As the University and other academic organizations, both governmental and business, have to manage large amount of vital information stored in some form of databases or files. One of the main problems to deal with information managing is the weak interoperability between various databases and information systems. Especially this problem is serious when we want organize collaboration between the information systems of various departments within the organization [5], therefore the Development which was carried out in the University lagged integration of data from various heterogeneous data sources which were present at various operational levels of the University.

This paper proposes a solution of integration of such heterogeneous data sources. The proposed solution address most of the issues pertaining to efficient storing and retrieving of this vital information using a data-warehouse in which the idea is of drawing data from several different (heterogeneous) data sources from different platforms and sources into a single data warehouse having many data marts.

**DATA MART & DATA WAREHOUSE**

A data mart is a simple form of a data warehouse that is focused on a single subject (or functional area), such as Examination, Registration, or Accounts etc [2][6]. Data Marts are often built and controlled by a single department within an organization. Given their single-subject focus, data marts usually draw data from only a few sources. The sources could be internal operational systems, a central data warehouse, or external data. A data warehouse, unlike a data mart, deals with multiple subject areas and is typically implemented and controlled by a central organizational unit such as the corporate Information Technology (IT) group. Often, it is called a central or enterprise data warehouse. Typically, a data warehouse assembles data from multiple source systems.
Nothing in these basic definitions limits the size of a data mart or the complexity of the decision-support data that it contains. Nevertheless, data marts are typically smaller and less complex than data warehouses; hence, they are typically easier to build and maintain[oracle].

Each Data Mart can contain different combinations of tables, columns and rows from the Enterprise Data Warehouse [3][7]. For example, a business unit or user group that doesn’t require a lot of historical data might only need transactions from the current calendar year in the database. The Personnel Department might need to see all details about employees, whereas data such as "salary" or "home address" might not be appropriate for a Data Mart that focuses on Sales[1].

**DATA MART DESIGN**

Let us take an example of a Registration System and Examination Automation System. Existing Registration Data Mart has Registrar Dimension, Course Dimension, Subject Dimension, Transaction Dimension, Log Dimension, REG10 Dimension, REG11 Dimension, REG12 Dimension etc. Table Reg10 & Reg11 are list of students having submitted registration fee for batch 10 & 11, every year this table is created which stores information of list of students having admitted for current year. The table 1 below shows the various data marts dimension that are used in designing the data warehouse of the University.

Table 1: Data Marts for Registration & Examination

<table>
<thead>
<tr>
<th>Registration Data Mart</th>
<th>Examination Data Mart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registrar</td>
<td>Enrolment</td>
</tr>
<tr>
<td>Course</td>
<td>Theory Marks</td>
</tr>
<tr>
<td>Faculty</td>
<td>Practical Marks</td>
</tr>
<tr>
<td>College</td>
<td>Result</td>
</tr>
<tr>
<td>University</td>
<td>Subject</td>
</tr>
<tr>
<td>Log</td>
<td>Course</td>
</tr>
<tr>
<td>Transaction</td>
<td>Faculty</td>
</tr>
<tr>
<td>REG11</td>
<td>College</td>
</tr>
<tr>
<td>REG12</td>
<td>...</td>
</tr>
</tbody>
</table>

Existing Examination database Enrolment Dimension, Theory Marks Dimension contains theory marks, Practical Marks Dimension contains practical marks, Subject Dimension, Course Dimension, Faculty Dimension and the final Result Dimension which contains the final result. On the same line other marts are created, warehouse administrator has capability to pick and choose data from various data sources. These will be followed by performing ETL on these newly created Data Marts. The Examination and Registration Data Marts is shown in the figure below

**DATA WAREHOUSE DESIGN**

In our solution the data integration into a single data warehouse with data marts is the prime focus. The solution thus developed is using Linux-Operating System, Oracle Database Management System, Apache TomCat WebServer, Java/JSP server with above mentioned software configuration is set up. This server is part of CAN where in it has been given a controlled access to all existing solutions in university e.g examination, registration, accounts etc in other words this server is made to perform all the ETL functions on all the heterogeneous data sources and place extracted data into data marts. The basic idea of this solution is to create Data Mart for every autonomous information source and then integrate these data marts to have single warehouse which could be named asExamination Mart, Registration Mart, Academic Mart, HRM Mart, Budge Data Mart, Accounts Data Mart etc.

University of Kashmir’s is interconnected by a Campus Area Network (CAN) in which each operational section/Wing has a separate working software Application and Data Source. While as the examination solution has been developed on LAMP (Linux, Apache, My SQL, PHP), registration system is developed on Microsoft technologies MSSQL...Net framework etc, at the same time budget is still very much legacy system developed in dBase 4.0.

The newly created marts are connected to create a single warehouse as shown below in Figure 1.

![University of Kashmir Data Warehouse](image)

**CONCLUSION**

Organizations across the globe while focusing on computerization of departments do not pay much stress upon uniformity and consistency of data [4], and almost all the organizations across the globe ended up with numerous heterogeneous data sources. While data in warehouse must be credible, it must be carefully assembled from a variety of sources around the organisation. Data Warehouse not only makes organization information easily accessible but has become tool for data integration.

**REFERENCES**


