

Database Migration Tool

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ABSTRACT

*This paper deals with the design of the tool Entitled **Database Migration Tool Across Standard Database Formats** processing data migration between different relational database management systems (RDBMS). The **Database Migration Tool Across Standard Database Formats** entitled is mainly aimed at designing a tool to handle for migrating one database from a sources of data to another, changing database's schema if necessary. Paper also proposes methodological guidelines for successful migration of database tables and their data between different RDBMS and suggests the possibility of tool extension when the source or target RDBMS is changed. The proposed tool is shown on data migration of selected database of the source RDBMS to the target RDBMS*

Keywords: Database Migration Tool, RDBMS, Migration, ETL, Oracle, MySQL, MS ACCESS, Database format.

I. Introduction

Actually, the concept of data migration is mentioned very often. Data migration is the process of transferring data between various computers or information systems, formats and storage types. We can apply this concept to all areas where we work with data, such as information systems, file systems, storage types, databases, etc. There are many reasons for data migration, the most common include the following:

1. Upgrading to a newer software or hardware
2. Change of company policy
3. Investment to IT services
4. Saving measures
5. Integration of multiple data sources into one system

In the area of relational databases we can provide data migration of databases between various types of relational database management systems, in which databases are implemented. During the process of data migration is important to provide correct migration of the logical structure of database and data migration of data stored in database tables with the appropriate data types. We also need to remember that various types of RDBMS have different properties and characteristics. All RDBMS are based on the relational model but the specific properties and parts of databases can be implemented differently. Differences may be in naming and support of data types, SQL commands for creating and editing database tables or the specific features of the RDBMS, which may not be supported in another RDBMS.

II. Problem Formulation

The general process of data migration, which is used for database migration and data between different types of RDBMS, is called ETL (Extract, transform and load) and consists of these steps:

1. Extracting data from the source database.
2. Transforming data into usable form for migration to the target database.
3. Migration of data to the target database.

The ETL process uses the terms source and target databases that are refine there:

Source database – database of source RDBMS, from which data are migrated.

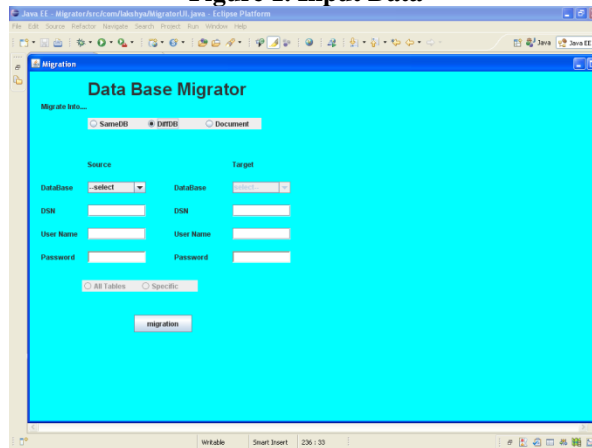
Target database – database of target RDBMS, into which data are migrated.

III. Problem Solution

To deal with data migration the tool designed, database migration tool. The mechanism adopted is discussed as stated below,

- Database migration tool takes the source database type (Oracle, MySQL, MS Access) and followed to its name of the database is given, these are the input required to the tool, this is the source side input.
- On the other hand the target database type (Oracle, MySQL, MS Access) is specified, and an empty database is created to move the data of the source to this database, these are all the input constraints required for the tool.

Figure 1. Input Data



- Initially the tool starts to fetch the data from the specified source database and then evaluates the data types used in the database individually for each attribute and it stores temporarily.
- After the evaluation at the source database is completed, the tool starts checking for the suitable data types present in the target database which matches the source database data types and after finding the compatible data types, it creates a query in the target database format which includes the data with the compatible data type and the other required constraints.

Table 1. Evaluation of suitable data types

SOURCE RDBMS	SOURCE DATA_TYPE	TARGET DATA_TYPE
MySQL	VARCHAR	VARCHAR2
MySQL		NVARCHAR2
MySQL		CHAR
MySQL		LONG
MySQL		BLOB

- The formed query is then executed in the target database.
This is the mechanism followed for a successful migration of the data between different databases.

