Research Article

Data Warehouse Design for Multi Finance Companies

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Abstract: Data is an important asset in an organization which is the basis for managers company to make policies, carry out strategies, or make decisions. Data processing can be done in various places, for example in databases operational, operational applications, or using technology data warehouse. The system data warehouse is connected to heterogeneous data sources and is used by decision makers to analyze the conditions and development of the organization. In this research, the initial stage is to carry out a system analysis database operational, studying the software and hardware used at PT XYZ to get an understanding of the current system requirements. Then data warehouse will be designed and set the ETL (Extract, Transformation, Loading) data needed from the database system that is running to the data warehouse that has been designed. The design of a data warehouse uses the Kimball method which consists of nine stages of the methodology (nine-step methodology). With the design results, it is hoped that it can provide a design data warehouse that can be implemented easily to support activities business analysis multi-finance and answer business questions quickly, flexible, and accurate

Keywords: ETL, database, data warehouse, finance, Kimball method.

1.Introduction

D ATA is an important asset in an organization which forms the basis for managers company to make policies, carry out strategies, or make decisions. Data processing can be done in various places, for example in databases operational, operational applications, or using technology data warehouse. Data warehouses are designed with query and analysis rather than transaction processing with a concept and a combination of technologies that facilitate organizations to manage and maintain historical data obtained from databases relational, systems or operational applications. The data warehouse supports the DSS (Decision Support System) and EIS (Executive Information System).

The system data warehouse is connected to heterogeneous data sources and is used by decision makers to analyze the conditions and development of the organization. technology Data warehouse is increasingly needed by companies that already have data historical, including PT XYZ. PT XYZ is an independent multi-finance company that focuses on providing finance leases and consumer financing. Offers its customers a wide range of financial service products in the form of leasing.

More needs companies finance in the hope of a data warehouse can be implemented easily to support activities of business analysis finance companies and answer business questions quickly, flexible, and accurate

2.Literature Review

A. Definition of Data Warehouse

Data Warehouse is a consolidated or integrated data that resides in a company and is taken from different operational data sources and various tools to facilitate user access to support decision making. [4]

The data warehouse is a system that can extract, clean, adjust, and produce source data into dimensional data and support the implementation of queries and analysis aimed at decision making [5]. A data warehouse can integrate data from various sources [6].

According to Turban, Sharda, Delen, and King (2011), a data warehouse is a data warehouse created to support decision making and is also a repository of current and previous data needed by the organization.

B. Characteristics of the Data Warehouse

The characteristics of a data warehouse are as follows [7]:

1. Subject-Oriented

A data warehouse focuses on subjects related to OLTP.

2. Integrated

The warehouse data has been processed through ETL to unify and integrate data from various sources in a new database called a data warehouse.

3. Non-Volatile

The data in the data warehouse is stored separately from the transaction data. The data in the data warehouse is also updated at a certain period.

4. Time-Variant

The data in the data warehouse is stored to present information from the past.

C. Data Warehouse Architecture

The data architecture provides a framework for identifying and understanding how data will move through the system and be used within the company. The data architecture for a data warehouse has a main component, namely a read-only database [4].

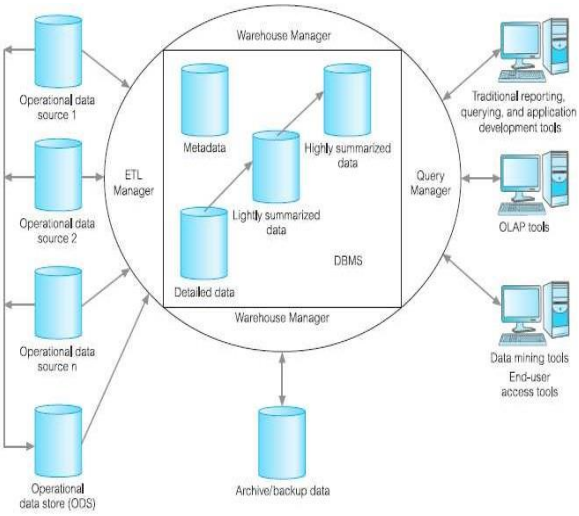

Fig. 1. Data Warehouse Architecture

1. Operational Data

Sources of data warehouse come from Mainframe, Departmental, Private, and External.

