Upgrade Guide | PUBLIC
Software Update Manager 2.0 SP09
Document Version: 1.0 – 2020-10-05

Database Migration Option: Target Database SAP HANA

THE BEST RUN **SAP**

Content

Document History

The following table provides an overview of the most important document changes.

> ⚠ Caution
>
> Before you start implementation, make sure that you have the latest version of this document. You can find the latest version on the SAP Support Portal at http://support.sap.com/sltoolset📁. Choose tab *System Maintenance*, then the scenario ▶ *Database Migration Option (DMO) using SUM* ❯ *Database Migration Option (DMO) with SUM 2.0 SP09* ❱.

Document: Database Migration Option of SUM 2.0 SP09

Version	Date	Description
1.0	2020-10-05	Initial version

1 Before you start

1.1 About this Document

This document gives you an overview of the update procedure with the Software Update Manager (SUM) tool using its Database Migration Option (DMO).

To smooth the way to the target database, SAP introduced a one-step procedure that combines the system update and the database migration. This is provided with the Database Migration Option (DMO) feature, which is delivered with the Software Update Manager (SUM) tool, a part of the Software Logistics Toolset (SLToolset).

The main benefits of DMO are:

- Simplified migration steps
- System update and database migration combined in one tool
- Reduced business downtime
- A comfortable and fast reset option

This document includes special planning, preparation and follow-up activities as well as information about using SUM with DMO and some troubleshooting information. The information in this document is intended for SAP system administrators with operating system, database, and SAP NetWeaver Application Server knowledge.

The document

- provides you with information to consider before and during the update procedure using SUM with DMO, and what you can do when you encounter errors
- describes specifics, when you want to update your existing SAP systems based on SAP NetWeaver Application Server for ABAP with subsequent migration of your database to SAP HANA database

1.2 New Features

The section lists significant new features and improvements of the Database Migration Option.

The table also indicates the SUM version in which the new or improved feature was introduced.

New Features for the Individual SUM with DMO Versions

Feature	General Availability as of	See for more details
Shadow repository on target database	The Software Update Manager creates the shadow repository on the target database instead on the source database as before. For the latest information on this feature, see the blog https://blogs.sap.com/2019/09/09/dmo-shadow-repository-on-target-database-for-conversion-to-sap-s4hana-1909/ 🔗.	SUM 2.0 SP08
DMO with System Move	Divers updates in the description, such as • Updated graphics • Phase `HOSTCHANGE_MOVE` renamed to `HOSTCHANGE_MOVE_SOT` • Complete download directory must be copied for the preparation	SUM 2.0 SP08
DMO with System Move	Description for "Reset of target system" updated. For more information, see Reset Option During System Move [page 40].	SUM 2.0 SP09

1.3 Naming Conventions

This section deals with the most important naming conventions used in this document.

See the *SUM Guide* for a comprehensive overview about naming conventions. The most important naming conventions in this document are:

Naming	Meaning
SUM Guide	Abbreviation for: *Update Guide – Update of SAP Systems Using Software Update Manager* `<version>`
Update	For clarity and readability, the generic term Update is used in this document in the context of release upgrade, enhancement package installation and Support Package Stack application with SUM.
SAPup	The DMO procedure is only available for systems based on AS ABAP, so on technical level, the executable SAPup (as part of SUM) is used, for example, in the log files or in commands.
anyDB	DMO of SUM migrates from an existing relational database type (called anyDB) to the target database.

Naming	Meaning
<SUM directory>	This spelling is used when referring to `<path to SUM directory> > SUM`.

1.4 Required SAP Notes

To prepare and perform the update of your SAP system and the migration of your database, you require some additional information that is not included in this document.

This information is in a range of SAP Notes from the SAP Support Portal at http://support.sap.com/notes🔗. Check the notes before you start with the preparations.

> ⚠ Caution
>
> Make sure that you always have the latest version of the SAP Notes.

Central SUM Note and the SAP Notes for your source database:

SAP Note Number	Description
2882379🔗	Central Note - Software Update Manager 2.0 SP09

> i Note
>
> The additional SAP Notes for the databases are listed in this central SUM Note.

SAP Note for the DMO

SAP Note Number	Description
2935107🔗	Database migration option (DMO) of SUM 2.0 SP09

> → Recommendation
>
> See also the PDF documents, which are attached to the DMO Note and the central SUM Note, for a graphical representation of the supported update and upgrade paths.

SAP Notes regarding SAP Business Warehouse (SAP BW)

If you are updating an SAP BW system, read and implement the following notes before starting the update:

SAP Note Number	Description
1142427	Trace cannot be deleted regularly
1388287	RSRD_BOOKMARK_REORGANISATION: Specified time not used
1695112	Activities in BW after migrating to the SAP HANA database
1714734	Functions RSPC_SHUTDOWN and RSPC_STARTUP do not exist
1845061	Background user has no authorization for scheduling
1958346	BW on SAP HANA: Landscape redistribution check procedures
1908075	BW on SAP HANA SP06: Landscape redistribution
2190948	730SP14: DMO/Houskeeping Task 'PSA_MAPPING_CHECK' inactivates older version of PSAs

Other SAP Notes that contain additional information

In addition to the above-mentioned SAP Notes, this document also refers you to other SAP Notes with additional information. The following list contains these SAP Notes

SAP Note Number	Description
816861	Migrating entries in the secure storage
936441	Oracle settings for R3load based system copy
1031096	Installing Package SAPHOSTAGENT
1784377	Checking pool tables and cluster tables
1788379	Transport of SAP NOTES
1845061	Background user has no authorization for scheduling
1929357	HDB client installation on HP-UX

SAP Note Number	Description
1899817	SAP Business Suite on distributed SAP HANA database (scaleout): Landscape redistribution
1000009	ASU Toolbox 2008
2033243	End of non-Unicode Support: Release Details

1.5 Other Required Documentation

In addition to this document, you also require other information such as the current central SUM Note or the following documents:

- **Upgrade Master Guide – SAP NetWeaver** `<Release>`
- **Upgrade and Update Guide for ABAP – SAP NetWeaver** `<Release>`
  The Upgrade Master Guide guides you through the complete update process and refers you to the required documentation for each step.
  The Upgrade and Update Guide describes application-specific preparations and follow-up activities, which you have to perform when you update your SAP NetWeaver ABAP system. It supplements the SUM Guide and refers to various SAP NetWeaver applications such as SAP Business Warehouse or Application Server ABAP.
  You can access the latest versions of these documents on the SAP Help Portal
  - for SAP NetWeaver 7.5 at: http://help.sap.com/nw75
  - for SAP NetWeaver AS for ABAP 7.51 innovation package at: http://help.sap.com/nw751abap
  - for SAP NetWeaver AS for ABAP 7.52 at: http://help.sap.com/nw752abap

  Choose then for every version ▶ *Installation and Upgrade Information* ⟩.
- **SUM Guide:** *Updating SAP <technology> Systems on <operating system>: <source database>*

  > **i** Note
  >
  > In this document, we also use the abbreviation *SUM Guide*.

