



Implementation of Data Warehouse in ERP System

KEYWORDS

ERP System, Data, Information, Data warehouse, Data marts

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ABSTRACT

In these days the use of ERP System is spreading all over the world very rapidly because application of ERP system in any organization can increase their performance in terms of cost, quality, speed and services. By adopting ERP systems, organizations eliminated the inconsistencies and inefficiencies that stemmed from working with standalone departmental systems. By centralizing data, ERP systems also eliminated inaccuracies and duplication of information as well as saves time by removing manual data entry. But yet there is a continued need to enhance the efficiency of operations in ERP system as the present ERP systems also have some limitations. One of the major limitations of ERP system is that it can only store the current information and not the past information. Due to this it became very difficult to take correct decision in the cases where past information is required along with this ERP system has no reporting and analysis capability. The present paper shows how organizations can retrieve past information by applying Data warehouse in ERP system as Data warehouse provide storage, functionality and responsiveness to queries beyond the capabilities of ERP system.

1: INTRODUCTION

ERP systems is a collection of ERP s/w modules, people and hardware which attempt to integrate all organizational current information in one central database, consequently they allow any organizational current information to be made visible [1]. Many organizations had spent huge amounts of money implementing ERP with the expectation that ERP will solve the information systems problems of the organization. Indeed ERP solved some of the problems of information systems but ERP hardly solved all of the problems of information systems. Organization after implementation of ERP found that ERP is good for gathering current data, executing transactions and storing current data but it cannot store past (historical) data. The best decisions can be made when all the relevant data available is taken into consideration. The best possible source for that data is a well-designed data warehouse which can store past as well as present data. Thus the objective of the present paper is to discuss the applicability of Data warehouse in ERP by which organizations can retrieve past information also.

2: DATA WAREHOUSE

Data warehouse is a database which stores collection of past (historical) as well as present (current) data. In an organization these data are useful for decision making process, comparison process & forecasting. The Data warehouses have following characteristics:

- Reside on computers.
- Run on a database management system (DBMS) such as those from Oracle, Microsoft Access, MySQL, SQL Server etc.
- Retain data for long periods of time
- Consolidate data obtained from many sources [2].

And inside a data warehouse the main characteristics of data are as follows:

- Subject-oriented: The data inside the data warehouse should be related to a particular subject. For example, Bank related Datawarehouse contain data related to depositor, borrower, account, loan etc, it cannot contain data related to Library.
- Integrated: data inside the data warehouse should come from different sources called data marts. Each of these sources has its own designer which creates its database file (collection of data) in different format. Integration of

all files in a Datawarehouse require transformation program which transforms many sources into one particular format so that integration program integrate all same format files into one consistent database.

- Non-volatile: Data inside the Datawarehouse can be accessed but cannot be changed.
- Time variant: Data is stored inside the Datawarehouse in timely variant manner.

A key aspect of the organization process of Datawarehouse is the creation of areas within the warehouse that are referred to as data marts. The challenge therefore is to collect and store data from multiple sources (i.e. data marts) into one coherent structure (i.e. Data warehouse) by using ETL (Extract, Transform & Load) process based on which data analysis can be performed [3]. By ETL process information can be extracted from a particular source (data mart), then transformed into some standard format and finally stored into the common database structure called Datawarehouse. In most cases, individual data marts contain data from a single subject area such as the admission section or perhaps the accounting section (Fig1).

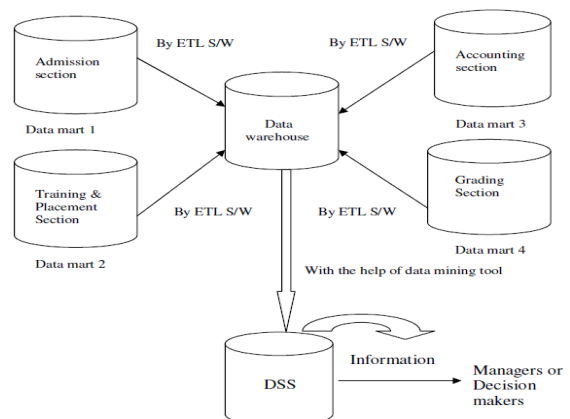


Fig 1: Creation of Datawarehouse & retrieval of information from it.

Enterprise Datawarehouses aim at physically framing multiple sources of data (e.g., databases and other) in an architecture that requires the mapping of data from one or more

operational data sources to a target database management system (DBMS) that supports the many decision making processes and business intelligence (BI) systems of an enterprise. Business Intelligence for ERP is the user-centered process of exploring data, data relationships and trends to improve overall decision making for enterprises. This involves an iterative process of accessing data (usually stored in the enterprise data warehouse) and analyzing it, thereby deriving insight, drawing conclusions, and communicating results to authorized users.

Datawarehouse contains a very useful source of data for the explorer and data miner. To help managers and decision makers retrieve information they need from tremendous amount of data reside in database many enterprises have built system environments focusing on datawarehousing technology, deployed that as an integral part of a decision support systems (DSS). Datawarehouse is optimized for information retrieval and not for routine transaction processing.

Datawarehouse support –OLAP (online analytical processing), DSS (Decision Support System), and Data mining application where OLAP is used to describe the analysis of complex data from the data warehouse, DSS support organization decision makers to take important decisions and Data mining tool retrieve information from Datawarehouse and put into DSS (Fig. 1).