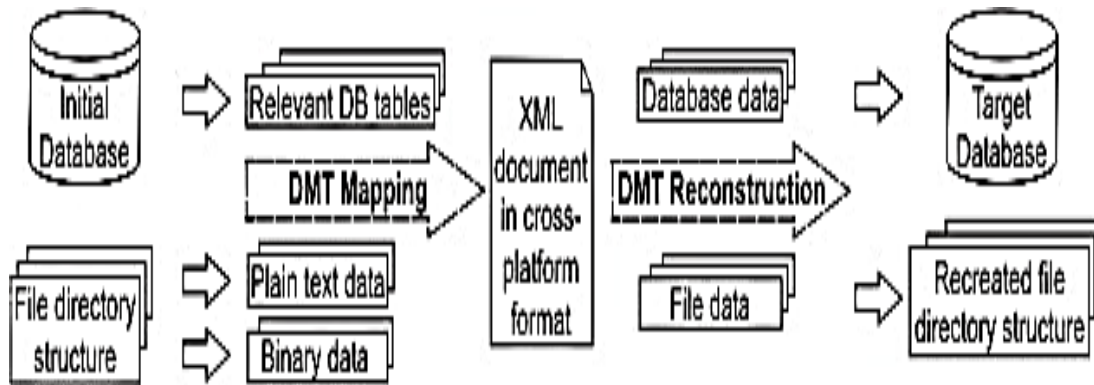
Input linguistic variables:

1. Type of the source RDBMS (SOURCE_RDBMS) – a member of the set of RDBMS {Oracle, MySQL,MS Access}
2. Data type of the attribute in the source database table, supported by selected source RDBMS (SOURCE_DATA_TYPE) – VARCHAR, CHAR, TINYTEXT, MEDIUMTEXT, LONGTEXT, etc.
3. Type of the target RDBMS (TARGET_RDBMS)– a member of the set of RDBMS {Oracle, MySQL, MS ACCESS}

Output linguistic variable:

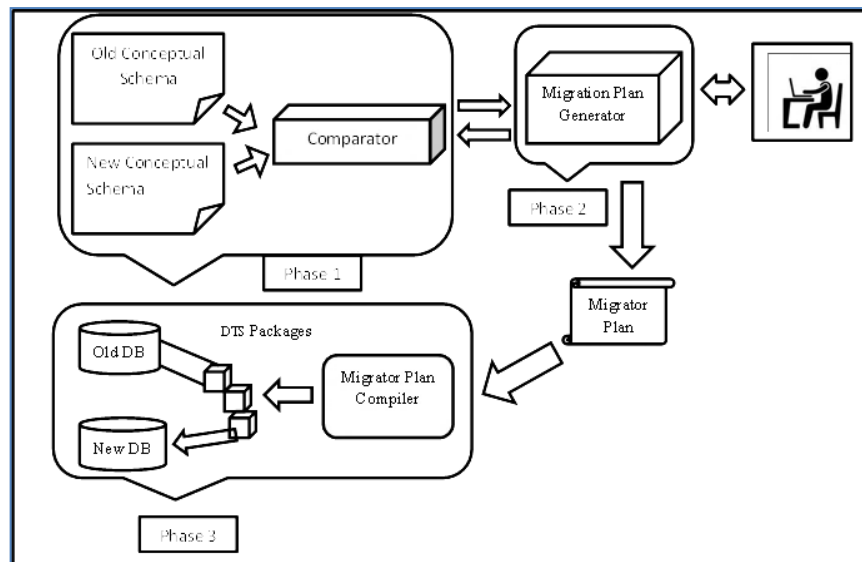
1. Data type of the attribute in the target database table, supported by selected target RDBMS(TARGET_DATA_TYPE)– VARCHAR2,NVARCHAR2, TEXT, CLOB, BLOB, etc.

IV. Architecture Diagram
Figure 2. Architecture Diagram



The above diagram shows the complete process of the database migration. There are two phases in this, the first phase is DMT mapping and the other is DMT re-construction, from the source database the relevant database tables and the respective data-structure is extracted and is mapped. Here the XML document acts as the cross platform for transformation of the format that is it acts as a bridge, on the other side the database data and the file-structure data is re-constructed in the DMT reconstruction phase and is transferred to the target database with the re-created file-structure.

Figure 3. Phase Diagram



This diagram deals with the schema and the plan for migration; it has three phases in it

1. Phase-1 deals with the schema's of the database, here the comparison of the schema is done between the old conceptual schema and the new conceptual schema. Through this comparison, this let us to know what transformation should be done.
2. Phase-2 plays a major role because here by taking the comparison result of the previous phase it generates a suitable plan in interaction with the user and this plan is implemented .
3. Phase-3 will implement the plan which is generated in the phase-2, this is implemented by a migrator plan generator, this will transfer the data and schema(if necessary)from the old database to new database by using the plan.

So these are phases that are to be processed for the successful migration.

V. Conclusion

Data migration is the key exercise for any new system setup, upgrades, and migrations from one platform to another. The need may also arise due to change up in technical areas of the company or adoption of new technology stack or updating the new technology stack to manage the data. Migration activity is also called for when disparate system exchange data in different formats- say from Excel files to database. Existence of differences in the data storage mechanism is one of the for most reasons to initiate data migration activity. Proposed tool, which can migrate database and their data from the source RDBMS to the target RDBMS. Finally, we presented created tool on the process of data migration of the selected database migrated from MySQL to Oracle. An expert system and its knowledge base can be easily extended for using in various types of RDBMS.

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