  This document describes how to update SAP systems based on SAP NetWeaver using the Software Update Manager (SUM). It includes general planning, preparation and follow-up activities, information about using the SUM, and troubleshooting information.
  You can access the latest version of this document on the SAP Support Portal at:
  http://support.sap.com/sltoolset ▶ *System Maintenance* ⟩ *Software Update/Upgrade with SUM 2.0 SP*`<version>` ⟩.
- **System Copy Guide for SAP Systems Based on SAP NetWeaver Application Server 7.1 and higher (for ABAP)**
  This document is relevant among others when you want to:
  - use the stand-alone Table Comparison tool (see also Table Comparison [page 63]
  You can access the latest version of this document on the SAP Support Portal at http://support.sap.com/sltoolset ▶ *System Provisioning* ⟩ *System Copy Option of Software Provisioning Manager 1.0* ⟩.

Database Migration Option: Target Database SAP HANA
Before you start

- **Dual-Stack Split Guide**

  This document explains how to use Software Provisioning Manager, which is a tool of the SL Toolset, to split a dual-stack (ABAP+Java) system into one ABAP and one Java stack each with its own system ID. You can access the latest version of this document on the SAP Support Portal at http://support.sap.com/sltoolset ➤ *System Provisioning* ➤ *Split a System using Software Provisioning Manager 1.0* ➤ *Dual-Stack Split Guides* ➤

2 Introduction

2.1 Basic Concepts

2.1.1 The DMO Concept

This section describes the idea behind the database migration option of the Software Update Manager.

The DMO feature helps you avoiding landscape changes (SID, host name) and allows the combination of all relevant steps for the in-place migration to the target database (Unicode Conversion, Update, and Migration) in one tool.

A further benefit of DMO is its comfortable and fast reset functionality, provided that the source database remains consistent throughout the procedure.

Assuming that you run your SAP system on anyDB, and you want to update the SAP system and to migrate the anyDB to the wanted target database, several steps such as

- Dual-stack split
- Unicode conversion
  (not for target systems based on SAP NetWeaver 7.5 or higher)
- Database update of anyDB
- Update of your SAP software
- Database migration to target database

can be necessary. The processing sequence is based on the *shadow system* functionality of SUM. A shadow system basically consists of a *shadow instance* and a *shadow repository*:

- The shadow instance is an additional ABAP instance that is created by SUM on the application server on which the SUM was started. It is used to prepare steps executed during the downtime.
- The shadow repository exists on target product version level. This means that the shadow instance must use the target kernel to create the shadow repository with potentially new object types.

The most important steps of the processing sequence are as follows:

1. During the uptime, the target database is being set up (such as tenant, schema) on the target database host.
2. Also during uptime, the shadow repository is being created on the target database.
3. The downtime starts. The application tables are migrated from the source database host to the target database host by means of R3load processes.
4. The SUM switches from the SAP source system kernel to the SAP kernel for the target system.
5. After the migration of the application data (including data conversion), the update is finalized and the SAP system runs again in uptime on the target database.
   The source database continues to run, remains consistent, and application tables are not modified. It remains as a fallback database for the Reset Option [page 39] throughout the complete DMO procedure. After the successful DMO procedure however, it cannot be used anymore as a productive database for an SAP system in parallel with the target database.

The following figure shows the different phases of the DMO during the procedure.

DMO phases during the procedure

Symbol	Step
1	Upgrade "Prepare"
2	Execute Upgrade (until downtime phase)
	Setup target database specifics (tenant, schema ...) Create shadow repository on target database — Uptime
Switch 3	database connection
4	Migrate application data (incl. data conversion) — Downtime
5	Finalize Upgrade
6	Start SAP system based on target database

Note
Source database continues to run, but is no longer used to store data

DMO at a glance

For more information about the DMO, see the following blogs in the SAP Community:

- Database Migration Option (DMO) of SUM – Introduction
- DMO: technical background

2.1.2 Standard SUM versus SUM with DMO

Consider the following main differences to the standard SUM procedure, that is, the system update without combined database migration in a one-step procedure:

- Different prerequisites
  Supported are all database versions listed in the Product Availability Matrix (PAM) of the source release and all operating system versions listed in the PAM of the target release.

> ⚠ Caution
>
> See also the latest SAP Note for DMO mentioned in Required SAP Notes [page 8] for the current prerequisites and restrictions.
>
> This note involves information regarding

- o operating systems and databases
- o minimum support packages
- o source and target releases

- Download directory
  One of the first DMO dialogs in the browser is the question where the stack configuration file `stack.xml` is located. SUM presumes that this file is part of the download directory, so there is no separate question about the location of the download directory. The download directory includes the kernel and software files that were downloaded after using the *Maintenance Planner*.

- Additional kernel files required
  When you select the required kernel files in the Maintenance Optimizer, select the kernel files of the target software release for both the source database and the target database (in addition to the other files).

- Additional Steps
  The database migration is an additional part of the DMO procedure compared to the standard update procedure of the SUM. Therefore, you must provide specific information for the migration and for the target database during the DMO procedure, such as a migration key. Or you must provide access to the SAP HANA database client installer.
  Technically, SUM creates the shadow repository on the target database and triggers the `R3load` to export and import the application data.

- Easy reset
  An easy reset to the source database is possible, as long as the source database and the SUM directory (of the existing update) exist. Do not perform a reset in a productive environment after the end users started working on the new system based on the new database.

- Password restrictions for SAP HANA database
  Currently, the password restrictions for users on SAP HANA database are different to those of the SUM. Take that into consideration when creating users for the SAP HANA database. Hint: Start the password with a capital letter and use alphanumerical characters only.

3 Planning

This part of the document contains information about planning your SAP system update and the database migration.

3.1 Performing DMO without System Update

You can run a DMO procedure for migration purpose only without updating the SAP system.

Prerequisites

- You do not intend to update your SAP software
- The source release of your SAP product already meets all requirements for running on the target database
- The download directory must exist
- The download directory contains the latest kernel archives for both the source and the target database
- The download directory does **not** contain software archives for an SAP software update

Context

The DMO offers the option to perform a SUM with DMO run, but without updating your SAP system and hence without the need to provide a `stack.xml` file. This option is relevant, if you want to carry out only a migration of your SAP system to the target database, but you do not intend to update your SAP software.

> **i Note**
>
> Please consider the following:
> - Although the Software Update Manager executes no update, it creates nevertheless the shadow system.
> - You cannot integrate customer transports (as described in the *SUM guide*) into this DMO procedure.

