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Analysis of Enterprise Data Warehouse Prototype using Business Intelligence Platform

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Abstract:

A main application domain of spatiotemporal data warehousing is the telecommunications industry, which is increasingly dominated by massive amounts of data. In this paper, a DW schema modeling approach is proposed that integrates temporal and spatial data in a unified manner into a common data warehousing framework. Temporal and spatial data integration becomes more important as the volume and sharing of data increases. The objective of this research work is to facilitate the understanding, querying and management of spatial data for on-line analytical processing (OLAP). The proposed new spatiotemporal DW schema extends OLAP queries to support spatial and temporal queries. A case study has been developed and implemented for the Telecom industry.

Keywords: OLAP, DW, Telecom Industry, management, Data etc.

1.1 Introduction:

Now let's understand about Data Warehouse, it is an important part of Business intelligence ie BI, Warehouse means that where we store data in Bulk, Warehousing can be of any thing, such a CJ which You have to store in bulk at a single place, but here we are talking about Data Warehouse i.e. Multiple Data which we want to store in one place for future use. It is called data warehouse.

Data in this data warehouse can be Homogeneous or Heterogeneous, Homogeneous Data means Same Kind of Data which is related to each other, and Heterogeneous Data which comes from different places and has no relation with each other. An increasing number of cloud computing (CC) platforms facilitate big data warehouse (DW) storage and manipulation. Having all the functionalities of DW on the internet makes it easy to access and storage is no longer an issue as clouds provide almost unlimited storage capacity. Apache Hive Data Warehouse [1] manages large distributed data sets using SQL, while Microsoft with Azure SQL Data Warehouse [2] can fully manage cloud DW providing a single holistic DW solution. Amazon also offers cloud DW capabilities on Amazon Redshift Cluster using standard SQL [3]. Google is not out of it with Google BiqQuery to oppose the other big vendors [4]. Nowadays, almost all big and small cloud providers like IMB [5], Oracle [6], Teradata [7], CoolaData [8] etc

1.2 Data warehouse architecture

A data warehouse architecture is a design that encapsulates all aspects of data warehousing.

Through data warehouse architecture, we can maintain any objective. The data warehouse architecture is designed keeping in mind the needs of the client and the goals of the employee.

There are many different types of architecture of data warehouse. Here we will read about the three tier architecture of data warehouse which is most commonly used.

three tier data warehouse architecture in hindi:-

There are three layers in the data warehouse architecture.

1:- bottom tier (lowest layer)

2:- middle tier

3:- top tier (highest layer)

1:- Bottom tier:- The lowest layer contains the database server which is mostly always a relational database system. In this, back end tools are used to load the data in the bottom tier and this data is taken from operational databases and external sources.

This layer handles the ETL process of the data warehouse. ETL process is the process in which data is extracted, transformed and loaded in the data warehouse.

The ETL (extract, transform, and load) process is performed by back end tools.

2: - middle tier: - This tier is also called application tier. This layer handles the requests of all the users. BI (Business Intelligence) is created in this layer.

OLAP server is there in this layer. This OLAP server is implemented in the following two ways.

1: - ROLAP (Relational OLAP): - These servers are intermediate servers which are located between relational back end servers and client front end tools.

2: - MOLAP (multidimensional OLAP): - This server supports multi-dimensional view of data.

3: - Top tier: - This tier is also called presentation tier. This is the front end client layer. This layer consists of query tools, reporting tools, analysis tools and data mining tools. This layer interacts with end users. That is, the data reaches the end users through this layer.
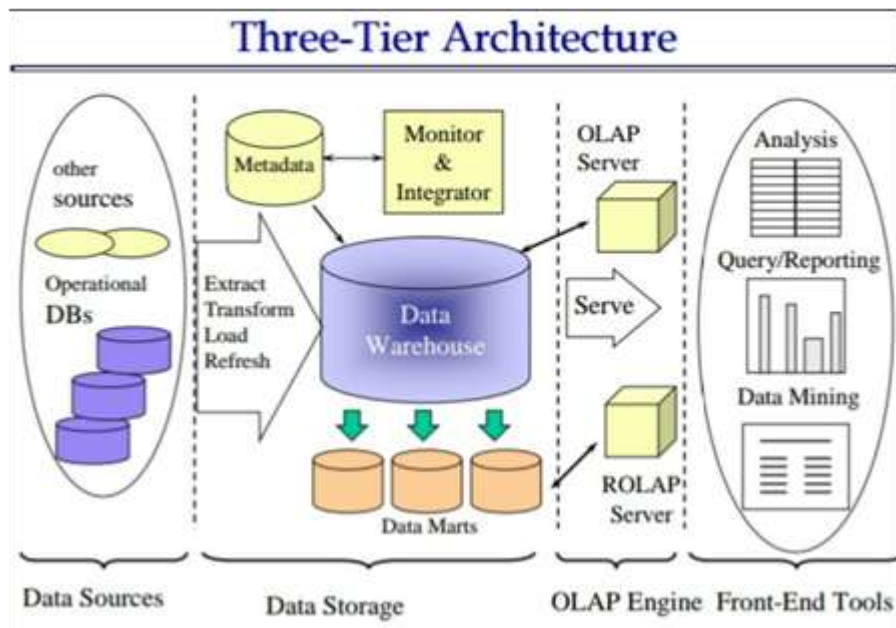
1.3 Role of BI in Banking

