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SAP Test Data Migration Servers

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***Abstract*—SAP Test Data Migration Server (TDMS) provide us with the small, easy-to-maintain non-production environment using extracts of business data to minimize infrastructure and maintenance expenses while maximizing the effectiveness and accuracy of your test and training systems. SAP TDMS ensures full data consistency and less transactional data during the execution of the migration projects from the production to non-production system. SAP TDMS provides new migration solution which help with the system refreshes and cover the migration strategy end to end. SAP TDMS is a fast method of data extraction which populates your quality and training systems with real SAP business data. Also, this tool provides the functionality to scramble the sensitive data copied from production.**

I. INTRODUCTION

Have you ever wondered if you could have a tool which could select customized data from your production server for purposes such as testing? The answer to this is SAP's TEST DATA MIGRATION SERVER (TDMS). TDMS operates at client level and creates non-production clients. The selected data from a client in the sender system is copied to a client in existing non-production system. The idea is not to have the entire system copy, rather have the data which is more critical and required. Approximately 80 % of the data volume of a typical database is contained in less than 10 % of the tables. Transaction data tables are usually the largest tables in the database. Thus, smaller non-production systems with only the required data can be created. Using TDMS you are not only saving the storage space but this can help you to run the queries faster and which can help in the performance of the system with less transactional data.

II. SAP TDMS ARCHITECTURE

A. SAP TDMS LANDSCAPE

The landscape of TDMS involves three different systems- Sender, Receiver and the server on which TDMS is installed. TDMS server has two systems basically one is called as control system and central system. Central system is the system where we perform and setup the receiver system configuration and control system is the triggering and monitoring system for the migration activities to carry out. The receiver system is the non-productive system to which production data is copied with less transactions data and data will be scrambled. SAP best practices says to have three systems on different servers for the better performance. All three system are connected with remote function call. SAP TDMS is a flexible tool which help you to integrate most of the SAP products to copy data from production to non-production and some of the example are SAP ERP, SAP BW, SAP CRM and SAP MDG etc.

III. SAP TDMS EXECUTION STEPS OR PROCESS FLOW

Before you start learning or understand the process, let's check the DO's and DONT's in TDMS. Make sure the version of source and target system both are on the same version, let's say production system is SAP ERP system and release is ECC EHP7 then we have to make sure target system is on the same release to carry the system refresh. Also make sure the version of DMIS components which brings SAP TDMS functionality in source, target and central system are on same version. Now let's discuss the process flow or how we carry out the extraction of the data. There are three layers or levels of the settings to work in TDMS. These are Project, Sub-project and Package.

Project: A collection of any number of subprojects. Normally the sub-projects which are related in some way are grouped into a project.

Subproject: The combination of the sender client, the receiver client and the RFC connection between them.

P**ackage:** A package is created for every transfer. A new package has to be created for every initial setup or refresh, for a given combination of sender and receiver systems. A separate subproject is created for every client whose data is going to be transferred to a non-production environment by means of SAP TDMS. We can create project, subproject and packages in SAP TDMS using transaction TDMS in 4.0 release whereas in version of TDMS 3.0 it is CNV_MBT_TDMS.

Once the package is created a process tree is created which has number of steps involved in it.

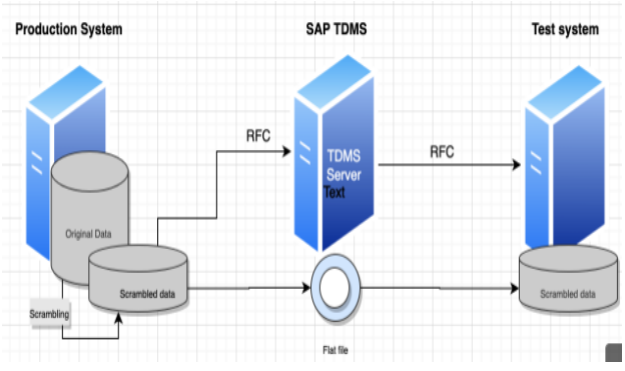

Figure1: Diagrammatic view of SAP TDMS architecture.

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A. TDMS capabilities and What we can achieve.

With TDMS, there are different ways of selecting data from the production server, these ways or reduction scenarios are called process types.

Few of them are listed below:

SHELL CREATION-

Migrated data contains only cross-client data and the required client-specific user and address data but no other client dependent data.

TIME-BASED REDUCTION-

Migrated data contains master data and customizing plus application data starting from a defined cutoff date.

TIME-BASED REDUCTION AND REDUCTION BY COMPANY CODE-

Migrated data contains the data from one or more company code from defined cutoff date.

REDUCTION BY DELETION OF ALL CLIENT-DEPENDENT DATA FROM A CLIENT SYSTEM-

The functions contained in this package are the same as the ones used in other packages to delete the client-dependent data from the receiver system in preparation to the data transfer.

