



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2016

Data Migrating with Foreign Key Concept from ORACLE to SQL SERVER

Chalorme Roy Mukhopadhyay¹, Prof. Dr Pranam Paul²

Final Year Student of MCA, Narula Institute of Technology, Agarpara, Westbengal, India¹

HOD, Department of Computer Application, Narula Institute of Technology, Agarpara, Westbengal, India²

ABSTRACT: To begin this project, I will try to Migrate table from Oracle platform to SQL Server platform for the initial process of the project. My goal is to keep the main structure of the table in intact format, means I will get the original database structure with its original data and as well as its primary key too (if there is any primary key present in table) after data migration process is over. This whole process is called as data migration between two different databases in my project. And in my project I will get the tables in SQL Server Platform as it was in the Oracle Platform.

KEYWORDS: Databases, Migrate, Table, Goal, Oracle, SQL Server, Intact.

I. INTRODUCTION

Here, I will work and find out how data will be migrated from Oracle to SQL Server platform keeping the entire structure of the database intact.

As my work progressed, I found out how the details of the table structure can be fetched from Oracle, which means Oracle itself is allowing copying its table's structure. If I was unable to collect these data about the structure through SQL, then I had to think about how to break the security of the DBA part of the Oracle in an ethical manner.

II. RELATED WORKS

•Discussion of Actual Work:

Here, I am discussing about my actual work to convert the database from Oracle to SQL Server. Section [1] discusses the establishing the connection. While section [2] gives the idea about these two databases. And [3] is an entire example of the migration process.

1. Establishing the connection between two databases:

- ❖ I have implemented my concept of migrating data from Oracle to SQL Server in Visual Basic (6.0) to develop the software which will be able to convert the database from Oracle to SQL Server.
- ❖ All necessary actions required for connecting the Oracle database and SQL Server database through Visual Basic were done.
- ❖ The SQL commands were written in VB properly so that they could be fired in proper database and the output were kept in record sets. Here, at first, SQL commands were fired through VB, the output were temporarily stored in record sets provided by VB. From the record set, each record were taken tuple wise and they were stored one by one in SQL Server keeping the format of each fields intact.

2. Required information about Oracle database and implementation in SQL Server:

2.1 Creation of table structure in SQL Server:

To migrate the table, at first I had to get the details about the structure of the table which was to be migrated. If multiple tables were related with each other, means more than one table was joined with reference keys, and then I had to get the details of every table's structure and so on. This information about the tables was used later to create the same tables with similar relations to other tables in SQL Server.

To get the actual structure of a table in Oracle I use "desc <table name>" command. But as I was working with VB and using SQL so I had to find the equivalent command of "desc" in SQL. I can get the structure from the table in

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2016

oracle named “all_tab_columns”. All required fields were taken from “all_tab_columns” using the proper SQL command.

The required fields to be fetched from “all_tab_columns” table were the column name, data type, data length, constraint name, and constraint (CON). This information was later used to define or create the main structure of the table in SQL Server.

COLUMN_NAME	DATA_TYPE	DATA_LENGTH	CONSTRAINT_NAME	CON
B	VARCHAR2	10	SYS_C005561	P
C	VARCHAR2	10	SYS_C005561	P

Fig. 2.1

The output of “desc” equivalent SQL command for a particular table having 2 foreign keys- B, C

2.2 Getting information from table user constraint:

In the following fig 2.2 constraint name, constraint type and r_constraint name from user_constraint table are shown:

CONSTRAINT_NAME	CON	R_CONSTRAINT_NAME
SYS_C005561	P	

Fig. 2.2

Output of SQL command with constraint name and their type

2.3 Finding the primary key in the table:

Primary key is the important part of any table, as it can uniquely identify any tuple from other tuples. It cannot be null. It also has vital role at the time of inserting any data tuple wise in a table. So, to fetch the information about primary key of any table and store it in a variable is very important. This will be used during the creation of the table in SQL Server. So, I had to use the SQL command to find the primary key in the table.

The following fig 2.3 shows the primary key present in a particular table. It provides the information about column name, constraint name, r_constraint name and constraint (CON).

TABLE_NAME	COLUMN_NAME	CON	CONSTRAINT_NAME	R_CONSTRAINT_NAME
P1111	B	P	SYS_C005561	

Fig. 2.3

Information about Primary key

In the above figure 2.3 column_name is the field which is the primary key of that table and “P” in the column of “CON” means the corresponding field is primary key.