2. Operational Data Store (ODS)

A storage medium for current operational data that is integrated and used for the analysis process. ODS provides data in the same way as a data warehouse but acts simply as a temporary data storage place to be transferred to the data warehouse.

3. Load Manager

Perform all operations related to extracting and loading data into the data warehouse.

4. Warehouse Manager

Perform all operations related to data management in the data warehouse, including data analysis, transformation, and merging of data sources, as well as data backup and archive.

5. Query Manager

The query manager is also called a back-end component. The query manager performs operations related to the management of user queries. The operations performed by this component include directing the query to the appropriate tables and scheduling the execution of the query. In some cases, the query manager also generates query profiles that allow the warehouse manager to determine index and aggregation suitability.

6. Detailed Data

This area stores all the detailed data in a database schema, aiming to complete the data set for the data warehouse. In most cases, detailed data is not stored online but can be provided via data aggregation at a later level of detail.

7. Lightly and Highly Summarized Data

Stores all lightly and highly summarized data generated by the data warehouse manager.

8. Achieve/Backup Data

Achieve is an area of the data warehouse that stores detailed data and summary data to archive and data backup. Data is sent to archival storage such as magnetic tape or optical disk.

9. Metadata

Metadata is an area of the data warehouse that stores all metadata definitions (data regarding data) using all existing data warehouse processes. Metadata is used for several purposes:

a. The process of extracting and loading metadata is used to map the data source to a more general form of data in a warehouse.

b. The warehouse management process metadata is used to automate the production of summary tables.

c. Part of the metadata query management process is used to query directly on the most suitable data source.

Metadata is a form of information that contains data, data types, data lengths, and data sources that will be used in a data warehouse [8].

10. End-User Access Tools

Users will interact with the data warehouse to support decision making through end-user access tools.

D. Data Warehouse Structure

Data warehouses have a specific structure and differ in the level of detail and age of the data.

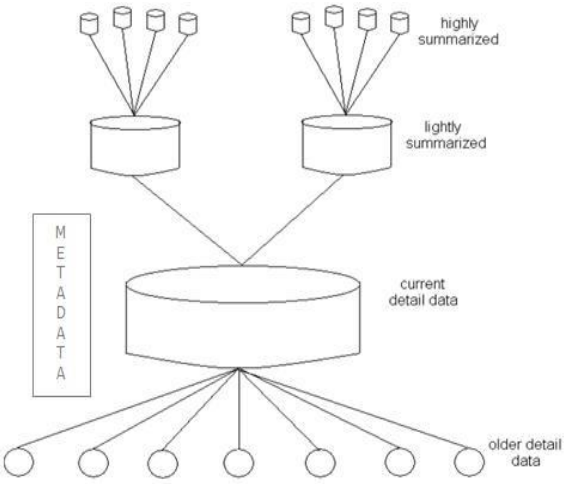

Fig. 2. Data Warehouse Structure

1. Older Detailed Data

This data is historical data from current detailed data. Data can be in the form of a backup or archive data stored in separate storage.

2. Current Detail Data

Detailed data that is active and running is the lowest level in the data warehouse.

3. Lightly Summarize Data

Summary or summary of current detail data. This data is summarized by period or other dimensions as needed.

4. Highly Summarize Data

The advanced level of Lightly summarized data, which is a summary result that is totality, can be accessed to perform an analysis.

5. Metadata

Metadata is "data about data" and provides information about data structures and the relationships between data structures within or between storage (data storage).

E. Advantages of Data Warehouse

The successful implementation of a data warehouse can provide various main benefits for the organization [4], namely:

1. Potential high returns on investment

An organization must commit to many resources to ensure success in creating a data warehouse, and costs vary depending on existing technical conditions.