To enable a SUM with DMO run for the migration only scenario, proceed as follows.

Procedure

1. Start the Software Update Manager as described in the *SUM guide*.

2. During the initial dialogs, specify the scenario category <u>without</u> `stack.xml` configuration file.

3. Select the option *DMO without System Update* and choose *Next*.

3.2 Performing DMO with System Move

You can run an update with database migration including a move of the primary application server from source to target system.

Prerequisites

1. You have prepared the target system landscape. See: System Move: Preparing Target System Landscape [page 29].

2. You have provided the complete download directory for the target system landscape in a separate directory. See: System Move: Providing Download Directory for the Target System [page 30]

3. If necessary, you have aligned the operating systems of the different PAS hosts. See: System Move: Switching the Operating System [page 31].

4. In a Software Update Manager dialog, you have enabled the system move during the DMO procedure. See: System Move: Enabling DMO with System Move [page 32].

For further the prerequisites and restrictions concerning DMO with System Move, see section *I/ Important General Information* of the related SAP Note for the DMO that is mentioned in Required SAP Notes [page 8].

> ⚠ Caution
>
> During a "DMO with System Move" run, dump files are created in the SUM folder that contain the contents of source database tables in compressed form. Since the entire source database is exported, make sure that there is enough space available.

Context

The database migration option (DMO) of the Software Update Manager (SUM) offers the move of the primary application server instance from the source system landscape to a target system landscape during the DMO procedure.

> i Note
>
> In the following, we use the term *system move* for this option.

The approach of this option is as follows: The SUM starts the system update and database migration procedure on the PAS of the source system and executes the first part of the procedure, including the export of the database content into files.

Then the files and the SUM directory are transferred to the target system, and the remaining part of the SUM with DMO procedure happens here. See below an overview of the principle and the steps in detail:

Overview: DMO with System Move (sequential mode)
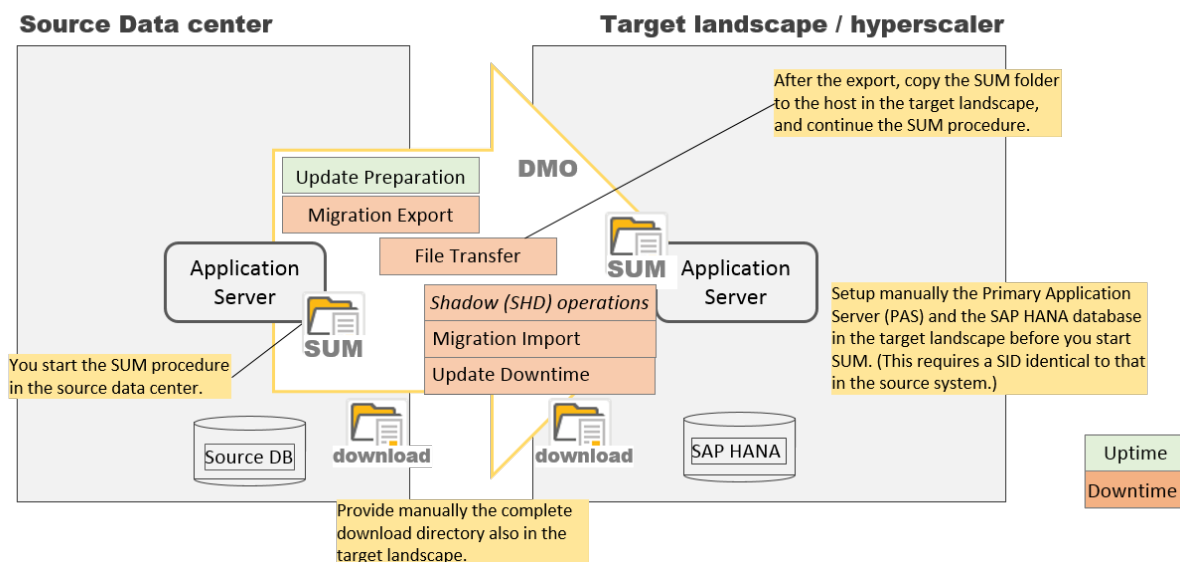
DMO with System Move: Overview

Procedure

1. You start SUM on the PAS host with the normal system update and database migration procedure.

2. During the SUM with DMO run, SUM displays a dialog in which you can enable the *system move* option (see also the prerequisites at the beginning of this chapter).

3. In a further dialog later on, you are prompted to transfer the SUM directory content from the source system to the target system.

   For more information on the data transfer, see System Move: Data Transfer [page 49].

4. After the data transfer, the SUM with DMO procedure is complete on the source system, and you continue with the procedure on the target system.

5. You finish the system update and database migration procedure on the target system.

   > **i Note**
   >
   > If you need to perform a reset during the procedure on the source or target system, consider the explanations in section Reset Option During System Move [page 40].

3.3 DMO with SAP Landscape Transformation

SAP Landscape Transformation (SLT) replication server uses a trigger-based replication approach to pass data from source system to target system.

The SAP SLT server is the standard real-time replication tool for SAP ABAP-based source systems among others to various SAP products and applications as well as to SAP HANA database and all further databases supported by SAP. The data replication functions within SAP Landscape Transformation use database triggers (SLT trigger) to record changes for all types of tables such as application tables, customizing tables, or switch tables.

During its standard execution, the Software Update Manager goes through several phases to check for relevant SLT triggers to avoid later issues. For more information, see also in the SUM Guide the section ▶ *Running the Software Update Manager* ▶ *Making Entries for the Checks Roadmap Step* ▶ *Checking for Database Triggers (SLT) on Switch Tables and Tables to be Converted (Phases RUN_CHECK_SLT_TRIGGER_*)* ▶.

However, if you run the Software Update Manager with a database migration option, the checks for database triggers are not available. You must manually re-create the database triggers and reload them initially afterwards.

