is a company engaged in textile manufacturing, particularly textile garment serving in large numbers. PT.Jusindo Source Initiative have an information system managed by the IT aimed used to record every transaction that goes especially in parts inventory. In its operations, parts inventory storing raw materials which will then be used by the production department.

The system runs on the inventory has been using computers to manage data in multiple data business unit operational results already stored in the database provided by the information system Warehouse. Process constraints the current system is that the management of the difficulty in getting information that is strategic as it analyzes the use of the goods by type of goods, quantity of goods, organizations that require a specific time period required for decision support business of procurement, reduction of the goods and the price adjustment due lack of tools or tools that can provide for the needs of dynamic analysis which can be tailored to the company's strategic information needs of diverse. During this part of the inventory in the analysis calculations are still using Microsoft Excel application it makes the process of analysis can only be carried out strictly in accordance with the analytical skills and understanding of employees to Microsoft Excel in processing the operational data for analysis, Reports generated also can simply be a form of summary reports or of the sum of each recap transactional data only. To obtain other information that is more strategic, data generated from the system information should be processed and analyzed back, it would take a long time because the data is already very large company transactions and will impact the cessation of production due to delays in the analysis of procurement.

Based on the study of literature and field studies in the form of interviews and observations that have been made, it needs a system that can bring together all the sources of data required in the analysis and decision support needs of business inventory parts into a form of design data is integrated and easy to be analyzed. It also needed a system that could provide for the needs of dynamic analysis to analyze data from various aspects, subjects and viewpoints different business that is multidimensional models [1] which can produce information that is strategic for the purposes of business decision-making. Data mart is a solution that will provide a positive impact for the company to utilize historical data

transactional result very much and piling to be used as a decision support [2], so as to separate the data that are not useful in the decision making process. Hence the need for more research on software development of data marts PT.Jusindo Sumber Prakarsa in the inventory division.

1.1 Data Mart

Data mart is a collection of data derived from the operational data processing companies that support the process of analysis and multidimensional and dynamic information needs of a specific department or business function to generate strategic information that can be used as the company's business decision support analysis [7].

Some opinions from experts as follows, According to Kimball, "the data mart is part of the logical and physical coverage of the area is owned by the data warehouse" [1].

1.1.1 Characteristic Data Mart

Characteristics of the data in the data mart is as follows :

a. Subject Oriented
b. Integrated
c. Time Variant
d. Non Volatile

1.1.2 Metode Pembangunan Data Mart

The method used in the construction of a data mart is following the method of data warehouse development of Rlph Kimball that have been adapted to the needs of [2], which consists of the stages of system analysis, analysis of data marts that include dimensional modeling, logical design and physical design [1], the data stagging which includes ETL process [5], in the form of OLAP analytical processing [8] and Deployment. The method of designing a data mart to be done can be described in Figure 1.2 Here:

1. System Analysis: This stage is to understand, explain and elaborate on the business issues that exist in the division and their inventory business requirements that must be met which can be solved with a software solution data marts.
2. Analysis of the data mart: This stage means analyzing and start doing the design stage of data marts with dimensional modeling methods, the design of the data mart model structure based on strategic information needs and business requirements and designing the physical needs of software and hardware to be used in a data mart architecture.
3. Data Staging: At this stage of the ETL process consisting of Extraction, Cleaning, conforming, and delivering data. This analysis aims to determine what data is used as the data facts and dimension data in the data mart, extracting, conditioning the data schema to the needs, and the process of moving data from the data source to data marts.
4. Analytical Processing (OLAP): After the Data Staging is completed, then the OLAP analysis. The analysis process is conducted to determine the form of OLAP in accordance with the existing problems, including the roll-up, Drill Down and slice and dice.
5. Deployment: At this stage the information needs presented in the form of pages in the form of visualization data into a graph chart in the form of pie charts, bar charts and line charts that are used to make it easier for users to read information quickly.

1.1.3 *Data Staging*

Data Analysis Staging is done by using the process of ETL (Extract, Transform and Load), which consists of subprocesses Extraction, Cleaning, conforming and delivering the data aimed at determining what data will be used as facts and dimensions that exist in the data mart, by transferring the data OLTP and changed into the structure of a data mart.

1.1.4 OLAP(*Online Analytical Processing*)

After the Data Staging is done, then the data mart can be used to do the analysis process OLAP, OLAP widely used to make business decision [8] which will be displayed multidimensional data into forms that aims to facilitate the analysis of the information. OLAP techniques used include techniques pivoting and operating techniques of presenting data in the form of drill-down, roll-up and slice and dice. For more details Below is an example of the surgical technique drill-down, roll-up and slice and dice in OLAP.