2. Competitive advantage

The possibility of a large return on investment on investment is evidence of competitive advantage. This competitive advantage is gained by allowing decision-makers to access data that could reveal previously unavailable, unknown, and unrecorded information such as customers, trends, and requests.

3. Increased productivity of corporate decision-makers

Data warehouses integrate data from several unstructured systems into a form that provides a single view of a company. By turning data into meaningful information, data warehouses enable decision-makers to perform more substantive and accurate analyzes.

F. Extraction, Transformation, Loading (ETL)

According to Turban, Sharda, Delen, dan King (2011), ETL retrieves or retrieves data from various sources, converting it, and loading it into a data warehouse. ETL consists of three main parts, namely:

1. Extraction

Extraction is the first stage in the process of retrieving data from the data warehouse. Extraction means reading and understanding data sources and copying the necessary data into the ETL system for further manipulation.

2. Transformation

After the data is extracted to the ELT system, there are many possible transformations such as data purification (correcting typographical errors, correcting domain conflicts, synchronizing with standard formats), combining data from multiple sources, and de-duplicating data.

3. Loading

The ETL process's final step is physical structuring and loading the data into the target dimensional model presentation area.

G. Online Transaction Processing (OLTP)

Online Transaction Processing (OLTP) is a system that can optimize a large number of transactions, which are predictable, repeatable, and intensively updated. Data in Online Transaction Processing (OLTP) can be arranged according to the transactions related to business applications and supports many daily decisions for operational users. This was stated by Connolly & Begg (2015; Marvelous et al., 2019).

H. Online Analytical Processing (OLAP)

It has been discussed by Connolly & Begg (2015) that Online Analytical Processing (OLAP) is a technology that uses a multidimensional display of aggregated data to produce fast access to strategic information for analytical purposes. OLAP is a tool provided by the data warehouse for intensive decision-making purposes where the data is stored in a multidimensional model. OLAP is usually used to describe the analysis of complex information warehouse data.

With OLAP, information can be seen in detail, called a drill-down, or in more concise terms, a roll-up. In OLAP, the queries used are often more complicated, including the aggregation. Time is a very valuable measure of the OLAP system.

1. Roll-Up

Roll up is a concept to view data globally / concisely or ascend to the top level in a dimensional hierarchy.

2. Drill-Down

Drill down, which is the concept to see data in more detail or the opposite of the roll-up concept.

3. Slice and Dice

The Slice operation takes one particular dimension from a given cube and represents a new sub-cube that provides information from another perspective. OLAP cubes (dice) are multidimensional data arrays. Data as cubes with hierarchical dimensions aids analysis. Synchronized data is easier to visualize and increases productivity.

4. *Pivot*

Pivots display size values in a different table layout and can also rearrange dimensions in the OLAP cube.

3.Results and Discussion

The design of data warehouse PT XYZ uses the Kimball method which consists of nine stages of the methodology (nine-step methodology) that must be implemented, including:

I. Choosing a process

Selecting a process that refers to principal a data mart particular. At this stage, what is done is selecting the subject matter faced from the data warehouse to be created, then proceed with identifying business processes and needs related to the subject of the problem. Based on the results of the analysis of the business processes and needs of PT XYZ, there are three processes that will be used for designing a data warehouse, namely:

a. Snapshot Contract Approval

Is the process of determining the quality of payment which determines the good or bad level of installment payments from customers. Each installment is viewed based on a snapshot so that the company can still control its credit contract with the customer.

b. Supervision Asset

Is a process in monitoring assets company that are in the customer. Assets are managed by the company to benefit from loans made to customers or other companies.

c. Snapshot Asset

Is a process that explains the time level or maturity period of an asset from the status of the goods entered into inventory until the goods are sold.

J. Choose the grain

At this stage it will be determined to determine what will be displayed in the fact table or also called to determine the grain in the table fact. Specifying a grain means choosing what data to represent for the table fact.

