

A Design of a Financial Management Information System Based on Data Warehouse Technology

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Abstract — With the development of computer technology and information technology, the quantity of information grows exponentially, which makes traditional database technology unable to meet the needs. Data warehouse techniques support the management decision-making process, it is subject-oriented, integrated, stable, and enables data collection at different times. Data warehouse technology has been widely used in the financial industry, while the domestic banking sector also saw great benefits brought by this technology and prompted many domestic banks to have or to develop bank data warehouse systems. By using a powerful data warehouse, the bank can establish enterprise customer base, individual customer database, and a unified organization structure of multiple data sources which encompasses business, finance, market competition and other enterprises to form an integrated storage structure. Such analysis lays the foundation for enterprise wide decision-making processes.

Keywords -- Data Warehouse; Financial Management; Banking information.

I. INTRODUCTION

With the rapid development of information technology, in particular a sharp increase widely used database technology and computer networks, the amount of data businesses have. In the large amounts of data and information, it bears the pros and cons of business operations, if possible with such vast amounts of data quickly and efficiently in-depth information analysis and processing, you can find out the rules and modes to obtain the required knowledge to help enterprises better businesses operational decision-making [1-2]. Data warehouse technology and product demand in this market gradually matured, and enterprises to obtain a high return on investment. How to optimize customer relationships, enhance the bank's competitive advantage has become the focus of attention of modern commercial banks. While the complicated market competition, many banks based on years of accumulated data and their core business, proposed the establishment of enterprise-class data warehouse planning and implementation of programs, to lay the cornerstone for the further development of the bank [3].

Financial management information system-based customer relationship management data warehouse related technologies segment customers to better meet customer needs, and connect customers and banks to maximize customer profitability and increase customer satisfaction and loyalty. This data the overall objective is to establish a warehouse system construction enterprise class infrastructure data bank system, integrate customer information resources to achieve comprehensive customer information management functions include: a single customer information management, customer comprehensive analysis of target customers search and business inquiries and statistics functions, for Bank management to provide

decision support information to improve their market competitiveness.

II. DATA WAREHOUSE TECHNOLOGY

Data warehouse is subject-oriented, integrated, stable, time-varying data sets to support management decision-making processes. Data warehouse data in the data source (including the operation of the database, external market data, office data, archive data, etc.) were collected, and its standardization, filtration, purification and other treatment, the back cover stamp, into the data warehouse (Data Warehouse), and then through a variety of tools (OLAP tools, reporting tools, DSS tools, data mining tools, etc.) for data warehouse knowledge discovery, and applied in practice, for customers to provide theoretical support scientific decision support system for the purpose of data warehousing, OLAP and data mining entity, it can target specific industries and specific companies the implementation [4-5]. Figure 1 is a block diagram of a data warehouse is usually the case system.

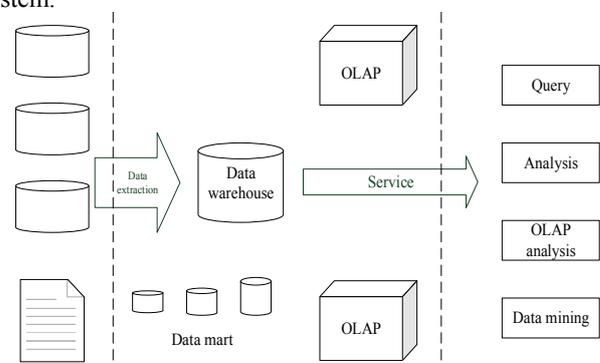


Figure 1. System structure of the data warehouse

Data warehouse data is organized mainly include three kinds, namely, virtual storage, storage-based and multidimensional database storage methods relational tables which are multi-dimensional database stored directly facing the organization in the form of data mining data analysis required for the operation, it DW on the angle of the massive amounts of data from a client interested in a hierarchical process, abstraction, and set dimensional indexing and metadata management file corresponding to correspond to the data warehouse data and virtual storage, storage-based relational table organizational relationships are way more complicated compared to the more suitable for organizing, storing massive amounts of data in the data warehouse.

Data warehouse and traditional database, it does not have a strict mathematical theory, and is more interested in engineering [6]. A complete data warehouse structure is generally shown in Figure 2, the layers of the basic functions are as follows:

- (1) Data source. Data source provides data source for data warehouse.
- (2) Data back-end processing. The data sources were extracted, cleaned, converted eventually become data warehouse.
- (3) Data warehouse and its management. This layer includes data warehouse and data warehouse management in two parts. Responsible for storing the data warehouse analysis, decision-making data, and the data warehouse management is responsible for managing the data warehouse.
- (4) Data marts. This layer is the local data warehouse or part of the data warehouse to provide data support for specific applications.
- (5) Data warehouse applications. The data warehouse is to use the service. Data warehouse applications include analysis, decision-making applications, such as OLAP, DM, etc.
- (6) Data presentation layer. The application layer is responsible for displaying the results, the data may also be referred to as the front-end processing layer.