EXTRACT DATA BASED ON A BUSINESS PROCESS LIBRARY-

In this process type, master data, business processes and business transactions whose data is to be copied from a predefined list can be migrated. We cannot use the standard business library, we need to create a custom business process library from standard.

TRANSFER OF MASTER AND CUSTOMIZING DATA AND MINIMAL TRANSACTION DATA

In this process type, we can copy only master data from production to non-productive client, there are very few tools available with which we can achieve this, and this is one of the key features of TDMS.

Figure2: Available process types in SAP TDMS 4.0.

B. Steps to perform transfer of Master data and customizing.

This migration solution includes the following phases:

Package Settings

In this phase you create technical settings such as master data tables for transfer, assigning logical system names in the receiver system, excluding user related data, scrambling of data and include the custom table. Based on the requirement from your functional team we can change the default classification of master data tables.

The PROCESS ACTIVITIES in this phase are:

Define RFC Destinations: In this activity, the creation of RFC destinations for all the systems is done.

Check Sender and Receiver Client Ids**:** It is a rule that the sender client and the receiver client should have the same ID. If this is not the case then the ID of receiver client is converted during transfer.

Assign Logical System Names in Receiver System: By the execution of this step, a sequence of programs is executed in the background which ensures correct handling of customer-specific and generated tables during the data transfer. Other programs carry out status checks and technical analyses required in preparation to the data transfer.

System Analysis

In this phase based on the system resources in source, central and target system we can change the number of process to copy the data, it depends on the CPU, memory and number of available work processes in source and target system. This is one of the key steps, with fine tuning of resources, master data and custom data can transfer with in less time.

The PROCESS ACTIVITIES in this phase are:

Analyze Table Sizes: In this activity, all TRANS, POOL and CLUSTER type tables (only the client dependent) in the sender system are analyzed regarding their size.

Analyze and Specify 'From-Date': In this step, the user gives the date from which the data needs to be migrated from sender to receiver system.

De-Activate Size Prediction for Receiver System: In this step, the user decides whether to have a prediction of the size of receiver system after data transfer.

Start Programs for Generation and Receiver Settings: By the execution of this step, a sequence of programs is executed in the background, the purpose of this to collect the technical information about the tables in which the dates are not present.

Display Data Transfer Volume (Optional): This is an optional activity, where the user can view the amount of data that will be transferred to the receiver system based on the settings made during the 'Data Transfer' phase.

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Data Transfer

In this phase you execute the final steps and lock and your steps, also based on the data transfer it lock the image from the source system, once the transfer of data begins, it cleans up the existing configuration in receiver system and start copying new data based on the image locked from the source system. Before the data copy begins make sure to lock the user in receiver system, so that no new changes can be done to copied data.

The PROCESS ACTIVITIES in this phase are:

Lock users in receiver system: This is an optional activity; where the users in the receiver system who are not directly participating in the current migration can be locked.

Start Deletion of Data in Receiver System: In this activity, the jobs for each table to be dropped are created and then these jobs are started.

Activate Database Views: In this step, database views are activated that may be de-activated after drop of tables in the receiver system.

Create Cluster in Sender System: In this step, a table DMC_INDXCL is created in the sender system for Oracle and Informix databases. For any other databases, this step executes without any action.

Fill header tables (Collective Exec.): This activity determines header entries for structured objects for data reduction.

Start Data Selection: In this step, the data selection for all conversion objects is started with reading type Cluster technique.

Check consistency of data load: This activity checks for the consistency of the transferred data and verifies whether all the objects that needed to be transferred have actually been transferred.

Post Processing

In this phase you execute the final steps, after the copy of the data in the receiver system, perform the adjustments of number range and business workplace tables. Also, after deletion of data in the receiver system, unlock the users which were locked as part of the data transfer phase. Cleanup few temporary tables which filled during the data migration process.

The PROCESS ACTIVITIES in this phase are:

Background processing: By the execution of this step, a sequence of programs are executed in the background that take care of various post-processing tasks such as transferring number range intervals, resetting buffers, adapting user addresses.

Unlock Users in Receiver System: In this phase unlock the users which were locked during the data transfer phase.

Refresh Data Selection Cluster of Current Transfer: In this activity, the data in the temporary storage (cluster) in the sender system can be deleted after the data transfer has taken place.

Complete Package: Here the package is closed. This activity sets the end status and de-activates the package.

By copying master and custom data it will improve the quality of test data by using business relevant and data up to date. Also this will reduce the transaction data significantly, which we will reduce the infrastructure cost to less than half. Below is the view on the storage footprint after using SAP TDMS.