The following are the grains from PT XYZ in the design of the data warehouse, including:

a. The Contract approval snapshot

Analysis that can be done for the contract approval snapshot process is to calculate the principal debt due, late charge bills (LC), invoices for non-accrued (NA), invoices for write off (WO), snapshot of the number of approvals contracts that are still running or active, total installment costs and interest that can be seen based on time, contract status, contract period, transfer of contract status in installment payments, contract period, contract time before and after the contract.

b. Asset Monitoring

Analyzes that can be carried out for the monitoring process asset are calculating the number of sales of assets that enter inventory, segmenting the types of assets offered, costs for asset repossession, the number of assets that go into inventory, snapshots asset based on asset, asset condition, asset owner, asset usage, asset sale, time, and contract period.

c. Asset snapshot

Analysis that can be performed for the process asset snapshot is to calculate the number of units asset, total repossesses unresolved, and total unresolved inventory by time.

K. Identify and Adjustment Dimensions

In this phase is to determine the dimensions based on grain pre-determined Dimensions set the context to provide a statement of facts in the fact table.

TABLE I
CONTRACT AGREEMENT

Dimensional Grain	Principal debt overdue	Bill *Late Charge* (LC)	Bill for *Non Accruel* (NA)	Bill for *Write Off* (WO)	Number of active agreements
Time	X	X	X	X	X
Period	X	X	X	X	X
Aging Bucket	X	X	X	X	
Maturity Group	X	X	X	X	
Contract Move	X	X			X
Contract Status	X	X	X	X	
Customer Exposure Group	X	X			
Default Status			X	X	X
EPD Status			X	X	X
Flag	X				X

TABLE II
ASSET MONITORING

Dimensional Grain	Segmentation of types of *assets* offered	Cost to *repossess assets*	Number of *assets* that go into *inventory*	Total sales of *assets* that are in *inventory*
Asset	X	X	X	X
Asset Condition	X	X	X	X
Asset Owner Status	X		X	
UsageAsset	X	X		X
Insurance Company	X			

Resale Value			X	X
Time	X	X	X	X
Period	X	X	X	X
Aging Bucket		X	X	

L. Choose the fact

In this stage, select the facts that will fill in each fact table. The facts selected must be in accordance with grain the predetermined.

Business Process	**Calculating**	**Content**
Agreement SS Fact Agreement (*Snapshot*) is a portrait of each contract that is taken every day. To collect data per day, a fact table is needed which is used to make an analysis of how many outstanding contracts are due. *fact*	Principal_Due_Amount	ID_Application
	Principal_Due_Paid_Amount	SK_Time
	OS_Interest_Amount	SK_Periode
	Interest_Due_Paid_Amount	SK_Aging_Bucket
	OS_Principal_Amount	SK_Agreement_Maturity_Group
	Interest_Due_Amount	SK_Contract_Move
	OS_LC_Amount	SK_Contract_Status
	OS_NA_Amount	SK_Customer_Exposure_Group
	OS_NA_Agreement	SK_Default_Status
	OS_WO_Amount	SK_EPD_Status
	OS_WO_Agreement	SK_Ever_30
	OS_Agreement	SK_Ever_90
		SK_Ever_270
		SK_First_30
		SK_First_90
		SK_First_270
		SK_Installment_Number
Fact Asset is a collection of *assets* based on categories	Asset_OTR_Amount	ID_Fact_Asset
	Insurance_Premium_to_ Customer_Amount	ID_Application
	Insurance_Premium_to_ Insco_Amount	ID_Asset
	Asset_Repossess_Amount	SK_Asset
	Repossess_Fee_Amount	SK_Asset_Age
	Asset_Inventory_Amount	SK_Asset_*Condition*
	Asset_Inventory_ Selling_Amount	SK_Asset_Owner_Status
		SK_Asset_Usage
		SK_Insurance_Company
		SK_Period