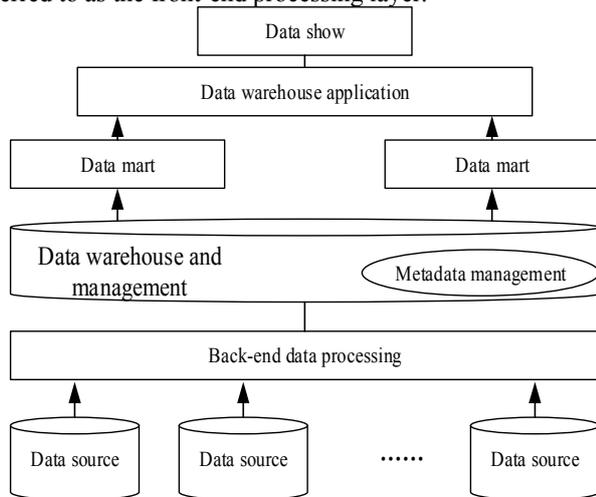


Figure 2. The data warehouse architecture

III. FINANCIAL ANALYSIS OF MANAGEMENT INFORMATION SYSTEM

Faced with a broad array of data, financial institutions begin to build their own statistics platform has become a trend, however, the data warehouse building is a systematic project, not overnight, so we need to make detailed in-depth needs analysis, by understanding the financial institutions, including its existing data sources and their current business situation to be considered together, the business needs of financial statistics platform system can be expanded from the functional and non-functional aspects [7]. Financial institutions existing systems to core business systems, credit management systems and intermediate business system based, in addition, also supported by a number of other peripheral systems, each system structure is complex, located in different network nodes, with different data structures; and these business system can only provide statements related to this system, leadership and business analysts can understand the dynamics of the industry by reporting data, the lack of analysis of macroscopic systems, therefore, based on this demand, the platform should be used for distributed data acquisition and centralized storage mode. Collected from different business systems data from after the ETL process data, to focus on the storage server in the head office of financial institutions. After the data warehouse set up, it should adopt hierarchical management application mode, the system application using hierarchical management mode, using the B / S technologies to enable application functions in their respective levels [8-10].

Through the above needs analysis shows that the core financial management information system that is the establishment of a data warehouse, thus establishing a data warehouse is the ideological core of the platform system design, specifically, is the data warehouse system should be consistent with the data warehouse hierarchical design, Thought for the Implementation of the distribution, the upcoming application platform system is also efficient, seamless integration into the data warehouse building to go. Each data layer service to different objects, and finally form a sound financial institution data warehouse model, shown in Figure 3.

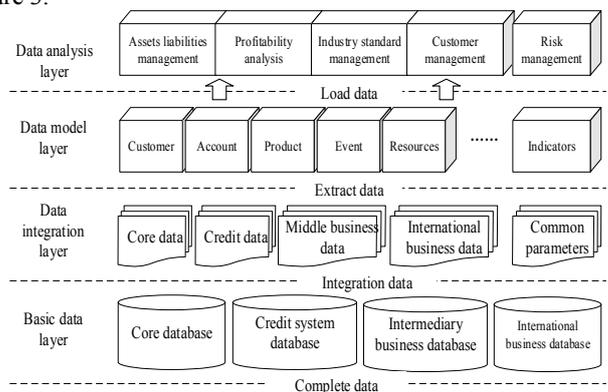


Figure 3. Function hierarchy of financial information management system based on data warehouse

Basic Data Layer. Data covers all business systems of financial institutions. Data sources by a financial institution from a business system will unload data into text, loaded into the data warehouse. The data layer is first to achieve the integration of heterogeneous platforms, provide data source for the upper, while the data warehouse applications and business systems separated, reducing the pressure on businesses to access the system, but also to ensure the integrity of the data warehouse for storing data. Data of the data layer is not as analysis.

Data Integration Layer. This layer is based on data base data layer for data integration, including integration parameter information, customer information, the validity of data integration, making the data warehouse to give a unified description. The data layer to achieve a data cleansing, removes erroneous data, invalid data and redundant data, will bring together all of the business data onto a single platform. The layer data mainly serves the query application and reporting application, therefore, data quality testing is the focus of the layer.

Data Model Layer. The data model will be used in accordance with the subject field of the data for data in the data warehouse reorganization. When data reorganization, advance indicators point to generate good value on time, stored in the data warehouse. It is among the topics closely together domain data model, common services in business templates and business applications.

Data Analysis Layer. Based on the data model, data warehouse loading data by business template design Cube, provide the foundation for business analysis model specific business applications; build data marts, providing data basis for specific business applications. Business Templates financial institutions are commonly used include the following categories: asset and liability management, profitability analysis, industry standards management, customer relationship management and risk management.

IV. FINANCIAL MANAGEMENT INFORMATION SYSTEM FRAMEWORK BASED ON DATA WAREHOUSE

Data Warehouse goal is to meet the needs of various users with small, unified management of data, provide the necessary information for decision support and the ability to operate its rotation, slicing, drill and other OLAP. Data warehouse construction is a systematic project, is a continuous build, develop, and improve the process usually takes a long time. This requires all enterprises to build the entire system and put forward a full, clear vision and technical implementation blueprint. Successful construction method is distributed iterative development, establish and gradually expand in stages. Features of this method is less initial investment, stages of development time is short, quick returns, risk control, provided that prior careful planning must be carried out in detail, and head always unswervingly implement [11]. For the banking industry, data warehouse applications is very broad, basically covering all aspects of bank management and business operations.

