



HANA Migration using Database Migration Option

Introduction

This document describes the HANA overview and introduction to HANA migration using database migration option (dmo) tool.

SAP HANA in Nutshell

SAP HANA is an in-memory database. It is a combination of hardware and software made to process massive real time data using In-Memory computing.

- It combines row-based, column-based database technology
- Data now resides in main-memory (RAM) and no longer on a hard disk
- It's best suited for performing real-time analytics, and developing and deploying real-time applications

An in-memory database means all the data is stored in the memory (RAM). This is no time wasted in loading the data from hard-disk to RAM or while processing keeping some data in RAM and temporary some data on disk. Everything is in-memory all the time, which gives the CPUs quick access to data for processing.

The speed advantages offered by this RAM storage system are further accelerated by the use of multi-core CPUs, and multiple CPUs per board, and multiple boards per server appliance.

Complex calculations on data are not carried out in the application layer, but are moved to the database.

SAP HANA is equipped with multiengine query processing environment which supports relational as well as graphical and text data within same system. It provides features that support significant processing speed, handle huge data sizes and text mining capabilities.

HANA Migration

Migrating your existing SAP system to the SAP HANA database means switching the SAP system to a new database that is running on a new host.

Planning is very important to have successful landscape migration following are Key Consideration on Planning Hana Migration.

- **SAP Data Volume Management**

We recommend to start with DVM 6-12 months before the actual HANA migration The implementation of the DVM recommendations leads to reduction of costs of ownership through:

- » Reduction of necessary disk space and postponement of hardware investment
- » Reduction of time slots needed for maintenance, which includes tasks such as backup, upgrade, and recovery
- » Increase in performance due to lower number of table entries and a lower system load
- » Data compression, reorganization, archival, deletion

- **Check Product Availability Matrix (PAM)**

Supported platforms, releases, add-ons, possible restrictions (add-on deinstallation)

- **Perform Sizing**

HANA DB: SAP Note 1514966, ABAP BS: SAP Note 1872170, ABAP BW: 1736976

- **Define target landscape**

- a. DEV and QA on one appliance? Scale-up (increase HW size) or scale-out (add nodes)?
- b. SAP appliance or SAP HANA TDI (tailored datacenter integration to re-use existing HW)?

- **Perform several migration phases**

PRD to sandbox, DEV migration, QA migration, PRD to sandbox, PRD migration

HANA – Migration options and tools for ABAP systems

There are mainly three migration options:

1. New installation (using SWPM)
2. Classical migration (using SUM and SWPM)
3. One-step procedure with DMO (using SUM)

SWPM is the abbreviation for the Software Provisioning Manager, the Software Logistics tool for system provisioning.

SUM is the abbreviation for Software Update Manager, the Software Logistics tool for system maintenance.