		SK_Installment_Number
		SK_Aging_Bucket
Fact Asset SS is a portrait of the number of *assets inventory* and *repossess* that has not been paid for and this portrait is done every day. *fact*	OS_Asset_Unit	ID_Fact_Asset
	OS_Repossess_Amount	ID_Application
	OS_Inventory_Amount	ID_Measure
		ID_Asset
		SK_Time

M. Store pre-calculations in the fact table

When the fact tables have been selected, each of the fact tables should be reviewed to determine whether there is still a chance of performing a calculation or pre-calculation. In the fact table there is an initial measure of the data that can be calculated

TABLE III
MEASURE FACT AGREEMENT SS

No.	*Measure*	*Scope*	*Descriptions*
1.	Principal Due Amount	ETL	Measure is the amount of the customer's obligation on the principal debt that is due and has not been paid in a snapshot period.
2.	Principal Due Paid Amount	ETL	Measure is the amount of the customer's obligation on the principal debt that is due and has been paid in a snapshot period.
3.	OS Interest Amount	ETL	Measure is the amount of the customer's obligation for interest or tax on each outstanding debt in a snapshot period.
4.	Interest Due Paid Amount	ETL	Measure is the amount of the customer's obligation on loan interest that is due and has been paid in a snapshot period.
5.	OS Principal Amount	ETL	Measure is the amount of the customer's liabilities for the principal outstanding debt, whether due or not yet in a snapshot period.
6.	Interest Due Amount	ETL	Measure is the amount of the customer's obligation on loan interest that is due in a snapshot period.
7.	OS LC Amount	ETL	Measure is the amount of LC that has not been paid in the snapshot period. S = (LCInstallment - LCInstallmentPaid - LCInstallmentWaived)
8.	OS NA Amount	ETL	Measure is a total amount with a default status of NA that has not been settled in a snapshot period.
9.	OS NA Amount Agreement	ETL	Measure represents the number of agreements with NA's default status that have not been completed in a snapshot period.
10.	OS WO Amount	ETL	Measure is the amount of the agreement with the default WO status that has not been completed in a snapshot period. S = (WOAmount - WOPaid - WOWaived)
11.	OS WO Agreement Amount	ETL	Measure is the number of accounts from the agreement with the default WO status that have not been resolved within a snapshot period.

12.	OS Agreement	ETL	Measure is the number of active agreements in a snapshot period. SS Date> = Go Live Date & SS Date <Inv Date & SS Date <WO Date & SS Date <RRD Date.
13.	Collection Agreement Ratio	OLAP	Measure is the ratio of AR Due Paid Agreement to AR Due Agreement in the same snapshot period. Paid / Due Agreement
14.	Collection Amount Ratio	OLAP	Measure is the ratio of AR Due Paid Amount to AR Due Amount in the same snapshot period. Paid / Due Amount
15.	OS Principal Amount Opening	OLAP	Measure is the amount of customer obligations for outstanding debt principal, whether due or not at the beginning of a snapshot period.
16.	OS Interest Amount Opening	OLAP	Measure is the amount of customer liabilities for loan interest, whether due or not at the beginning of a snapshot period.
17.	OS AR Amount	OLAP	Measure is the amount of unpaid amount, whether due or not in a snapshot period, which consists of principal and interest. TotalOSPrincipal + TotalOSInterestmeasure
18.	OS AR Amount Opening	OLAP	Thisis the amount of the unpaid amount, whether due or not at the beginning of a snapshot period, which consists of principal and interest. S = (OS Principal amount + OS Interest amount)measure
19.	OS AR Agreement	OLAP	Thisis the number of accounts that have not been paid, both those that are due and those that have not been in a snapshot period.
20.	OS AR Agreement Opening	OLAP	Measure is the number of unpaid accounts, whether due or not at the beginning of a snapshot period.
21.	OS AR Due Amount	OLAP	Measure is an unpaid amount that is due in a snapshot period.
22.	OS AR Due Agreement	OLAP	Measure is the number of unpaid accounts that are due in a snapshot period. AR Due Amount! = 0 then 1 else 0
23.	OS AR Due Paid Amount	OLAP	This measure is the amount of the amount that is due and has been paid in a snapshot period. S = (PrincipalDuePaid + InterestDuePaid)
24.	OS AR Due Paid Agreement	OLAP	Measure is the number of accounts that are due and have been paid in a snapshot period. AR Due Paid Amount! = 0 then 1 else 0
25.	OS NA Amount Opening	OLAP	This measure is the amount of the amount with the default status of NA that has not been completed at the beginning of the snapshot period.
26.	OS NA Agreement Opening	OLAP	Measure is the number of agreements with the default status of NA that have not been completed at the beginning of the snapshot period.
27.	OS WO Amount Opening	OLAP	Measure is the total amount with the default WO status that has not been completed at the beginning of the snapshot period. S = (WOAmount - WOPaid - WOWaived)