The main function of this system: customers can correspondence between dimension tables and fact table, query the basic information; use of data mining algorithms mining the information to predict the movements of the bank; data analysis can be based on a customer's ability to repay, and so on. The overall framework of the system shown in Figure 4.

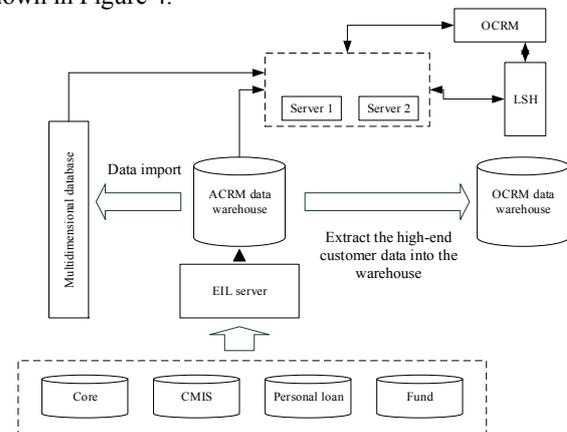


Figure 4. The application of data warehouse technology in banking

The primary task of the system is to be completed .txt document data into the database, and these databases as a data warehouse data source. These databases which can be the same database management system and can also be distributed, heterogeneous databases. While using an application system to achieve the management of data in the database to complete routine transactions. Followed by the transfer of data to the data warehouse, and then design a foreground application (in this case is an online analysis tools and data mining tools) to complete statistical analysis and forecasting capabilities, implement support for decision-making. Because there are many mining algorithms, thus also on various mining algorithms to analyze several algorithms to choose the data warehouse were mining, mining end also these kinds of algorithms were evaluated to find out one of the most The system is suitable algorithm. The data transfer tools and metadata management tools are used to manage data from various data sources (traditional database) to the data warehouse and the data warehouse data structures and business rules.

V. DATA WAREHOUSE TECHNOLOGY-BASED FINANCIAL INFORMATION SYSTEM MODEL

According to the financial information system data warehouse design requirements, development of methods and data organization scheme, wood paper designed a financial information system model. For simplicity, the model bypasses the relevant financial information system network topology, each business subsystem specification and interconnection issues, focuses on the design and implementation of data warehouse environment. Financial information system data warehouse environment by the

underlying system network, data collection, data warehousing, data presented in four parts, the structural model shown in Figure 5.

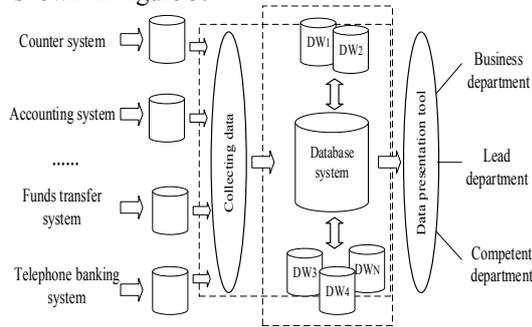


Figure 5. The structure model of financial information system based on data warehouse

Collecting data. Data collection is stored in the data warehouse tools and processes data from various business processing system. Because while we deal with the business environment is very complex, data processing is also different, some of the data in different systems with the same name but different meanings. Therefore, to obtain from each business data processing system is not simply to extract work, but a more complex process.

Database system. Most of the data warehouse or the use of a database management system (DAMS) to manage its data. DAMS can be established on the basis of the existing database can also be used with the original system is different DAMS However, since the data warehouse party scene and the need to manage large data, but also to meet the other requirements for efficient query, so its choice is very important.

Data presentation tools. Data is presented to the user's query data presented to a technical user. We cannot put the data in the data warehouse and displayed directly on the user before, but should be user queries to the data represented graphically, so that decision-makers to understand and use. Therefore, the data presentation tool selection is also an important aspect in data warehouse design process.

VI. CONCLUSION

Data warehouse technology as a means of decision support has been accepted by an increasing number of enterprises and research institutions, especially the development in the financial sector is increasing rapidly. Financial institutions in order to survive in the fierce competition, have started to build their own data warehouse. The main content of this paper is how to apply the data warehouse technology to build financial information systems, out of the system overall construction plan.

The establishment of financial information system data warehouse can be well-managed business data of various

departments, making financial decision-making wooden paper presents a financial information system based on data warehouse technology solutions and design the structure of the model. However, the establishment of financial data warehouse and cannot solve all the traditional problems of financial information systems, it is only a means, and its essence is in accordance with the requirements of various departments, the daily business data processing and reorganization, the creation of an information analysis for decision-making platform. The establishment of financial data warehouse can only answer a few simple questions, and to answer some questions with the forecast or the nature of the decision, relying solely on the data warehouse was unable to get satisfactory answers.

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