In the following you get a rough overview about the procedure in the DMO scenario:
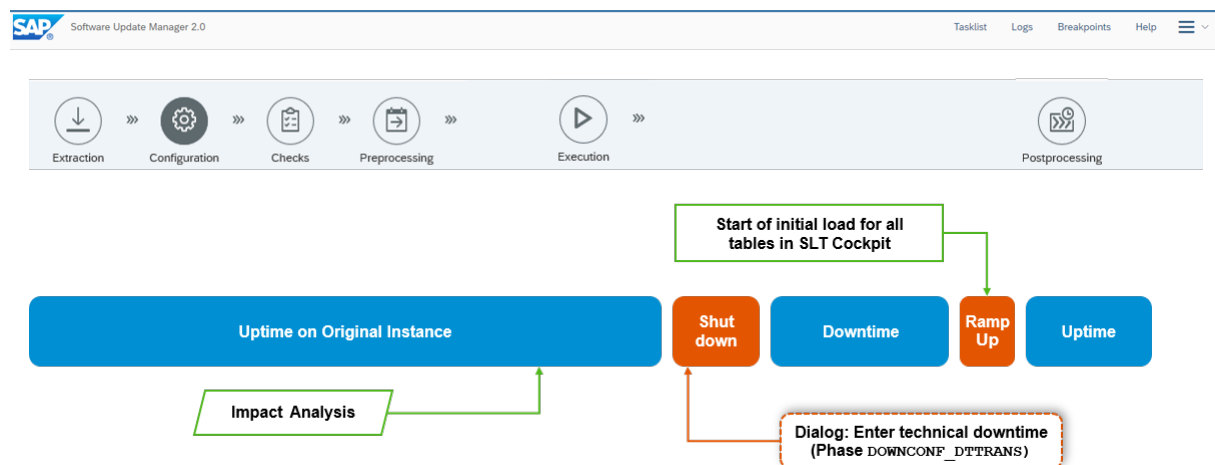
3.4 Dual-Stack Split

Since the DMO works only with ABAP systems, a dual-stack split may be required beforehand.

If a dual-stack split is necessary, make sure that it has already been performed before you start the update and migration procedure.

For more information about the dual-stack split, see the section *Dual-Stack Split* in the *Upgrade Master Guide* for your SAP NetWeaver version. For detailed information about the dual-stack split and its procedure using Software Provisioning Manager, see also the *Dual-Stack Split Guide*. All guides are mentioned in section Other Required Documentation [page 10].

3.5   ASCS Instance Split

The Software Update Manager is equipped with a procedure to split off the ASCS from the primary application server instance. This procedure creates a new ASCS instance that runs on the primary application server.

If you carry out an update with database migration option, the ASCS split is optionally possible. The Software Update Manager prompts you in a dialog to select one of the following options:

- Perform the ASCS instance split
- Keep the current system setup

For more information, see in the *SUM Guide* section ▷ *Planning* ❯ *ASCS Instance Split* ❯

3.6   Unicode

A `Combined Upgrade & Unicode Conversion (CU&UC)` for target systems based on SAP NetWeaver 7.5 or higher (such as SAP ERP 6.0 EHP 8) is not possible.

Make sure that the SAP NetWeaver source system already supports Unicode, because SAP NetWeaver supports as of version 7.5 Unicode only.

See also SAP Note 2033243 .

3.7   Performance Optimization with Migration Duration File

You can provide the Software Update Manager with the information about table migration durations from a previous SUM with DMO run. SUM uses this data to optimize the performance of subsequent DMO runs.

Although SUM does consider the table sizes for the migration sequence, other factors can influence the migration duration. In other words, consider more criteria than just the table size for the duration of a table migration. The real durations are the best criteria, but they are only known after the migration of the tables.

During a migration, SUM creates a text file with the extension XML that contain the information about the migration duration for each migrated table. The file is called `MIGRATE_DT_DUR.XML`, and is created in subdirectory ▷ *<SUM directory>* ❯ *abap* ❯ *doc* ❯ *analysis* ❯. It can be used for the next DMO run to improve the table splitting. For this purpose, put the file into the download folder so that SUM can consider it during the next run.

> **i Note**
>
> The file with the duration information ("migration duration file") can even be reused for a similar system. The systems can also have a different SID.
>
> For example, you can use the duration file from a copy of the productive system for a further DMO run on this productive system. The file contains both the table migration time and the table size. In case of different table sizes, `SAPup` adapts the migration time accordingly.

3.8 Downtime-Optimized DMO

By means of the downtime-optimized database migration (*downtime-optimized DMO*) to SAP HANA database, you can migrate selected large application tables already in uptime to reduce the downtime.

Overview

The downtime-optimized DMO procedure performs a part of the data migration in the uptime processing. This technique significantly reduces the overall business downtime. The delta record and replay technology (CRR) ensures that any changes, which end users made in the uptime but during the data migration, are considered.

In the following, you get a rough overview of the new approach and the difference to the standard DMO procedure:

Downtime-optimized DMO of SUM – procedure overview
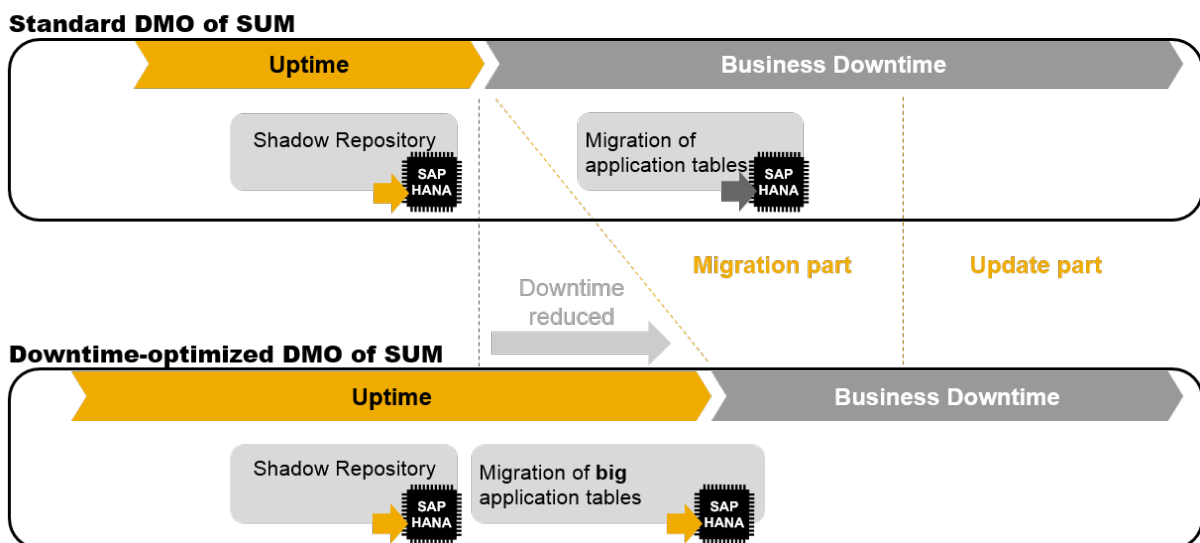
The downtime-optimized DMO in a nutshell:

1. Determined large application tables are already migrated during the uptime in phase `EU_CLONE_MIG_OPTDMO_RUN`. Changes to these tables are recorded after their migration.
2. A delta migration is carried out during the uptime in phase `RUNASYN_RRC_REPLICATE`. If necessary, a second delta migration takes place during the downtime in phase `RUN_RRC_REPLICATE_FINAL`. The delta migrations depend on the change rate of the end users.
3. Afterwards during the downtime, the remaining tables are migrated in phase `EU_CLONE_MIG_DT_RUN`.