Pre-requisite for HANA Database

Running an SAP system on SAP HANA database requires -

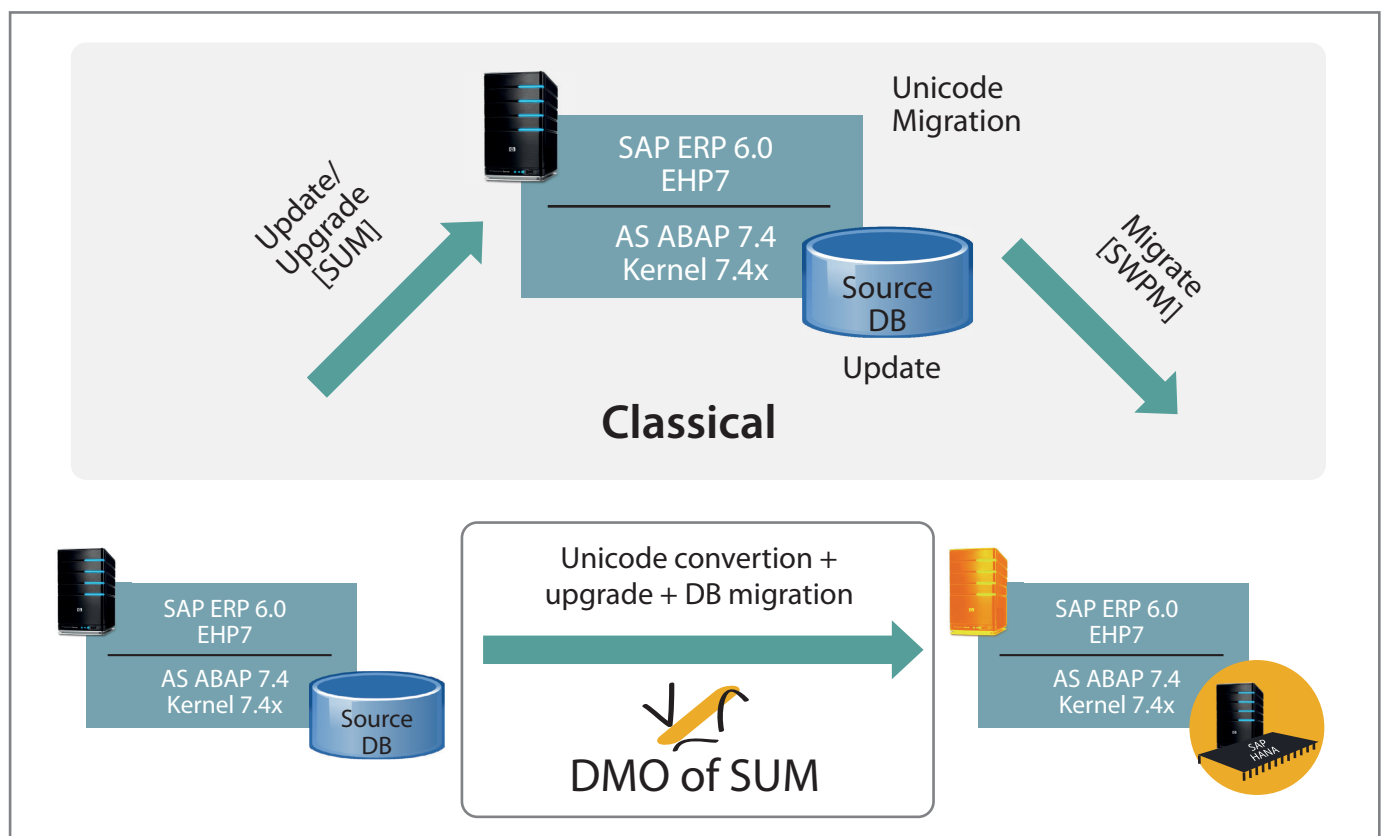
1. SAP Netweaver BW system, the minimum level is SAP Netweaver 7.3
2. As with the SAP HANA database, non-Unicode systems are no longer supported. This means that the SAP system has to be updated (EHP or Upgrade) before the migration takes place and have to cover the Unicode conversion as well.

DMO in Nutshell

Now with the Database Migration Option (DMO) of the Software Update Manager (SUM), the procedure is simplified. SAP system update and database migration are combined in one tool, in one procedure. If required, the Unicode conversion may be included as well. And for some source database types, it is not required to update the source database software for the migration.

Migration options to SAP HANA database

Comparison of standard migration options



It is important to understand what is happening during the migration phase, so let's take a look at the system components involved during the migration. In a typical system landscape. We have an existing SAP system which will be migrated to SAP HANA. Of course this SAP system has a database which usually is located on a separate server. And because we want to migrate our SAP system to SAP HANA we also have a target SAP HANA DB.