3: NEED OF DATA WAREHOUSE IN ERP SYSTEMS

Datawarehouse is responsible for providing information needed for supporting executive decision making. As a result, datawarehousing technology has been integrated into ERP systems. An ERP generates enormous amount of data on a daily basis and to keep the database size manageable, older data is archived periodically. ERP system cannot store past information because when the time passes, information will increase as a result performance of ERP system decreases due to overloading of data (Fig. 2)

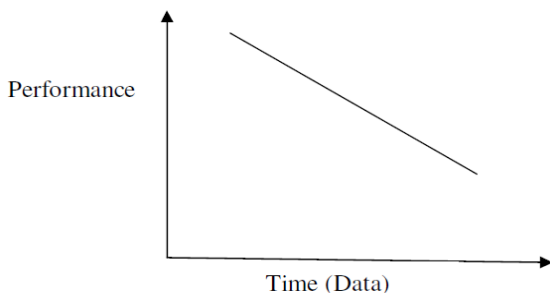


Fig 2: performance decreases as data & time increases.

So we require a separate system data warehouse for storing past (historical) information which is asset of any organization.

4. HOW ERP& DATAWAREHOUSE WORKS TOGETHER

To understand the concept of Datawarehouse in ERP System, take an example of an engineering college which uses only ERP system. Inside the college, all departments share only their current information by sending information from one department to other. Consider a query: find out total pass-out students in 2006 (past 7 years). If the institute uses the traditional ERP system then we cannot find out that result. For resolving this problem, we can use Datawarehouse which can store present as well as past information and hence may be quite useful in solving such problems in which past information is required. Information that is not used for a long time is retrieved periodically from ERP system and stored into the Datawarehouse. Now all departments/sections communicate with the Datawarehouse & can retrieve past as well as present information from it and can take better decisions (Fig 3).

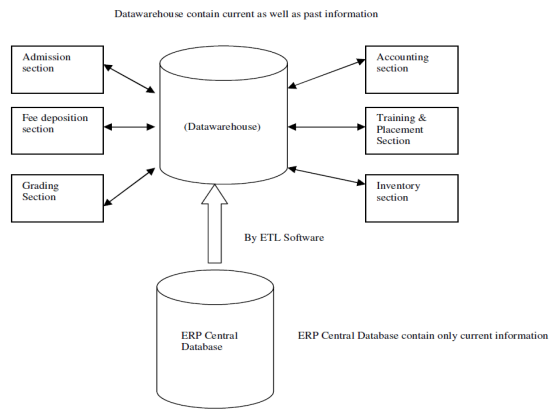


Fig 3: Communication inside the organization through the Datawarehouse

ERP with Datawarehouse provides "central single source of information" so that all necessary decisions may be taken correctly. ERP system creates central repository for current information sharing, while Datawarehouse creates central repository for current as well as past information sharing. Some of the issues that ERP & Datawarehouse can solve:

- Use of central repository for all organizational information.
- Ability to manage relationships inside organization.
- Provide clean data.

4. BENEFITS OF DATA WAREHOUSE IN ERP IMPLEMENTATIONS

Information is the assets of any organization and data warehouse provide whole information about the enterprise to the decision makers so Datawarehouse is beneficial to any organization. Here are some of the Benefits of the Datawarehouse:

- a) Due to whole information, it allows decision makers to take correct decisions so Datawarehouse improves organizational intelligence.
- b) In the Datawarehouse all information are placed in common place which are taken from multiple sources. So decision makers access the information from the Datawarehouse without spending time for access data from multiple sources.
- c) A data warehouse implementation includes the conversion of data from numerous source systems into a common format. Since each data from the various departments is standardized, each department will produce results that are in line with all the other departments. So one can have more confidence in the accuracy of the data used by him and accurate data is the basis for strong business decisions.
- d) A data warehouse stores large amounts of historical data so one can analyze different time periods and trends in order to make future predictions.

5. CHALLENGES IN IMPLEMENTING DATAWAREHOUSE FOR ERP

Although, Datawarehouse is beneficial to any organization, but there are many challenges in implementing it with ERP System. Some of them are:

- Data is hosted on various systems which make silos of information. It is time consuming to get the data and compile it. Some of the data comes in forms of Excel spreadsheets or PowerPoint presentations. There is no easy way to get access to the data and it requires intensive manual processing to gather the data and create reports.

- There is no ability to perform custom analysis or drill down capabilities.

6. CONCLUSIONS

This paper describes how the performance of an ERP system may be improved with the help of Datawarehouse. At present the ERP systems are being used to integrate all current information of different units into one central database and make information visible everywhere, so that all individual can take correct decision before taking any important action. But the traditional ERP systems can not store past/historical

information which is important for forecasting. To remove this problem Datawarehouse may be used which is essentially a collection of present as well as past data that possesses the ability to take correct decision. The benefits of this approach include improved quality information for taking any important decision. Although it seems that Datawarehouse is better approach, the present paper point outs some limitations of Datawarehouse such as security and practical problems

REFERENCE

1. Swati Verma, "Impact of Service Oriented Architecture on ERP Implementations in Technical Education" Int.J.Computer Technology & Applications, Vol 4, 364-368, 2013 |
2. Joseph Guerra and David Andrews, "Why You Need a Data Warehouse" © Copyright Andrews Consulting Group, Inc., 1-8, 2011. |
3. Erhard Rahm and Hong Hai Do, "Data Cleaning: Problems and Current Approaches, IEEE Techn. Bulletin on Data Engineering, Vol 23, 1-11, 2000. |