1.1.5 Multidimensional Modeling

Dimensional modeling is the analysis stage to draft in the form of multidimensional data model, multidimensional modeling of this data is an initial stage in building the architecture of the data in the data mart schema [1]. As for the dimensional modeling process consists of 4 stages consisting of, memili business processes, determine the grain, determine the dimensions and determine the facts.

2 THE CONTENT OF RESEARCH

2.1 Development Method Data Mart

2.1.1 System Analysis

Systems analysis is an activity that define and describe a company's business needs based on a system that is currently running in PT.Jusindo Sumber Prakarsa which aims to identify and evaluate the problems that may occur that lead to a solution to resolve the existing problems in company.

2.1.1.1 Analysis Of The Problem

Based on the results of field studies that have been made include interviews, observation and data

collection has been done and has been described previously in Chapter 1, so he found some problems that exist in the inventory division PT.Jusindo Sumber Prakarsa, among others :

1. Dificulty of data analysis
   Data analysis problems that occur in PT.Jusindo Source Initiative is the management of trouble to change the existing transactional data into useful business information due to management difficulties unify the structure and format of separate data for requirements analysis process
2. Dificulty in obtaining strategic information
   Problems obtain strategic information is the impact of the problem of data analysis described previously, which caused data recap of the results of operational activities very much and lack tools to do anlisis data, the information generated from the analysis process just a simple information consisting of report in the form of a summary of the data as an example of divisions parts inventory only get a stock of goods at this time of the results of the analysis conducted to transactional data at this time, this information certainly can not include any consideration of aspects of the existing business to generate value better information, so it will have an impact on the quality of business decisions that will be taken.

2.1.1.2 Data Sources Analysis

Analysis of the data source is an analysis of all existing data on the inventory division PT.Jusindo Source Initiative, Data supplied is the data demand for goods and goods in and out. At this time the inventory division PT.Jusindo Sumber Prakarsa has used DBMS to assist the recording of daily transactions (OLTP).

2.1.2 Data Mart Analysis

2.1.2.1 Data Mart Architecture

Analysis of the data mart is an analysis done for the software development process the data mart on PT.Jusindo Sumber Prakarsa can be run properly, correctly and more focused.

Architectural design that will be built is described in Figure 2 which is a kind of two-layer architecture consisting of two layers, namely the data source and data marts.

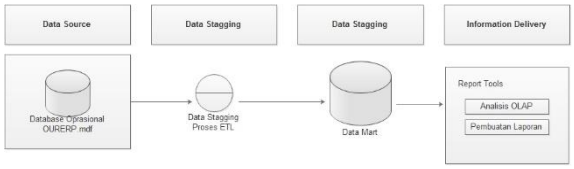


Figure 1 Data Mart Architecture

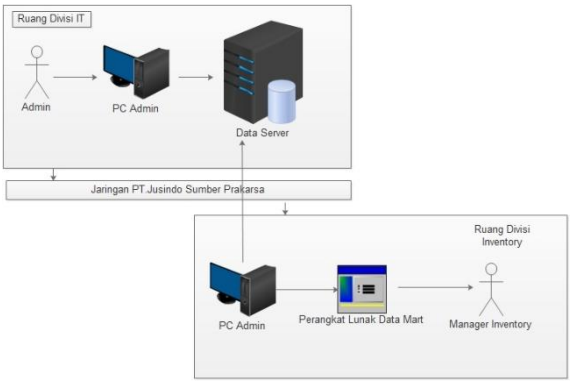


Figure 2 Network Architecture Data Mart Inventory Division

2.1.2.2 Dimensional Modeling

Dimensional modeling is the analysis stage to draft in the form of multidimensional data model, multidimensional modeling of this data is an initial stage in building the architecture of the data in the data mart schema [1]. As for the dimensional modeling process consists of four stages comprising, selecting business processes, determining grain, determine the dimensions and determine the facts.

2.1.2.2.1 Selecting Business Processes

This stage is to understand and choose which business processes that will be used in multidimensional data model to be built. As based on interviews with the IT Manager and Inventory Manager PT.Jusindo Sumber Prakarsa, known to have a business process that is described in Table 1 following:

Table 1 Business Process Runs

No	Business process
1	The process of demand for goods
2	Process goods usage
3	Refunds
4	Adjustment process
5	Goods receipt
6	The process of stock taking

Based on what has been described only a limited number of business processes that will be used in the data mart in accordance with the strategic information needs and their strategic information company.business processes are used as follows :