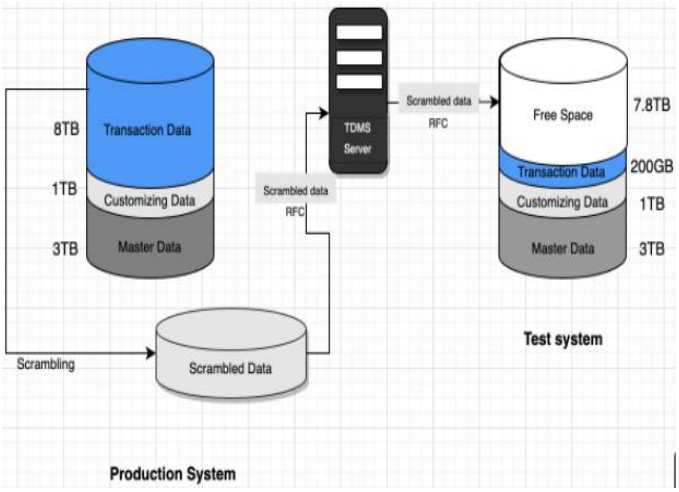

Figure3: Benefit of TDMS in copying master and custom data

C. SAP TDMS Business Process Library

The Business Process Library in SAP TDMS is a collection of specific SAP business processes. You use the BPL-Based Transfer migration solution to transfer data relevant to the business processes from the sender system to the receiver system. SAPTDMS provides a BPL object for each of the business processes available with TDMS BPL. SAP TDMS BPL does not allow to use the standard templates to copy the data, so we can only use custom templates. SAP TDMS transfers the relevant data of BPL object based on the selection criteria you specify in your TDMS project for BPL.

The PROCESS ACTIVITIES in this phase are:

Define RFC settings and view a list of all BPL objects, tables, sub-objects, foreign key and reduction criteria. Create new BPL objects and copy a BPL object and modify it according to your needs.

Modify BPL objects, including add tables, add sub objects. Deactivate or activate sub object links. Set a table as a root table or remove the selection. Creating a BPL project from the Projects Work Center.

Specify the BPL objects you want to set for transfer in the Projects work center then create a project relevant to TDMS BPL and specify data selection parameters in the form of variants. Create a migration package related to TDMS BPL and access the BPL migration process tree to carry out the BPL data migration.

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There are over 100 different templates available in SAP TDMS-BPL, which can be used to copy the data from sender to receiver system. We can add tables into the customized business process library, based on the requirement. There is different type of BPL object categories are available, like Transactional data, master data, custom data, processes. We can copy them into custom business library and transfer the data. BPL object key tables are:

Root Table: The starter table that specifies the reduction criteria for the BPL object. Data selection for a BPL object starts with the root table.

Tables: Database tables that are transferred as part of the selected BPL object.

Sub Objects: BPL objects included with another BPL object. A sub-object can be transferred separately or included with a BPL object.

SAP TDMS BPL provides ready-to-use content that contains information about the BPL object, related sub objects, tables, and table dependencies. Standard delivery includes ready-to-use content for predefined BPL objects. The predefined BPL objects include master data (for example, customer or vendor), transaction data (for example, material document or purchase requisition), business processes (for example, production order, loans contract), common sub objects (for example, change documents, standard texts), and custom objects.

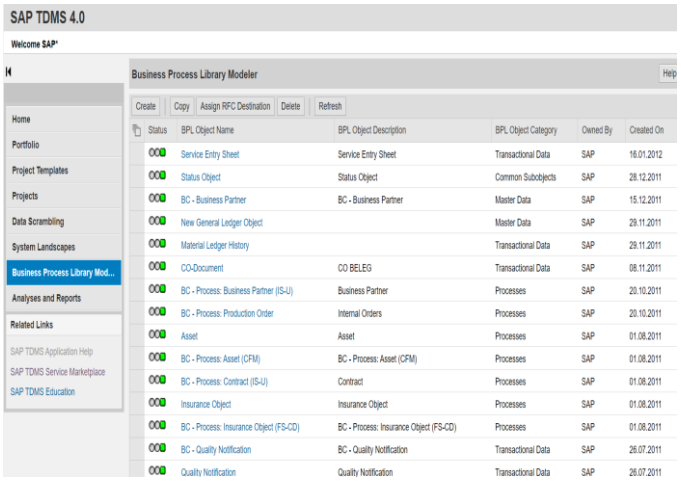

Figure4: Business Process library available templates

CONCLUSION

After going through this document, we will know about the standard sap tool to copy the data from production system to non-production system. This tool provides us with the capability to copy company specific, time based, master data copies. This tool not only give us a specific data based on time reduction also the infrastructure cost. This tool allows us to copy the master and custom data only, with which we can reduce the footprint of transactional data. The key feature of this tool is the scrambling of the data, since our production data has sensitive data and we don't want to copy that data to non-production or we don't want to visible sensitive data in non-production. Using this feature, we can scramble the data. This tool is quite straight forward with the availability of inbuilt templates which make this tool user friendly.

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