Prerequisites and Restrictions

For further the prerequisites and restrictions concerning downtime-optimized DMO, see section *I/ Important General Information* of the related SAP Note for the DMO that is mentioned in Required SAP Notes [page 8].

Enabling and Monitoring

To enable and monitor the downtime-optimized DMO, proceed as follows:

1. After the start of the Software Update Manager, the initial dialogs to specify the scenario and the roadmap appear. Choose the scenario category *with stack.xml configuration file*.
2. If a database migration to SAP HANA database is not mandatory anyway, choose in the dialog *Decision on DMO* the database migration to SAP HANA.
3. In a further dialog, select the scenario strategy *downtime-optimized*.
4. Sometime afterwards, the dialog *Migration Parameters* appears in which you specify the path and name of the file with the table names that are to be migrated during the uptime. The list must be a plain text file with one table name per line.
5. At the end of the uptime, that is at the end of the `Preprocessing` roadmap step, you can check the status in the *CRR Control Center* of the SUM Utilities. The dialog *Preparations for Downtime* in phase `DOWNCONF_DTTTRANS` offers a link to it.

> i Note
>
> The initial dialogs of the Software Update Manager and the SUM Utilities as well are described more detailed in the *SUM Guide*.

> → Recommendation
>
> For the downtime-optimized DMO procedure, we recommend the following sequence:
>
> 1. Run a standard DMO procedure with optimizations, such as using duration files.
> 2. Determine large tables for the uptime migration.
> 3. Run a downtime-optimized DMO procedure on a copy of your productive system.
> 4. (Optional:) Run a downtime-optimized DMO procedure on your productive system until the end of the uptime. Then determine the change rate on selected tables. Reset SUM afterwards.
> 5. Start downtime-optimized DMO procedure on your productive system again. We recommend using one weekend for the initial data transfer, a second weekend for the downtime.
> 6. Note that an error is displayed, if tables cannot be replicated. Remove then the table name from the table list.

Table selection

For various reasons, the table size as only criterion for the manual table selection is not always clear:

- The table migration duration is not always linear to the table size.

- You cannot include all tables. For example, SAP BASIS tables are not suitable.
- The change rate is relevant. As a consequence, tables with a high change rate should not be considered.

To meet the requirements for the table selection, use report `RSUPGBA_DODMO_SELECT` or `RS_DODMO_SELECT` at the end of a DMO run on a sandbox system.

- Use report `RSUPGBA_DODMO_SELECT` if your target system is based on SAP_BASIS 753 FPS1 or higher. The report is delivered with SAP BASIS 7.53 SP1.
- Use report `RS_DODMO_SELECT` if your target system is based on SAP_BASIS lower than 753 FPS1. The report is delivered with the SUM tool import.
  Use this report before the Software Update Manager informs you in a dialog in phase `REQ_UP_FINAL` that in the next step, cleanup activities are performed. The report will be deleted during these activities.

Impact Analysis

Changes on the content of those tables that are migrated already during uptime must be recorded by means of triggers. However, the change recording increases the daily database growth.

To avoid a business impact on your production system, it is necessary to estimate in advance how much additional database space will be required. The *Impact Analysis* approach provides you with an estimation for this.

For more information, see the SAP Notes 2402270 and 2481983 .

3.9 DMO Auditing Evaluation Form

SUM creates a `txt`-file that contains information about the migrated tables and their data, and which you can use as auditing evaluation form.

During a database migration, the Software Update Manager creates a text file `MIGRATE_*_TAB.TXT` and stores it in the subdirectory `doc > analysis`.

The file provides an overview stating which tables have been migrated during the DMO run, and with which data. Furthermore, it lists information regarding the export and import row count. After a successful DMO run, you can use the file as evaluation form for auditing purposes.

Below, you find an example of the content of such a `txt`-file as visualization how it might look like:

```
# DMO Evaluation Form
# Generated in phase 'EU_CLONE_RUN'
Table: /1BS/TEST_TABLE        size:     0 kB    exprowcount:      0      improwcount:           0
Table: /BOBF/OBM_ASSOCC       size:   192 kB    exprowcount:    666      improwcount:         666
Table: /BOBF/OBM_BO           size:   128 kB    exprowcount:     11      improwcount:          11

...
```

Example of the content of MIGRATE_*_TAB.TXT

4 Preparation

This part of the document contains information about the preparations that you perform before you update your system and migrate your database to the desired target database.

You can prepare for the update while the system is in production operation. Careful preparation of the update is the best guarantee that it runs without errors.

The Software Update Manager supports you by making a range of checks automatically in the preparation roadmap steps (*Initialization*, *Extraction*, *Configuration*, and *Checks*). To make sure that all requirements are met, run the preparation roadmap steps of Software Update Manager as soon as possible. The successful execution of the preparation roadmap steps is a prerequisite for starting the roadmap step `Preprocessing`.

You can reset and repeat the preparation roadmap steps as often as you need by choosing *Back* before you start the actual procedure in roadmap step *Preprocessing*.

4.1 Checking Pool and Cluster Tables

We recommend to check all pool tables or cluster tables in the source system before the migration.

Context

Several reports are available with which you can check pool tables or cluster tables if

- there are corrupt or initial cluster records
- in a certain table pool the contained pool tables are readable
- the BCD number are correct in a table that you must specify individually

> **i Note**
>
> Note that some reports may have long runtimes for large datasets.

Procedure

Apply the check reports that are described in SAP Note 1784377 .

4.2   BW: Checking RFC Destination into BW client

Ensure that the `RFC` connection from client 000 to the Business Warehouse (BW) client is working.

Context

Check if the RFC destination into the BW client for import post-processing is working. Furthermore, make sure that the user assigned to this destination (usually the BW-user for background processes) is authorized to submit programs of group `SODQADM` for background processing.

Procedure

Authorize the BW background user to execute programs in the authorization group `SODQADM` (authorization object `S_PROGRAM` with field *P_ACTION = BTCSUBMIT* and *P_GROUP = SODQADM*).

4.3   BW: Deleting InfoObject 0BCTCOMP

Check if the `InfoObject 0BCTCOMP` is used.

Context

The `InfoObject 0BCTCOMP` is obsolete in SAP BW. Note that this InfoObject is not delivered anymore with SAP BW 7.30 and higher (no new D version).

Procedure

- If the `InfoObject` is not in use, delete the (active version) using transaction `RSD1`.
- Otherwise, edit the `InfoObject` (active version) in transaction `RSD1` and de-select *short text exists* and *with texts*, save your changes and activate the `InfoObject`.

4.4   BW: Applying SAP Notes

Some SAP Notes related to SAP Business Warehouse (SAP BW) are relevant for the DMO preparation.