DMO of SUM is started on the Primary Application Server, and during the downtime migration phase several R3load processes will be started to perform the actual data migration. In contrast to the Heterogeneous System Copy where we at first create the export of the source DB, and then later on import this exported data into the target DB, SUM is doing the migration by exporting and importing in parallel. Pairs of R3load processes get started. One R3load is reading (exporting) the data from the source DB and is handing over the data via a memory pipe to the importing R3load which will write the data directly to the target SAP HANA DB.

So in the case of DMO the export is not written to the file system which has some benefits:

- » You do not need additional disk space for the export
- » Because we do not save the export to disk we do not have to compress it to save disk space
- » Because we do not have to compress the export we will save a lot CPU resources
- » We can use the CPU resources saved to start more R3load processes

Monitoring

It's a good idea to real time monitor the whole system landscape to get a better understanding of the system load caused by the migration.

- » CPU load: how high is the CPU load during the downtime migration? Optimal usage would be 80-90% CPU load
- » Network traffic: export and import traffic runs through the PAS host. How many MB/s are transferred?

Benefits of DMO

- » Combined procedure needs only one maintenance phase (not two): Reduces business downtime (TCO), less regression tests necessary
- » In place migration keeps application server and System-ID stable: Low impact on system landscape: only database server is new
- » Original database is kept, can be reactivated as fallback: Reduces risk, no restore required, more time for testing before cutover
- » Lower prerequisites for SAP and DB start releases: Reduces effort (TCO), may avoid update of source database

Migration Best Practice to optimize the Downtime:



Always use Latest Kernel and R3tool

Please make sure to always use the latest Kernel archives and the latest R3-Tools (R3load, R3ldctl, etc.) before you start with the DMO procedure. The Kernel archives calculated by the Maintenance Planner are most of the time older because it uses combination of the target ABAP stack and a kernel that have been validated by SAP. However, for the SAP HANA migration we highly recommend to use the latest versions of the Kernel and the R3-Tools because they contain the latest optimizations and fixes relevant for the migration to SAP HANA.

Find the optimal number of R3load Processes

The first step will be to find a feasible number of R3load processes for the system Landscape currently used. As R3load processes started by DMO will consume less CPU resources because we do not use compression. This on the other hand means that we can start more R3load processes. Finding the optimal number of R3load processes for the downtime migration is crucial for a good migration performance. With this we can make sure to get the best possible transfer rate

Migrate only a small percentage of the DB: There is no need to perform a migration of the complete database to find the optimal number of R3load processes. A Migration runtime of about 30 minutes should be enough to find the right number of R3load processes. So in this case we can use the functionality of the Benchmarking Tool to only migrate a part of the database. Set the percentage of the DB in the Benchmarking Tool to a value which is equivalent to about 100 GB.

Complete the Migration with this number of R3load Process

After we have found the optimal number of R3load processes it is time to run a full migration of the complete database. Also here we can use the Benchmarking Tool. Here we can use the Test Cycle option. This will give us the possibility to repeat the migration phase without having to go through the whole configuration screens again. This is helpful because we want to run the full migration twice. The first time to get the durations file, and a second time to make use of the durations file to optimize the table splitting.

Use Duration file to optimize the table splitting

We will then analyze the migration and get to know the long running tables with the help of the durations file. This file contains the runtime of the tables (sum of the runtime of all packages for a table). The durations file not only contains information about the runtime of the tables, it can also be used to optimize the table splitting. Without the durations file the table splitting is only based on the table size. The assumption is that larger tables will take longer and therefore this tables will be split in more parts (packages), whereas smaller tables require less time to migrate and might not get split at all. However sometimes this assumption is not always right. Sometime there are tables which are not that large, but they nevertheless require much time during the migration. This is where the durations file can help to improve the table splitting. By providing the runtime of the tables we can adjust the table splitting according to the runtime instead of the table size.

About the Author



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Pramod has 16 Years of IT experience in SAP consulting, Implementation/Upgrade and OS/DB Migration. He is SAP certified in OS/DB Migration as well as Netweaver technology. He has extensive experience in installing and managing complex SAP implementation, maintenance and production support.

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