28.	OS WO Agreement Opening	OLAP	Measure is the number of accounts from the agreement with the default WO status that has not been completed at the beginning of a snapshot period.
39.	OS LC Amount Opening	OLAP	Measure is the amount of LC that has not been paid at the beginning of the snapshot period. S = (LCInstallment - LCInstallmentPaid - LCInstallmentWaived)

TABLE IV
MEASURE FACT ASSET

No.	*Measure*	*Scope*	*Descriptions*
1.	Asset DP Amount	ETL	Measure is the down payment amount of an asset.
2.	Asset OTR Amount	ETL	Measure is the OTR Amount value of an asset.
3.	Insurance Premium to Customer Amount	ETL	Measure is an insurance premium value for customers.
4.	Insurance Premium to Company Amount	ETL	Measure is the insurance premium value from the Insurance Company.
5.	Repossess Fee Amount	ETL	Measure is the total cost amount used in the repossess process.
6.	Asset Inventory Amount	ETL	Measure is the value of the amount of assets that change its status to inventory. Have an Inventory Date or Inventory Amount
7.	Asset Inventory Selling Amount	ETL	Measure is the value of the amount of assets with the status of Inventory sold.
8.	Asset NTF Amount	OLAP	Measure is the NTF Amount value of an asset. Asset NTF Amount = Asset OTR Amount -Asset DP Amount
9.	Num of Asset	OLAP	Measure is the amount of assets being financed.
10.	Gain Insurance Amount	OLAP	is the value of income from insurance by taking into account the condition of its replacement asset. Gain Insurance Amount = Insurance Premium to Customer Amount - Insurance Premium to Insco Amount
11.	Asset Repossess Unit	OLAP	Measure is the number of assets that are successfully repossessed.
12.	Asset Inventory Unit	OLAP	Measure is the number of units of assets whose status changes to inventory.
13.	Asset Inventory Selling Unit	OLAP	Measure is the number of asset units with Inventory status sold.
14.	Avg. Inventory Selling Days	OLAP	Measure is the average number of days an asset is sold from that asset in the inventory.
15.	LOI Amount	OLAP	Measure is the amount of the difference between Inventory Amount and Inventory Selling Amount, then add the Reposses Fee Amount. LOI Amount = Inventory Amount - Inventory Selling Amount + Repossess Fee Amount
16.	LOI Amount Ratio	OLAP	Measure is the ratio of LOI Amount to Inventory Amount.