Context

The following SAP Notes must be considered:

- 1142427
- 1714734
- 1388287
- 2190948

Procedure

Apply the above-mentioned SAP Notes. For more information, see section *SAP Notes regarding SAP Business Warehouse (SAP BW)* in Required SAP Notes [page 8].

4.5   BW: Using Application-Specific Upgrade Toolbox

If you update an SAP BW system, consider also the application-specific upgrade toolbox (ASU Toolbox).

Context

The ASU toolbox allows you to manage the preparation and follow-up activities you need to perform for the technical update. For more information, see the *Upgrade and Update Guide: SAP NetWeaver* `<Release>` *ABAP* (mentioned in section Other Required Documentation [page 10], and see SAP Note 1000009 as well.

Procedure

Execute the ASU Toolbox before the update using transaction `/ASU/START` and select the appropriate ASU content definition.

4.6 FI/CO: Performing Additional Consistency Checks

To ensure that the source system is consistent, user of Financial Accounting (FI) and Controlling (CO) need to perform some preparatory activities, among others additional consistency checks.

Context

You can perform additional consistency checks before starting the downtime, as well as after the DMO procedure is finished, and then compare the results. You may also see the section *3.2 Product-Specific Preparations* of the *System Copy Guide*, which is mentioned in Other Required Documentation [page 10].

> ⚠ Caution
>
> Make sure that no customer data is changed in the meantime.

Proceed as follows:

Procedure

1. FI: Run job `SAPF190` to perform an additional consistency check.

   Choose ▶ *Accounting* ❯ *Financial Accounting* ❯ *General ledger* ❯ *Periodic Processing* ❯ *Closing* ❯ *Check/ count* ◼. Then choose for
   - classic FI: *Reconciliation*
   - new general ledger: *Reconciliation (New)*
2. FI: You can further check consistency by running the jobs listed below:
   - RFUMSV00 (tax on sales/purchases)
   - RAGITT01 (asset history sheet)
   - RAZUGA01 (asset acquisitions)
   - RAABGA01 (fixed asset retirements)
3. CO: Run the report group `1SIP`

4.7 Oracle: Suppressing Long-Running Phases

If your source database is Oracle, you can suppress long-running phases before you start the update.

Context

During the update with DMO, the following phases can be long-running:

- `EU_CLONE_DT_SIZES`
- `EU_CLONE_UT_SIZES`

In the course of these phases, the system updates the database statistics regarding the usage of space that the tables need on the database. The aim is a better distribution of the tables during the system cloning. Before you start the update, you can suppress these long-running phases using the following procedure.

> ⚠ Caution
>
> It is of the utmost importance to follow the entire procedure. Executing only parts of the procedure results in a longer downtime because the table split algorithm is based on correct statistical data.

Procedure

1. Log on to the host where the Oracle database instance is running.

   Use user `ora<dbsid>` for UNIX system or user `<sapsid>adm` for Windows.

2. Open a command prompt and execute the following command:

   `brconnect -u / -c -f stats -o <schema_owner> -t all -f allsel,collect,space –p 8`

3. Add to file `SAPup_add.par` the following line:

   `/ORA/update_spacestat = 0`

   The file `SAPup_add.par` is located in the subdirectory `bin` of the SUM directory. If this file does not exist yet, create it.

4.8 Oracle: Checking Database Parameterization

If your source database is Oracle, make sure that the database parameterization is properly configured with regard to parameter `parallel_max_server`.

Procedure

Apply SAP Note 936441.

4.9 Oracle: Index-Organized Tables

This section is relevant if you use index-organized table on your Oracle database.

The Database Migration Option is able to work with index-organized tables on source database Oracle. index-organized tables will be split by primary key automatically. There is no special action or preparatory activity from your side necessary.

For more information about index-organized tables, you may see SAP Note 641435.

4.10 Preparing Target Database SAP HANA

Prepare the target database SAP HANA for the SUM with DMO run.

Context

> → Recommendation
>
> Set the log mode for your target database SAP HANA manually to *Overwrite*. Otherwise, the log can overflow because it considers all changes of the migration.

> i Note
> - **Change log mode**
>   Note that a dialog with the option to change the log mode is only available during a normal update procedure, but not during an update procedure with *Database Migration Option*.
> - **Replication scenarios that include the target database**
>   If you want to run a replication scenario that includes the target database, start it at the earliest after the DMO run and not before.

> Before a DMO run is completed, the target database is still in an initial state. As a consequence, replication scenarios in this phase can cause errors.

Procedure

1. Make sure that you have successfully installed an SAP HANA database.
2. Make sure that you are prepared to enter system details and the password of user `SYSTEM`.
3. Make sure that you are prepared to enter the password of your database user, and the name and the password of the database security user as well. If the user SYSTEM is deactivated, the Software Update Manager uses the security user to activate the user SYSTEM for a short time, if necessary, and to deactivate it again afterwards.

4.11 System Move: Preparing Target System Landscape

This preparatory step is relevant, if you want to perform a system move during the SUM with DMO run.

Context

In addition to the required preparation steps in the **source** system landscape (such as providing the `stack.xml` file, getting installation files for the database client, updating SAP Host Agent), you prepare the **target** system landscape to perform a move to a new primary application server (PAS).

For more information about the system move, see .

> ⚠ **Caution**
>
> Make sure that you stop the target SAP system as mentioned in the following procedure.

> **i Note**
>
> If you run SAP HANA and SAP NetWeaver AS ABAP on one server, note that the system ID of the database must not be the same as the system ID of the primary application server (PAS) on the source system landscape.
>
> See SAP Note 1953429 for more information on this scenario.

> **i Note**
>
> Depending on the target product version, the term *SAP target system* in the procedure refers to the following systems:
>
> - SAP Enhancement Package 8 for SAP ERP 6.0 Powered by SAP NetWeaver: SAP system based on SAP NetWeaver Application Server for ABAP 7.5

- SAP S/4HANA 1610: SAP system based on the SAP NetWeaver Application Server for ABAP 7.51 innovation package
- SAP S/4HANA 1709: SAP system based on the SAP NetWeaver Application Server for ABAP 7.52
- SAP S/4HANA 1809 and subsequent versions: SAP system as (full) SAP S/4HANA system

Note that the initial stack is sufficient for the installation of the respective systems.

Procedure

1. Prepare the target database.

   See also Preparing Target Database SAP HANA [page 28].
2. Provide the PAS host in the target system landscape with the same system ID as the PAS host in the source system landscape:
   a. Install the ASCS as SAP target system.
   b. Install the database instance.
   c. Install the PAS as SAP target system.
   d. Stop the SAP system.

   > ### i Note
   >
   > Make sure that the tenant exists. Do not delete it.

3. Provide the database client.

   See also Downloading Latest Database Client Software [page 33].
4. Update the SAP Host Agent.

