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# Data Migration System in Heterogeneous Database

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*Abstract:-With information becoming an increasingly valuable corporate asset, today's IT organizations need the right tools to store, manage, and move that information in the most reliable and cost-efficient manner. As part of an Information Lifecycle Management (ILM) best-practices strategy, organizations require innovative solutions for migrating data between storage systems, especially in heterogeneous environments. To support this need, we as planned to design a powerful tool that enables affordable, high-performance data migration in a wide range of storage environments. This project is the unique challenges of data migration in dynamic IT environments and the key business advantages that we have designed to provide over traditional tools used for migration.*

**Keywords:** - Data Migration, Database, Design.

## I. INTRODUCTION

### A. Need of system development

When a company starts, it usually starts as a Small- Scale industry. And hence Microsoft Access Database is quite capable of handling its records and databases. But gradually as the company expands its database has to expand too. Thus they have to switch to more efficient databases. The most widely used database is the Oracle Database. Hence this software, "Database Migrator" is aimed at making the conversion of an MS access database to Oracle database easy and efficient, without any manual effort and the need of technical knowledge. A "Database Migrator" is usually developed for individuals and organizations to save time for converting to a new database if a database already exists. Instead of creating all the tables etc. of the already existing database, one can simply use the software to convert it into new database, if required. It can also be used by organizations that deal with complex data import, export and migration issues. After all, importing, exporting or migrating data between different sources is very complicated and time consuming, especially if these data sources store data in different formats. This is where a database migratory comes handy. The existing migrating tools available in the market are Oracle migration workbench. [1].

### B. Project Statement

To develop a Migration tool that helps in migrating database structures and data across various relational Databases. It will also facilitate migrating data from MS Access, to SQLServer and Oracle." The system will take an existing database in one format from the user and will convert it to a database in another format, which again will be specified by the user. Not only will it convert tables etc. The various other scopes can be enumerated as follows:

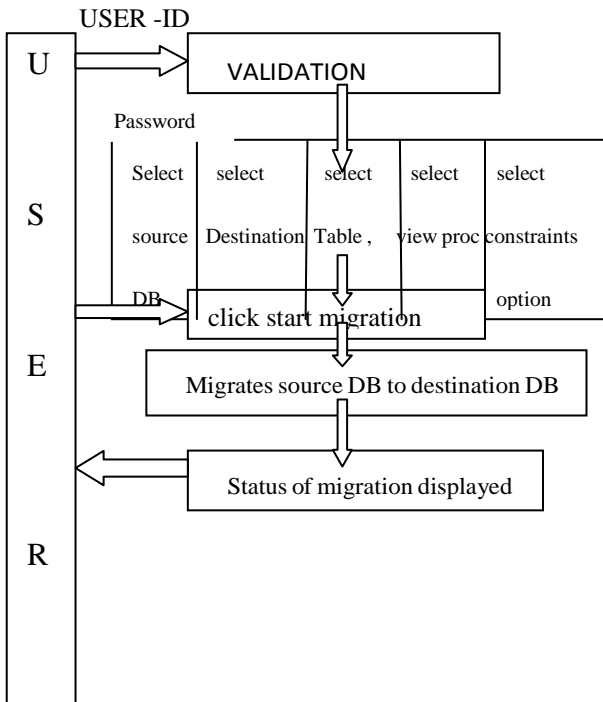
- Security: The application is such that it segregates the authorized as well as unauthorized users.
- Time efficient: Migrating every record manually would take quite a lot of time but using a migration tool would take the application few seconds to migrate from the specified source to the specified destination.
- Flexible: The inherent nature of this application is flexible. The initial concept of data migration that we have implemented on typical case of Access to Sql can be further extended to any source database and to any destination database.
- Interactive: The highly interactive nature of this application ensures that minimum special training is required to handle it.
- Visually Attractive: Interactive systems designed using Visual Studio makes the system visually attractive.

### C. Significance of Data Migration

Now a days, database technology has become technology of information system in each organization .in domestic informatization began at the late 1980s.along with the development of information technology, database technology also has been promoted which certainly includes database management system technology. Since the appearance of these advancements, old system has already been replaced by more powerful system. During the process of updating, data migration is significant issue. Data, which are migrated

into new system, not only are huge in size, but also are prerequisite for the new system starting up and vital basis of decision making. What so called data migration here is the process of data cleaning, transforming and loading into new system? It is mainly applied in the switching of single or multiple old systems to a new system when historical data are migrated into new ones.