17.	Asset Repossess Amount	ETL	Measure is the value of the amount of assets that have been successfully repossessed.

TABLE V
MEASURE FACT ASSET SS

No.	*Measure*	*Scope*	*Descriptions*
1.	OS Asset Unit Amount	ETL	Measure is a value that shows the number of asset units. Snapshot Date> = Go Live Date & Snapshot Date <Inventory Date & Snapshot Date <WO Date & Snapshot Date <RRD Date
2.	OS repossess Amount	ETL	Measure is the amount of assets with repossess status that have not been resolved in the snapshot period. Have a Repossess Date but don't have Inventory Date
3.	OS Inventory Amount	ETL	Measure is the amount of an asset with an inventory status that has not been resolved in the snapshot period. Have an Inventory Date or Inventory Amount but do not have a Paid Date.
4.	OS Repossess Unit	ETL	Measure is the number of units of assets with repossess status that have not been resolved in the snapshot period.
5.	OS Inventory Unit	ETL	Measure is the number of units of assets with an unresolved inventory status in the snapshot period.
6.	OS Inventory Unit Opening	OLAP	Measure is the number of units of assets with an unresolved inventory status at the beginning of the snapshot period.
7.	OS Inventory Amount Opening	OLAP	Measure is the amount of assets with an inventory status that has not been completed at the beginning of the snapshot period.
8.	OS Repossess Unit Opening	OLAP	Measure is the number of units of assets with repossess status that have not been resolved at the beginning of the snapshot period.
9.	OS Repossess Amount Opening	OLAP	Measure is the amount of assets with repossess status that have not been resolved at the beginning of the snapshot period.
10.	OS Asset Unit Opening	OLAP	Measure is a value that shows a portrait of the number of asset units at the beginning of the month. Snapshot Date> = Go Live Date & Snapshot Date <Inventory Date & Snapshot Date <WO Date & Snapshot Date <RRD Date.

N. Roundout the dimensiontables

In this stage, back on the table as much as possible the dimensions and add text description to the dimension table. Description text should be intuitive and easy for the user understand.

TABLE VI
DIMENSIONS OF TIME

Attribute	Type Data	Length
Full_Date	date	

Day	int	100
Month	int	100
Quarter	int	
semester	Int	
Year	int	
Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE VII
DIMENSIONS OF ASSETS CONDITION

Attribute	Type Data	Length
ID_Asset_Condition	varchar	10
Asset_Condition	nvarchar	100
Current_Asset_Condition	nvarchar	100
Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE VIII
DIMENSIONS OF ASSET OWNER STATUS

Attribute	Type Data	Length
ID_Asset_Owner_Status	varchar	10
Asset_Owner_Status	nvarchar	100
Current_Asset_Owner_Status	nvarchar	100
Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE IX
DIMENSIONS OF ASSET USAGE

Attribute	Type Data	Length
ID_Asset_Usage	varchar	10
Asset_Usage	nvarchar	100
Current_Asset_Usage	nvarchar	100
Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE X
DIMENSIONS OF CONTRACT MATURITY GROUP

Attribute	Type Data	Length
ID_Agreement_Maturity_Group	varchar	10
Agreement_Maturity_Group	nvarchar	100
Current_Agreement_Maturity_Group	nvarchar	100
Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE XI
DIMENSIONS OF CONTRACT STATUS

Attribute	Type Data	Length
3.61ID_ Contract_Status	varchar	10
Contract_Status	nvarchar	100
Current_Contract_Status	nvarchar	100
Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE XII
DIMENSIONS OF CONTRACT MOE

Attribute	Type Data	Length
ID_ Contract_Move	varchar	10
Contract_Move	nvarchar	100
Current_Contract_Move	nvarchar	100
Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE XIII
DIMENSIONS OF RESALE VALUE

Attribute	Type Data	Length
ID_ Resale_Value	varchar	10
Resale_Value	nvarchar	100
Current_ Resale_Value	nvarchar	100
Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE XIV

DIMENSIONS OF COSTUMER EXPOSURE GROUP

Attribute	Type Data	Length
3.64ID_ Customer_Exposure_Group	varchar	10
Customer_Exposure_Group	nvarchar	100
Current_Customer_Exposure_Group	nvarchar	100
Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE XV
DIMENSIONS OF DEFAULT STATUS

Attribute	Type Data	Length
3.65ID_ Default_Status	varchar	10
Default_Status	nvarchar	100
Current_ Default_Status	nvarchar	100
Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE XVI
DIMENSIONS OF PERIOD