   See also Preparing SAP Host Agent [page 36].

4.12 System Move: Providing Download Directory for the Target System

For a system move, provide SUM with the complete download directory for the target system.

Context

During the DMO procedure including system move, you are prompted to specify the download directory on the host for the target system. It must contain all files and software packages from the download directory of the

source system. This means that you must have copied the whole content from the download directory on the source system to that on target system before you start the DMO procedure. Proceed as follows:

Procedure

1. Create a download directory on the host for the target system.

   Example for a Unix system: `/usr/sap/<SID>/download`

2. Copy the download directory content from the host for the source system into this directory.

3. After you have started the Software Update Manager with the scenario `DMO with System Move`, provide on request the path to the new download directory.

4.13 System Move: Switching the Operating System

For a system move, execute additional steps in case the operating systems do not match.

Context

If the operating system of the **source** primary application server (PAS) host is different to the operating system of the **target** PAS host, you must execute an additional step after you have copied the SUM directory from the source to the target system landscape.

Procedure

Extract the appropriate SUM archive, which belongs to the operating system of the **target** PAS host, "over" the SUM folder that was copied from the **source** PAS host, so that the SUM executables fit to the operating system and can be started with the operating system of the **target** PAS host.

4.14 System Move: Enabling DMO with System Move

You can move from an old primary application server (PAS) to a new PAS during the SUM with DMO run.

Prerequisites

You have prepared the **target** system landscape as described in

- System Move: Preparing Target System Landscape [page 29]
- System Move: Providing Download Directory for the Target System [page 30]

.

Context

The DMO of the SUM offers the option to perform a system move, that is, a switch from the PAS of the **source** system to a new PAS of the **target** system. To enable the feature, proceed as follows:

Procedure

When the Software Update Manager displays the dialog *Migration Parameters* during the initial dialogs sequence, activate the checkbox *Enable the migration with System Move* in section *DMO with System Move*.

4.15 Requesting Migration Key for Target Database

Make sure that you have a valid migration key for the new target database.

Procedure

Request the migration from the SAP Support Portal at https://support.sap.com/migrationkey .

4.16 Downloading Latest Database Client Software

Make sure that you have the latest client software for your target database.

Context

If you have to install the client software for your target database, proceed as follows:

> ⚠ **Caution**
>
> **UNIX systems other than Linux:**
>
> If you are using a UNIX-based operating system except for Linux, install the SAP HANA database client manually to avoid the error described in section Troubleshooting [page 70]. See in this section the item *The HANA database client installation on HP-UX (and other UNIX-based operating systems except for Linux) fails with an error*.

Procedure

1. Download the software from the SAP Support Portal.
2. Extract the software on the server that runs the DMO.

   SUM with DMO requests the path to the executable `hdbinst`.

4.17 Requesting Permanent SAP License

Make sure that you have a permanent SAP license for your system that will be migrated to the target database.

Context

You can request a new license key from the SAP Support Portal. It is mandatory that you keep your installation number to avoid a secure store migration.

Procedure

1. Download the license key from http://support.sap.com/licensekey↗.
2. Copy the SAP license file to the server that runs the DMO.

   The SUM with DMO will request the path to this license file.

4.18 Preparing Software Update Manager

Make sure that you have the latest version of the Software Update Manager (SUM).

Context

The SUM controls the entire procedure, from checking the system requirements and importing the necessary programs through stopping production operation until production operation is resumed. The procedure is divided up into a number of different roadmap steps. The roadmap steps are in turn divided into individual steps. The successful completion of a step is a precondition for the success of all subsequent steps.

For more information, see the *SUM guide* mentioned in Other Required Documentation [page 10], especially the section ▌ *Running the Software Update Manager* ▶ *Downloading and Unpacking the Software Update Manager.* ▌.

Procedure

1. Download the latest version of SUM from the main Software Logistics Toolset page.
2. Unpack the `.SAR` archive to the defined SUM directory.

4.19 Changing Schema Name

This section is relevant if you want to change the schema name of the target database SAP HANA.

Context

By default, the new database schema and the schema user will be created via `HdbslLib` (a library delivered by SAP) as `SAPABAP<n>`, where `<n>` is the next free number that is found and taken by `HdbslLib`. If required, it is

possible using the file `SAPup_add.par` to define another schema name instead `SAPABAP<n>`. You also have the option to set a schema name without the prefix *SAP*.

> **i** Note
>
> The file `SAPup_add.par` is located in the `bin` directory, `for example on a Unix system in <SUM directory>/abap/bin/`. If it does not exist yet, create it manually.

> **⚠ Caution**
>
> **DMO with System Move**
>
> If you perform a DMO run with *system move option*, make sure that you execute the step 2 described below on the **source** server.

Procedure

1. Extract the SUM archive.
2. After the extraction, add the following line to the file `SAPup_add.par`:
   a. To change the schema name: **/migrate/targetschemasid=<VAL>**

      This line creates the schema name `SAP<VAL>`, where `<VAL>` is the desired identifier. Note that if the specified value `<VAL>` already starts with the prefix *SAP*, the Software Update Manager does not add the prefix *SAP* again.
   b. To set a schema name without the prefix *SAP*:**/migrate/AskTargetDBUSER=1**

      This line causes the Software Update Manager to open a dialog during the update procedure in which you enter the wanted schema name. Note that *SAP* will not be prefixed automatically to this name.

      > **i** Note
      >
      > If both commands mentioned above are added to `SAPup_add.par`, the Software Update Manager creates first the target schema name `SAP<VAL>` and displays it in the described dialog. Here, you can change the name again.

4.20 Preparing SAP Host Agent

This section covers the `SAP Host Agent` tool in combination with the SUM so that the SUM UI and the SUM work properly.

Context

To ensure that the SAP Host Agent runs correctly, proceed as follows:

Procedure

1. Make sure that you have installed on all application servers instances the latest version of the SAP Host Agent.
2. Register SUM in SAP Host Agent **before** you start SUM with DMO.

   For more information, see in the *SUM Guide*: ▶ *5 Running the Software Update Manager* ❯ *Registering SUM in SAP Host Agent* ❯ .

4.21 Downloading Files from Maintenance Planner

Download the files calculated by the SAP Maintenance Planner that are necessary for the update.

Context

The *Maintenance Planner* supports the download of a consistent queue that includes all necessary support packages and enhancement packages. In addition, it calculates a valid import queue for the selected SAP system and generates the stack configuration file `stack.xml`. In the `Select Target` phase of the SUM, you enter the path to the stack configuration file.