## II. SYSTEM ARCHITECTURE



**Fig 1: System architecture**

This figure explains the system architecture of our migrating tool. It explains the overall working of the application.

Step 1 - The user is provided with the login facility. The user will first enter its username and password which are encrypted in our coding. The user's entered information is validated.

Step 2 - The user is then asked to select the source database which is to be migrated. The source database consists of MS Access, SQL Server and Oracle. After selecting the source database the user has to fill the details of the selected source database to create the connection.

Step 3 - After the connection is tested the user is asked to select the destination database to which the migration will take place. After selecting the destination database the user has to fill the details of the selected destination database to create the connection.

Step 4 - The user is asked to select the tables, columns of the table, views which are to be migrated.

Step 5 - the user is also provided with the facility to select either the schema of the table or rows of the table along with the constraints which are applied to the tables.

Step 6 - Click start migration button to start the migration. After the complete and successful migration of source database to destination database it displays the status report of the complete migration process.

## III. DESIGN SPECIFICATION

To design the system, we are considering following points:

1] Front End:

The front end of our application is designed using C# to make it look more attractive.

2] Back End:

The back end of our application includes coding for connections to our database and implements functionality of our application. The code should be optimized to make it more efficient. It avoids redundancy. It also reduces lines of code. [3]



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Our migrator tool provides source databases as MS Access, and destination databases as SQL Server and Oracle. We also have implemented migration from SQL Server to Oracle and vice versa. The very purpose of our project is to provide flexibility to client to migrate his existing database into a different database without any manual intervention.

#### **A. Design Consideration**

The design is done considering user convenience. The design of our project is simple which makes a non-technical person also understand how the application works. The user does not need to have prior knowledge to run the application except the user needs to know the authentication for the databases.

##### 1 Assumption and Dependencies

- About the security of user: Login form in application accepts username and password which provides security of user in our application.
- How mapping rules are defined? The mapping rules are defined in a MS Access file which is referenced in our code to map various data types from source to destination.
- How the data migrates from one database to another? Firstly source and destination connections are tested. For actual data migration the mapping rules are referenced for mapping various data types. Once migration is complete the status report is displayed which shows if data has been migrated successfully, failed or pending. [3].

## IV. PROJECT PLAN

#### **A. Purpose**

A “Database Migration Suite” is usually developed for individuals and organizations to save time for converting to a new database if a database already exists. The purpose of our project is to migrate data from an existing database to another database. Our migrator tool provides source databases as MSAccess, and destination databases as SQL Server and Oracle. The very purpose of our project is to provide flexibility to client to migrate his existing database into different database without any manual intervention.

#### **B.Objectives**

The objectives of our project are as follows:

##### 1. To migrate Tables along with the following:

- Primary key constraint
- Foreign key constraint
- Unique key constraint
- Index key constraint
- Check constraint

##### 2. To migrate Views

##### 3. To migrate selected columns.

##### 4. Log

##### 1. To migrate Table:

The goal deals with migrating tables applying constraints, such as primary key, foreign key, unique key, index key and check constraints. Migrations of views are also supported. We have also provided facility for selecting and deselecting the fields of a table or an entire table itself for migration.

##### 2. To migrate views:

Views can be used to hide a part of database from certain user. Data access can be customize as per the needs of different users. Same data can be seen different way by the different user.

##### 3 To migrate selected column:

The goal deals with migrating selected column from source database to destination database.

#### **C.Project Scope**

The purpose of the project keeps the scope of project limited to following categories. They are:

- The initial part deals with conventional migration keeping in mind i.e. we strictly adhere to the definition that “the source of data to be migrated is a database and the destination is also a database .While doing so the only part that undergoes any visible change is the structure of the source and destination database while all the data, attributes, table name etc remains unaffected. This is a classical case of database migration and every aspect regarding the migration is taken care of by tool called ‘(Data migration suite)’. Our source database is an Access database, which is generally a norm for



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small databases and destination database is SQL Server which is an open source and capable of handling comparatively larger database efficiently.