Attribute	Data Type	Length
3.66ID_ Period	varchar	10
Period	nvarchar	100
Current_ Period	nvarchar	100
Effective_Date	Date	
Expiration_Date	Date	
Row_Is_Current	tinyint	

TABLE XVII
DIMENSIONS OF EPD STATUS

Attribute	Type Data	Length
3.67ID_ EPD Status	varchar	10
EPD Status	nvarchar	100
Current_ EPD Status	nvarchar	100
Effective_Date	Date	
Expiration_Date	Date	
Row_Is_Current	tinyint	

TABLE XVIII
DIMENSIONS OF FLAG

Attribute	Type Data	Length
3.68ID_ Flag	varchar	10
Flag	nvarchar	100
Current_ Flag	nvarchar	100
Effective_Date	Date	
Expiration_Date	Date	
Row_Is_Current	tinyint	

TABLE XIX
DIMENSIONS OF AGING BUCKET

Attribute	Data Type	Length
ID_ Aging_Bucket_Group	varchar	10
Aging_Bucket_Group	nvarchar	100
Current_ Aging_Bucket_Group	nvarchar	100
ID_ Aging_Bucket_Detail	varchar	10
Aging_Bucket_Details	nvarchar	100
Current_ Aging_Bucket_Details	nvarchar	100
EFFECTIVE_DATE	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE XX
DIMENSIONS OF ASSET AGE

Attribute	Data Type	Length
ID_ Asset_Age_Group	varchar	10
Asset_Age_ Group	nvarchar	100
Current_ Asset_Age_ Group	nvarchar	100
ID_ Asset_Age_Detail	varchar	10
Asset_Age_Details	nvarchar	100
Current_ Asset_Age_Details	nvarchar	100
EFFECTIVE_DATE	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE XXI
DIMENSIONS OF ASSET

Attribute	Data Type	Length
Asset ID_Type_	varchar	10
Type_Asset	nvarchar	100
Current_Type_ Asset	nvarchar	100
Asset ID_Category_	varchar	10
Category_Asset	nvarchar	100

Current_Category_ Asset	nvarchar	100
Asset ID_Brand_	varchar	10
Brand _Asset	nvarchar	100
Current_Brand_ Asset	nvarchar	100
Asset ID_Description_	varchar	10
Description _Asset	nvarchar	100
Current_ Description _ Asset	nvarchar	100
Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

TABLE XXIDIMENSIONS OF INSURANCE COMPANY

Attribute	Type Data	Length
3.72ID_ Insurance_Company	varchar	10
Insurance_Company	nvarchar	100
Current_Insurance_Company	nvarchar	100
Effective_Date	Date	
Expiration_Date	Date	
Row_Is_Current	tinyint	

TABLE XXIIIDIMENSIONS OF PRODUCT TYPE

Attribute	Type Data	Length
ID_ Product_Type	varchar	10
Product_Type	nvarchar	100
Current_ Product_Type	nvarchar	100
Effective_Date	Date	
Expiration_Date	Date	
Row_Is_Current	tinyint	

TABLE XXIV: DIMENSIONS OF REGION

Attribute	Type Data	Length
ID_ Region	varchar	10
Region	nvarchar	100
Current_ Region	nvarchar	100
ID_ Area	varchar	10
Area	nvarchar	100
Current_ Area	nvarchar	100
ID_ Branch	varchar	10
Branch	nvarchar	100
Current_ Branch	nvarchar	100

Effective_Date	date	
Expiration_Date	date	
Row_Is_Current	tinyint	

4.Conclusion

Through a data warehouse that has been designed, detailed data originating from OLTP is processed into data summarized so that the data processing process is more effective and efficient which can strengthen the analysis process in decision making, including determining company strategy and predicting future company needs by the executive. This can be seen from the data structure, in the data warehouse the structure is in the form of a multidimensional model which is depicted with a star schema, while in an ongoing system the structure is in the form of a database operational which is described by ERD.

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