This command is also capable of finding the composite key (when more than one field together uniquely identifies the tuple, it is called composite key).

As discussed in section 2.2, that information was used to get the primary key.

2.4 Finding the foreign key between the tables:

It is also very important to find the foreign key or reference key between tables. I know, by foreign key tables are inter related to each other. And the field which is used as reference key in tables must have same data type and structure. If foreign key or its structure is altered, omitted or replaced, then the entire table is changed and I am not able to migrate the actual table, in fact it will show an error message. So it is very important to find the foreign keys, store it in a variable and declare it in the SQL Server table, keeping the entire database intact.

The following fig. 2.4 shows the reference keys present in the database:



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2016

TABLE_NAME	COLUMN_NAME	TABLE_NAME	COLUMN_NAME
P111	B	P1111	B
P111	A	P1112	A

Fig. 2.4

Foreign keys present in the tables

In the above fig. 2.4 the foreign key are denoted to corresponding field name and it also gives the information about the field which is referenced to it.

Similar structure is created while creating the table structure in the SQL Server and hence the main structure is kept intact.

2.5 Parent- child relation between tables:

It is also important to find which table is related to each other and which one is created first. I know many table could be related to each other. The table which is created first is called the parent table, while the later created table is called child table. Let me divide the creation of table in levels in Oracle database. At the time of creating the tables in SQL Server, the tables in first level of Oracle must be created before the second level and so on. In similar words, every child table can only be created, if and only if all the parent tables of that child table are defined first.

The following fig. 2.5 shows parent tables of a particular table selected.

TABLE_NAME	COLUMN_NAME	TABLE_NAME	COLUMN_NAME
P111	B	P1111	B
P111	A	P1112	A

Fig. 2.5

Parent table of a particular table

This structure is maintained while creating the database in SQL Server.

2.6 Selecting the table to be migrated:

After login in with the user name and password in the database of Oracle, I have to select the table which will be migrated to the SQL Server. So, I have to show all the tables available under that user, so that the user can select the table. This list of tables is shown by the data grid in my software, user will select the table and the table will be migrated to the SQL Server platform keeping its main structure, relation with other table and data types of every field intact.

All tables available under a particular user are shown from where particular table can be chosen for migration. In the following Fig. 2.6 I can get the list of tables available for a particular user:



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2016

TNAME	TABTYPE	CLUSTERID
P1222	TABLE	
P1223	TABLE	
P121	TABLE	
P211	TABLE	
P13	TABLE	
P111	TABLE	
P122	TABLE	
P21	TABLE	
P11	TABLE	
P12	TABLE	
P2	TABLE	
P1	TABLE	
C1	TABLE	
P1112	TABLE	
P1111	TABLE	
P1221	TABLE	

Fig. 2.6

Tables available under a particular user

2.7 Selection or Creation of a SQL Database as Destination Database in SQL Server: After selecting the table to be migrated in to SQL Server, it is necessary to select a existing SQL database or to create a new SQL Database to migrate the table from source destination to SQL Server with its data and structure.

2.8 Login to the destination platform: Once the user selects the table it will divert to the login page via which the user have to login to the destination platform with proper details according to the requirement.

2.9 Selecting the proper database presented in the destination platform: After logging in to the destination platform user need to choose a particular database or have to create a new database presenting in destination platform in which user wants to copy the entire table with its data and structures and as well as its referenced tables too. After this the migration process will be starts and can be migrated successfully.

III. SIMULATION RESULTS

3. Example:

To illustrate my work let me consider the following example given in fig. 3.A
Here, a table named **P111** has two parent tables – **P1111** and **P1112**.
I want to migrate this P111 table from Oracle to SQL Server. As it have two parent tables,
So parent tables must be migrated first. Only after the migration of all parent tables with the data, then only the child table will be created and data will be inserted, i.e. migration will be completed.