Tabel 2 Selecting Business Processes

No	Strategic Information Needs	Business Process
1	Information recapitulation of goods received by the warehouse every	

	month and year	Goods Receipt Process
2	Information for most items received by the warehouse every month and year	
3	Information goods received by the warehouse at least monthly and year	
2	Information recapitulation of items required by specific divisions every month and year	Process Goods Demand
3	Information recapitulation of items that are returned by the warehouse every month and year	Returns Process
4	Information recapitulation of goods used by each division every month and year	Process Use Goods

Based on Table 2 it will be produced along with the selected business processes, data needs to be used in data marts, while for business processes which are selected will be described in Table 3

Table 3 Selected Business Processes

No	Selected Business Processes	Data Needed
1	The process of demand for goods	1. Data permintaan barang(InvRequest) 2. Data detail permintaan barang(InvRequestDetail) 3. Data informasi gudang(Store_Info) 4. Data informasi barang(Item)
2	Process goods usage	1. Data pemakaian barang(Issue) 2. Data detail pemakaian barang(IssueDetail) 3. Data informasi gudang(Store_Info) 4. Data informasi barang(Item)
3	Refunds	1. Data pengembalian barang(Return) 2. Data detail pengembalian barang(ReturnDetail) 3. Data informasi gudang(Store_Info)
		4. Data informasi barang(Item)
4	The process for receiving goods	1. Data penerimaan barang(Receive) 2. Data detail penerimaan barang(ReceiveDetail) 3. Data informasi gudang(Store_Info) 4. Data informasi barang(Item)

2.1.2.2.2 Determining Grain

Determining grain or granularity means determining what records will be used on the fact table. The following is an explanation of these stages, in which the determined needs what information is used in accordance with the business processes that have been described previously.

Table 4 Determination of Grain

No	Strategic Information Needs	Grain
1	Demand for goods	1. Information number demand for goods 2. Information requested warehouse where the requesting organization to issue goods 3. Information list items that leave the warehouse along with the number of goods units 4. Information Organizations requesting goods 5. Information on the type of goods demanded
2	Usage Goods	1. Information number demand for goods 2. Information requested warehouse where the requesting organization to issue goods 3. Information list items that leave the warehouse along with the number of goods units 4. Information

		Organizations requesting goods 5. Information on the type of goods demandedbarang dalam tanggal, bulan dan tahun

2.1.2.2.3 Determining Dimension

Dimensions are used to explain the information to the needs of businesses that used to support a fact that can be done analysis multidimension.Berikut is an explanation of the dimensions to be used:

Table 5 Determination of Dimensions

No	Grain	Dimension
1	1. Information number demand for goods 2. Information requested warehouse where the requesting organization to issue goods 3. Information list items that leave the warehouse along with the number of goods units 4. Information Organizations requesting goods 5. Information on the type of goods demandedbarang dalam tanggal, bulan dan tahun	1. Information no demand for goodsInformasi gudang 2. Item Information 3. Organization Information 4. Time (month and year)
2	1. Information number demand for goods 2. Information requested warehouse where the requesting organization to issue goods 3. Information list items that leave the warehouse along with the number of goods units 4. Information Organizations requesting goods 5. Information on the type of goods demandedbarang dalam tanggal, bulan dan tahun	1. Information Warehouse 2. Item Information 3. Usess Information 4. Organization Information 5. Time (month and year)

2.1.2.2.4 Deterkining Fact

At this stage been facts that will populate the fact table, where the facts have to be in accordance with the grain and the dimensions specified in previous stages.

Table 6 Determination of Facts

No	Dimension	Fact
1	1. Information no demand for goodsInformasi gudang 2. Item Information 3. Item Information 4.Organization Information 5. Time(Month and Year)	1. Facts Goods Demand
2	1.Informasi Gudang 2.Informasi Item 3.Informasi no pemakaian 4.Informasi Organisasi 5.Waktu(bulan dan tahun)	2. Facts Use Item

2.1.3 Logical Design

Logical design is the stage after the development of data marts, where this stage the data mart table structure is determined based on the analysis results, described sebelumnya.Adapun peranganan schema data marts are performed as follows:

2.1.3.1 Relation Scheme Design Data Mart

Based on mapping business dimension PT.Jusindo Source Initiative consisting of strategic information needs of information, business processes, destination information, facts and dimensions of business, it can be seen dimensional models and schemes required data in the data mart that is described in Figure 4