- The next part deals with migrating Tables applying constraints such as primary key, foreign key, unique key, index key and check constraints. Migrations of views are also supported.
- We have also provided facility for selecting and deselecting the fields of a table or an entire table itself for migration. The mapping rules have been defined in an MS Access file which is referenced by our migrator tool to map the various data types in the process of migration.

After the migration has occurred a status report will be displayed which will indicate if the table schema is migrated, records are inserted, constraints like primary key, foreign key, unique key, check constraints have been migrated successfully or pending or failed.[4][5].

### V. CODE SPECIFICATION

#### A. Code Specification

##### 1 Database Migration

This part includes designing of user interface using Visual Studio. The UI is simple and easy to understand. The UI is designed in such a manner that it enables the user to execute the application without any prior knowledge. The system should be able to work on the any windows platform. Also it should not consume a lot of system resources.

##### B. Software's Used

- SQL Server
- MS Access
- Oracle
- Visual Studio 2008

### VI. APPLICABILITY OF SYSTEM

#### A. Expanding Organizations

When a company starts, it usually starts as a Small-Scale industry. And hence Microsoft Access Database is quite capable of handling its records and databases. But gradually as the company expands its database has to expand too. Thus they have to switch to more efficient databases. Hence this software, “ – The Database Migration tool” is aimed at making the conversion of an MS access database, , SQL Server. Using this tool the database migration becomes easy and efficient, without any manual effort and the need of technical knowledge.

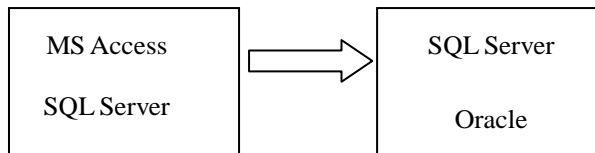


Fig 2: Expanding the Size of the database

Our migration tool becomes very useful for the organization when the size of their data expands. In this case switching to a bigger database becomes very necessary. The above figure simply shows the source databases and destination databases provided in our application. It provides four databases in source i.e. MS Access, SQL Server.

#### B. Individuals

The database migration tool also becomes useful for individuals. If an individual has data divided into two different databases and he wants to combine the two, then he can convert one part into the other's format and use it. Thus database migratory comes handy here.

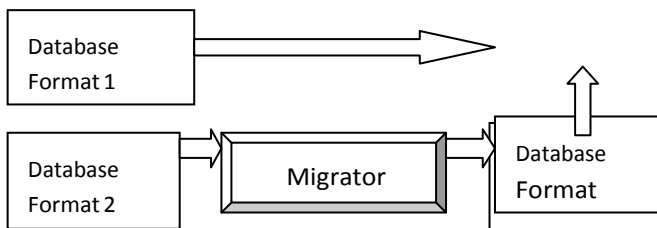


Fig 3: combining of different database



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The above figure explains how database migratory becomes handy for individuals. If the data is divided into two different formats then database in format 1 is used in the same format and the database in format 2 is given to the migrator to convert the database in format 2 to the database in format 1. This converted database is then combined with the previous database.

#### VII. SYSTEM TEST AFTER DATA MIGRATION

The system test is to check the quality of migration, the results of which are important criteria's of deciding whether to start up the new system. System test after migration includes:

- Completeness check: Check the existence of referenced foreign key.
- Consistency check: Make sure the same meaning data have consistent values in bit.
- Total balanced check: Such as depositors' balance check.
- Records count check: Check the consistency of records count in new and old database.
- System integrity test: CPU speed, memory capacity, migration time.

#### VIII. CONCLUSION

We know that various organizations use different type of databases to store their user's information. If we want to use the existing databases of such organizations then we have to convert the database in the format which is compactable to our application. This database migration is achieved by database migration tool. A "Database Migration Suite" is usually developed for individuals and organizations to save time for converting to a new database if a database already exists. The purpose of our project is to migrate data from an existing database to another database. Our migrator tool provides source databases as MS Access, destination databases as SQL Server and Oracle. We also have implemented migration from SQL Server to Oracle and vice versa. The purpose of our project is to provide flexibility to client to migrate his existing database into a different database without any manual intervention.

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