Business intelligence systems provide the technical platform and knowledge for its implementation, thus, do not exist as a final product. Banks are among the leaders in adopting new technologies and knowledge. Thus, to meet the needs of these BI systems special databases called data warehouses are created where the data is organized in such a way that it is convenient to conduct analytical procedures on large amount of data sets. These data sets are specially structured for reports and analysis. Data warehouse and online analytical processing (OLAP) form the informational basis for implementing business intelligence. Business Intelligence takes care of many areas of banking business, some of them are

- Analytical Customer Relationship Management
- Bank Performance Management
- Asset and Liability Management
- Enterprise Risk Management
- Compliance

1.4 Prospects for the use of business intelligence systems in agile manufacturing management

Organizations that want to effectively achieve agile manufacturing must be able to integrate their marketing and sales activities with their design and production activities to obtain specialized products for customers and in a way that best meets the needs of customers. be able to fully respond to demand (Hormoji, 2001). In agile manufacturing, customer participation should also be provided for in the product design process. Rapid changes in the design of products should also be evaluated in the design phase of products, and in relation to changes in customer expectations (Maskell, 2001). Guneshkaran (1999) also stresses that hardware and software must be easily adaptable, and this is one of the basic conditions of production agility. In successfully implementing agile manufacturing, implementing robots, integrated design with computers, integrated production with computers, electronic data exchange, the Internet, and electronic commerce are critically important.

1.5 Business intelligence Systems

1- Based on the growing data volumes of the organizations, it facilitates to get more meaningful and reliable results with its detailed analysis feature and to access the information easily when required by the organizations and corporations with its integrated architecture, and Which became an essential part of the decision making process.

2- Organizations that carry business information in a mobile environment can access critical information at any time with respect to users' needs and technological advances. The developed provides access to all analysis results, reports and dashboards even in a mobile environment, enabling organizations to make more effective decisions in less time and stay a step ahead of competitors in a tough competition environment.

3- Business Intelligence systems that provide institutions and organizations with a comprehensive view and a means for detailed and robust analysis on large-sized data, by providing individual business intelligence participation to each and every employee working in the organization. which can respond to the user's requirements.

1.6 Analysis of enterprise data warehouse prototype using business intelligence platform

Like the corporate sector, the education sector and the banking sector are in great need of "Business Intelligence" these days, especially in India, where bridging the industry-academia gap and meeting industry demand are key to producing industry-ready students. The biggest challenge for Brigade. Furthermore, the tool can be used to enhance the competitive advantage of universities/institutes and banking and help achieve goals based on factual data from all data resources.

In addition to regular standard queries and reports, business intelligence tools can also provide answers to many complex and difficult questions of strategic value based on the facts collected in the data warehouse. Business Intelligence can help the management to determine which students should be admitted, what special training the students of a particular course need, how to improve the admission rate, what special skills corporates need, How to improve the curriculum to meet the industry demand, what can be other places of expansion, what new courses to start, what courses can be started as e-education and e-banking, country In which sector of the world there is a high demand for e-courses (Joseph L.V., 2014). Many other such important questions can be addressed by data warehouse ad business intelligence tools and can help education management of universities/institutes and banking to take more informed decisions.

Table 1.1: The Education and Banking sector DW features

Table Name	Size (KB)	Number of Rows
Contract	2048	30,000
Product	66	200
Call	52200	2,000,000
Customer	842	20,000
Employment	66	600

Companies invest a lot of money in BI for better business decisions and DW is an essential management tool in this direction. DW should transform operational data into a more understandable and user-friendly format for analysis and decision making. Analysis of data using DW is also greatly improved by using new operations such as roll-up and drill-down to retrieve data at multiple levels of aggregation. Data mining techniques can subsequently be used to find hidden patterns in customer behavior and predict future trends, allowing businesses to make proactive and knowledge-based decisions.

DW's usefulness to a telecommunications company is multifaceted, it can facilitate data analysis by providing a key source of information for creating reports, and drill down into user data details by analyzing data faster and generating reports more easily. can do; Plus, they can slice-and-dice in ways they never could before and submit multi-dimensional queries against spatial and historical data. The results of the analysis can lead to better decisions to promote products that are attractive to customer needs, for example people who have not changed countries or cities in their entire lives are not good candidates for long distance planning or Offering different plans. Age groups in different geographic regions.

1.7 Conclusions and Future Work

Can increase production with product category management and product sales analysis and follow production in parallel with market requirements. With predictive analysis from existing data, you can find open points in the market and new business insights. Data warehouse and business intelligence form a platform to analyze data and present it as information in various ways such as interactive reports, graphs and dashboards. The information provided is actionable and can help the education and banking sector, especially universities, banking and institutions make more informed decisions. This technology can prove to be a "magic stick", especially for the Indian higher education sector and the banking sector. It will completely change the face of contemporary education system and will enable to gain competitive advantage. A prototype implementation is underway with actual data for validation of the logic. Future work involves solving the related challenges encountered. The solution proposed in this study can be easily generalized to support services in other business domains. Furthermore, testing our model is the final step for many cloud vendors. Apache Hive DW has been set up and preliminary testing has already been conducted with very promising results regarding quality and time complexity.

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