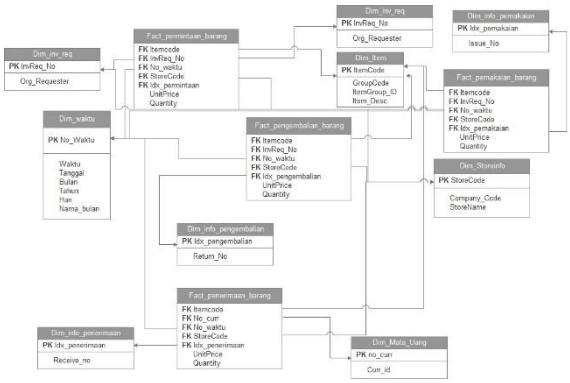


Figure 3 Relation Scheme Data Mart

2.1.4 Physical Design

The application will run properly if the existing hardware specifications match or exceed the minimum hardware specification limits that have

been determined to run the system. Based on the observations of the hardware that is used to perform analysis on unit PT.Jusindo Sumber Prakarsa Inventory, it is known specifications of the hardware used in the company are described in the following table:

Table 7 Hardware Requirements

No	Hardware	Specification
1	Processor	2,3 GHz
2	RAM	2 GB
3	Harddisk	1 TB
4	VGA	Intel HD *(onboard)*
5	Keyboard	Standard
6	Mouse	Standard

Table 8 Software Requirements

No	Hardware	Specification
1	Prosesor	2.0 GHz
2	RAM	2 GB
3	Harddisk	2 GB
4	VGA	Intel HD *(onboard)*
5	Keyboard	Standard
6	Mouse	Standard

2.1.5 Data Staging

Data Analysis Staging is done by using the process of ETL (Extract, Transform and Load), which consists of subprocesses Extraction, Cleaning, conforming and delivering the data aimed at determining what data will be used as facts and dimensions that exist in the data mart, by transferring the data OLTP and changed into the structure of the data mart.

Stages of data staging to be done is as follows:

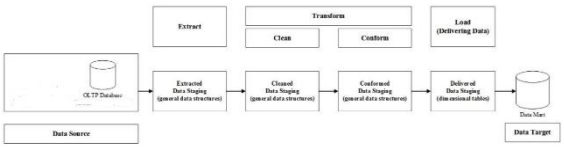


Figure 4 Data Staging

Information :

1. Extract
   This process is preparing the data source to be converted into a data mart structures.
2. Transform
   This process is a process of changing the form of OLTP schema into a data mart schema according kebutuhan.Proses Transform does is Cleaning and conforming.
3. Load
   The process by which data facts and dimensions loaded into the data mart, the technique does is insert, where teknikini will immediately add data in OLTP into the data mart and delete all data that is soon to add new data.

2.1.6 OLAP(Online Analytical Processing)

After the Data Staging is done, then the data mart can be used to do the analysis process OLAP, OLAP widely used to make business decision [8] which will be displayed multidimensional data into forms that aims to facilitate the process towards a information.Teknik OLAP analysis that is used include pivoting engineering and operating techniques of presenting data in the form of drill-down, roll-up and slice and more specifically dice.Untuk. Here is an example of the surgical technique drill-down, roll-up and slice and dice in OLAP.

2.1.7 Deployment

This stage all forms of analysis performed combined into one complete application that aims to facilitate the manager to analyze the data without changing the data separated into flat-file.Adapun before it is presented in an application form contained the data for visualizing bullet into shape chart to simplify the user to read and understand the information accurately.

3. THE DESIGN OF THE INTERFACE

Here is an example of a software interface design data marts will be built:

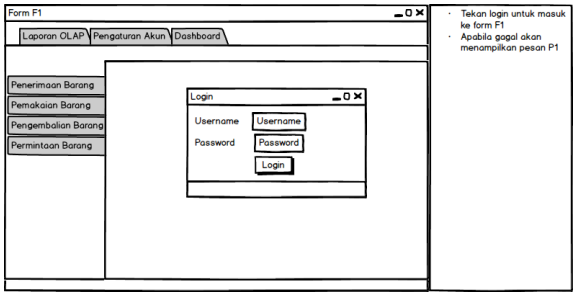


Figure 5 Interface Login page

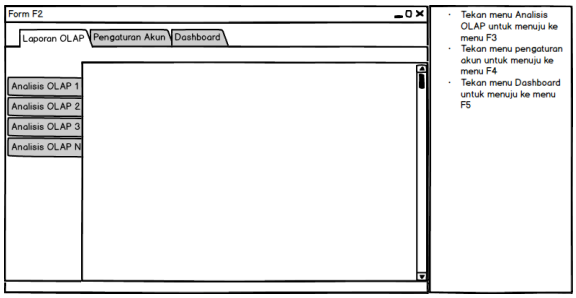


Figure 6 Home

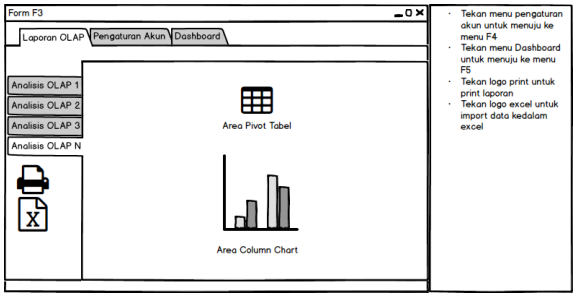


Figure 7 Page Analysis

4. IMPLEMENTATION INTERFACE

Here is an example of the implementation of the interface of software built data marts:

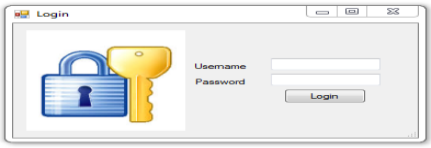


Figure 8 Interface Login

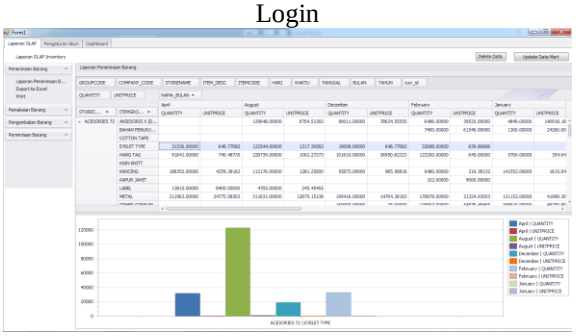


Figure 9 Page Analysis

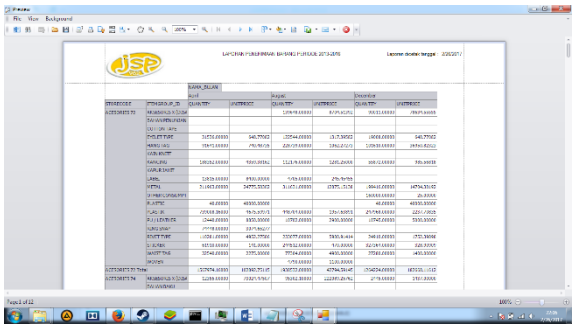


Figure 10 Print Preview

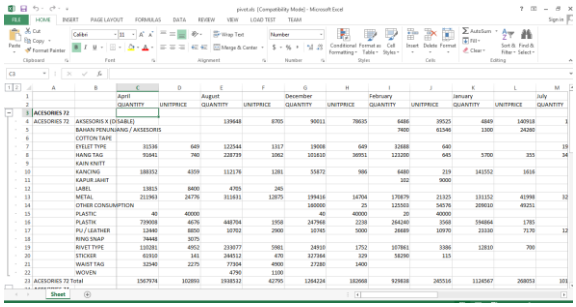


Figure 11 Import Results

5. TESTING

Here is a plan of tests:

Table 9 Test Plan

No	Types of Tests	Method	Aim	Tester
1	*System Testing*	*Blackbox*	Functional testing system	*Developer*
2	*User Acceptance Testing*	Wawancara	Objective testing system from a user perspective	User Manager Division of inventory

Based on the test results of blackbox in the testing system testing has been done, it can be deduced that the system has been running well, in this test proved that the software has been run in accordance with the functionality, OLAP successfully tested and displays information in accordance with the needs of the business information required by the division inventory.

Based on the interview test in testing user acceptance testing, it can be concluded that the software data marts has been built to meet the needs of users in which software can provide strategic business information companies and to facilitate the company in changing transactional data into strategic business information.

Based on the results of the testing system testing methods blackbox and testing of user acceptance testing with the interview method, it can be concluded that the software data marts are built for the division of the inventory has been successfully tested and has been run in accordance with the functionality and successfully meet the needs of companies of the issues there either from the author's perspective as a developer or user who uses the system.

6. CONCLUSION

Based on the results of the analysis and testing has been done on software inventory data marts in the division, it can be concluded that :

1. Applications can assist management in the strategic use of information goods based on the type

of goods, quantity of goods, and information organizations that need a warehouse to store goods in a certain period of time the items required to support business decision making procurement, reduction of the goods and the price adjustment.

2. Applications can assist management in changing transactional results data into the information needed in the periodic reporting and analysis for business decision.

Based on the research that has been done, put forward some suggestions that can improve or optimize the performance of the functions of the application is built, including the:

Building a Data Warehouse with Data Mart to build all the divisions that exist in PT.Jusindo Sumber Prakarsa is expected to integrate all the data available in PT.Jusindo Sumber Prakarsa aims to facilitate data retrieval, maintenance and control of your data.

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