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2016

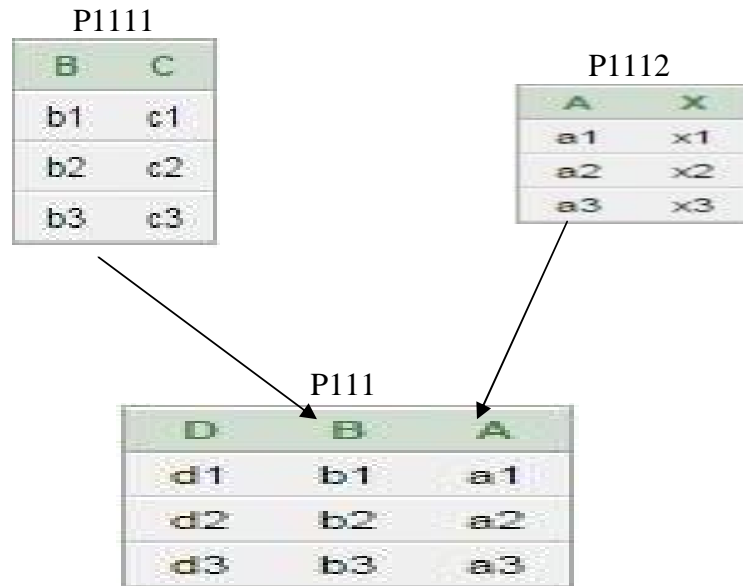


Fig. 3.A - Structure of database in ORACLE to be migrated in SQL Server

Here we can see in ORACLE, that Table P111 have 2 foreign keys named B (connects with table P1111) and A (connects with table P1112) which makes table P1111 and table P1112 as the parent tables of table P111.

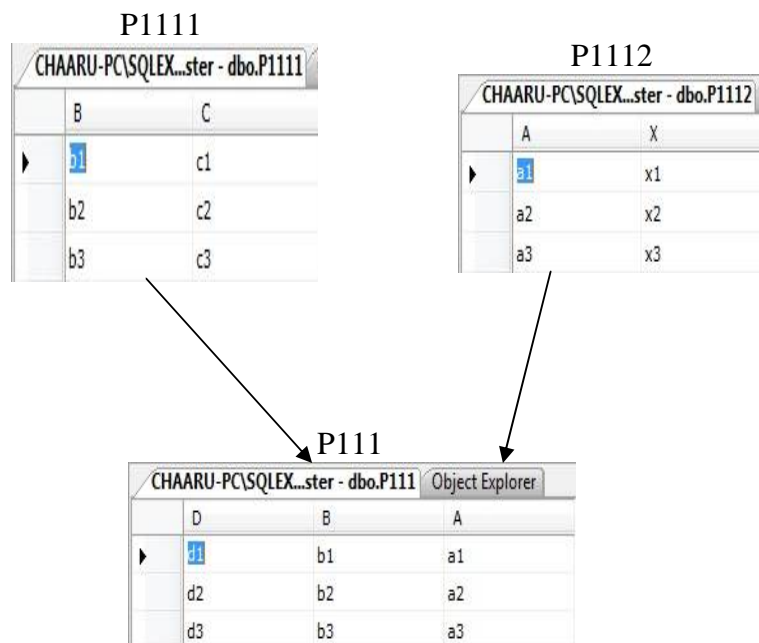


Fig. 3.B - Structure of database in SQL Server after migration from ORACLE

Here we can see in SQL Server, that Table P111 have 2 foreign keys named B (connects with table P1111) and A (connects with table P1112) which makes table P1111 and table P1112 as the parent tables of table P111.



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2016

Above figures signifies that from ORACLE P111 table is copied with its data, structure and referenced tables in SQL Server.

Now, if I want to migrate **P111** table from ORACLE to SQL Server. Here is the step by step explanation how these tables are migrated from Oracle to SQL Server.

3.1: Finding the foreign key in child table:

As I select the child table and convert it, at first, it searches for the foreign key. Here child key have two foreign keys. Fig. 3.1 shows the information about the foreign keys fetched by the SQL command.

TABLE_NAME	COLUMN_NAME	CON	CONSTRAINT_NAME	R_CONSTRAINT_NAME
P111	A	R	FK_P1112	SYS_C005460
P111	B	R	FK_P1111	SYS_C005461

Fig 3.1
Foreign keys of child table

So before creating the structure of P111 table, it goes to P111 and P1112 tables.

3.2: Creation of structure of foreign key:

As it moves to P1111 table, which is foreign key of P111 table, it again searches for foreign key of P1111 table. Fig. 3.2 shows it has no result.

no rows selected

Fig 3.2
No foreign key of P1111

3.3 Creation of structure and data insertion P1111 table:

As P1111 have no foreign key so it starts to construct the structure of P1111 table. Then it finds the Primary key of it and one by inserts the tuples.

3.4 Creation of structure and data insertion P1112 table:

The above process is done recursion ally meaning as 3.3 creates and inserts data in table P1111, then the structure of P1112 is created, primary key is implemented and data are inserted.

3.5 Creation of structure of P111 table and data insertion:

As all the tables of P111 table now has been created, so it comes back to P111 table, then creates it structure and inserts all the data. And finally all tables are migrated from Oracle to SQL Server.

IV. CONCLUSION AND FUTURE WORK

As my initial goal was to migrating tables from one database to another different database the software developed by me is successful of migrating tables between ORACLE to SQL Server. Though it has some limitations but I look forward to work out and develop more accurate software.

Above said limitation of my project can be rectified. I will work out about this limitation in future and hopefully will overcome this limitation.

Apart from this, as I am able to migrating tables from Oracle to SQL Server, now I will concentrate on extending my project so that it will be able to migrating the table in some other way, i.e. from some other database to some other database.

Not only that, I wish to carry forward my work and developing the software which will be able to migrating tables between all major databases which follow the CODD's rule (Oracle, SQL Server, My SQL).

REFERENCES

- [1] Kevin Loney and George Koch, *Oracle 9i, The Complete Reference, sixteenth reprint, 2005, Oracle Press.*
- [2] Silberschatz, Korth and Sudarshan, *Database System Concepts, fourth edition, McGraw-Hill International Edition.*
- [3] Ivan Bayross, *SQL, PL/SQL: The Programming Language Of Oracle, 4th Revised Edition.*
- [4] <http://www.google.co.in/>
- [5] <http://stackoverflow.com/>
- [6] <https://www.wikipedia.org/>
- [7] Yahoo.com
- [8] <https://community.oracle.com>
- [9] <https://oracle.com>
- [10] www.blocks.oracle.com



International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 5, May 2016

[11] Kibria Dastagir Dafadar, Chalorme Roy Mukhopadhyay, Prof. Dr Pranam Paul; "Implementation of Data Migration between Two Different Databases for discrete table"; Paper ID: V40202104; Accepted and Published in "International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCCE)"; ISSN No: 2320-9801 (Online), 2320-9798 (Print); Vol. 4, Issue: 1; Feb 2016; pp 2144 – 2147.

[12] Chalorme Roy Mukhopadhyay, Kibria Dastagir Dafadar, Prof. Dr Pranam Paul; "Implementation of Data Migration between Two Different Databases for inter connected tables"; Paper ID: V40202106; Accepted for Publication in "International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCCE)"; ISSN No: 2320-9801 (Online), 2320-9798 (Print)); Vol. 4, Issue: 1; Feb 2016; pp 2148 – 2154.

BIOGRAPHY



Chalorme Roy Mukhopadhyay is a Final year student of MCA in Narula Institute of Technology, Agarpara, Westbengal, India. She completed her BCA degree from George College (Kolkata) , under the West Bengal University of Technology.

Achievements:

1. Got 431st Rank on NEST(Nationwide Education And Scholarship Test) Aptitude Test 2013,
2. Scored among the top 24 %(76 percentile) on NIIT 8th National IT Aptitude Test 2012.
3. Two papers published in an International Journal.



Prof. Dr Pranam Paul, Assistant Professor and Departmental Head, CA Department, Narula Institute of Technology (NIT), Agarpara had completed MCA in 2005. Then my carrier had been started as an academicians from MCKV Institute of Technology, Liluah. Parallely, at the same time, I continued my research work. At October, 2006, National Institute of Technology (NIT), Durgapur had agreed to enroll my name as a registered Ph.D. scholar. Then I had joined Bengal College of Engineering and Technology, Durgapur. After that Dr. B. C. Roy Engineering College hired me in the MCA department at 2007. At the age of 30, I had got Ph.D. from National Institute of Technology, Durgapur, WestBengal. I had submitted my Ph.D. thesis only within 2 Years and 5 Months. After completing the Ph.D., I had joined Narula Institute of Technology in Computer Application Department. Parallely I continue my research work. For that, I have 39 International Journal Publications among 54 accepted papers in different areas. I am also reviewer of International Journal of Network Security (IJNS), Taiwan and International Journal of Computer Science Issue (IJCSI); Republic of Mauritius.

Achievement:

1. Accepted my name for publication in "Who's Who Science and Engineering, 2011 – 2012" published by "Marquis Who's Who", USA on 31st Dec 2010
2. Selected my name as "Top 100 Engineers' 2011", by "International Biographical Centre", Cambridge, England
3. Selected my name as "Outstanding 2000 Intellectuals of the 21st Century, 2012", by "International Biographical Centre", Cambridge, England