Procedure

1. In the *Maintenance Planner*, select for the download the following options:

   ○ SAP Kernel

> **i Note**
>
> - The `SAPEXEDB` archives for both target database and source database are not selectable and will be downloaded automatically.
> - When you select the kernel files using *Maintenance Planner*, consider that you have to select the kernel files of the target software release for both the source database and the target database. The reason is that the system creates the shadow instance for the target software release on the existing source database first and then copies it to the target database.
> - We recommend using the path `/usr/sap/<SID>/download` to store the required files. Alternatively, you could create a symbolic link.
> - **Additional kernel components**
>   Make sure that you have selected all necessary kernel components, such as the `IGSEXE.SAR` file, in the Maintenance Planner. Currently, the Maintenance Planner does not calculate these files automatically.

2. Upload the following files to a folder on the application server on which you run the Software Update Manager (typically, this is the primary application server):

   - The files calculated by *Maintenance Planner* including kernel for the source and target database
   - `stack.xml` file
   - Target database client for the required operating system

> **i Note**
>
> **Additional SPAM files might be required:**
>
> The *Maintenance Planner* only offers the latest `SPAM` version for the target software release.
>
> If the Software Update Manager prompts you during the `SPAM` version check to import the latest `SPAM` update for your source release, download the latest `SPAM` version for the current software release manually and extract the files to the directory `/usr/sap/trans/EPS/in`. Afterwards you confirm the directory in the dialogue so that SUM can find and check this `SPAM` version.
>
> If the latest `SPAM` version for the source release is already in the download directory before the update, the Software Update Manager will extract the files automatically

4.22 Testing Update and Migration

Before your start the actual update and migration procedure for your productive system, it is necessary and highly recommended that you carry out DMO test runs.

Context

The aim of these DMO test runs is the optimization of the various parameters (such as the R3load processes) and the determination of the expected total length of the update and migration procedure of your productive system.

Procedure

Perform at least one update and migration procedure of an SAP system for testing purposes with a similar set of data, ideally with a system copy of your production system.

5 Running the Software Update Manager

This part of the document provides information about the update and migration procedure using SUM with DMO.

The Software Update Manager controls the entire procedure, from checking the system requirements and importing the necessary programs through stopping production operation until production operation is resumed. The procedure is divided up into a number of different roadmap steps. The roadmap steps are in turn divided into individual steps. The successful completion of a step is a precondition for the success of all subsequent steps.

This section describes features and DMO-specific actions during the different roadmap steps. In addition, you receive information about the `Reset`-option in the SUM with DMO and the built-in Table Comparison tool.

If your target database is SAP HANA, consider also the information about the Landscape Reorganization [page 55].

> **i Note**
>
> All required planning and preparation actions must be completed.

5.1 Reset Option

The Software Update Manager offers the option to reset the update, that is, to undo all changes that have been made in the system during the update procedure.

The reset option is described in the *SUM guide* (see Other Required Documentation [page 10]) in section ⫽ *Running the Software Update Manager* ⟩ *Resetting the Update* ⟩.

When you use the *Reset* functionality in the built-in database migration option, SUM revokes all update and migration activities that are carried out the point in time you start the reset. Furthermore, it re-establishes the connection to the source database.

To perform this reset procedure, SUM offers in every roadmap step a *Reset* option in the *More* menu. This means that you can carry out the reset at every step of the update and migration procedure, even during or after the Business Downtime.

The system is not only reset to run on anyDB afterwards, but completely reset to its status before the update and migration procedure was started. You can then start the update and migration with the SUM again.

Note that after you have chosen the *Reset*-button, a *Confirmation* dialog box appears first to prevent an unintended reset.

> **⚠ Caution**
>
> - **Prerequisites**
>   To carry out the reset, it is required that

- ○ anyDB is still available
- ○ the SUM directory is not cleaned up
- **Limitations**
  - ○ Target database client is not deleted from `PAS/AAS` automatically
  - ○ BR*tools are not restored
  - ○ User `DBACOCKPIT` and related roles are not deleted in target database
- **No Reset possible after Cleanup**
  After the update and migration procedure comes to an end, the Software Update Managers offers in addition to *Reset* the option *Cleanup*. Note that after a cleanup, a reset is not possible anymore. For example, you cannot carry out a manual reset on operating system level (as described in SUM guide) after a cleanup.
- **ASCS Instance Move**
  If you use the `ASCS Instance Move` feature in addition, and you reset the procedure, you must restart the `SAP Startservice` of the ASCS instance from the remote application server **manually**. For more information, see the chapter *ASCS Instance Move* in the *SUM guide*.

---

i Note

SAPup processes after a successful DMO run or a reset

After the update procedure has been performed successfully, SUM displays an appropriate information in the web browser window. Afterwards, you have to stop the Software Update Manager - as described in the SUM Guide in section ▶ *Running the Software Update Manager* ▶ *Stopping the Software Update Manager* ▶ - to terminate all remaining `SAPup` processes on operating system level.

This also applies after a reset and the subsequent cleanup in case you do not want to continue the update.

Only valid for 'OS Family': UNIX and Linux

i Note

Access rights on source database Oracle

After a successful reset, the "old" SAP kernel is re-enabled. As a consequence, you have to adapt the access rights on the Oracle database again. Call the script `oraroot.sh` with the options SID and oracle user as follows: **`oraroot.sh <SID> <oracle user>`**. Example: **`oraroot.sh XYZ oracle`**. The script is provided together with the SAP kernel.

End of 'OS Family': UNIX and Linux

5.2 Reset Option During System Move

There are two ways to reset a DMO with System Move: You can either perform a reset on the source system or on the target system. However, this is not as smooth as the normal reset option, as some special features have to be taken into account.

As described in Performing DMO with System Move [page 16], you can run an update with database migration including a move of the primary application server (PAS) from source to target system ("*DMO with System Move*").

However, this also means that you have two systems with one SUM directory each: A source system with a SUM directory, and a target system with a SUM directory, which has been copied from the source system during the *DMO with System Move* procedure. Remember that the procedure can be divided roughly in 3 steps:

1. The Software Update Manager starts the procedure on the PAS of the source system and executes the first part, including the export of the database content into files.
2. The source system goes into the downtime, and the SUM directory is transferred to the target system.
3. The remaining part of the procedure happens on the target system that changes in the subsequent procedure from downtime to uptime for productive use.

Since there are basically two systems after the physical shipment of the database content and the SUM directory, it is possible to perform a reset either on the source system or on the target system. However, this does not work as smooth as the normal reset option as described in Reset Option [page 39]. A reset must be well considered and prepared, because there are special features to consider.

> ⚠ Caution
>
> Before you perform a reset, either on the source or the target system, make always sure to have a backup of the SUM directory of the source system!
>
> The backup is at least required for the reset on the target system to ensure a SUM directory that corresponds to the desired initial state for the target system. If you finish the procedure on the source system and continue on the target system and simultaneously reset the source system, you no longer have a SUM directory that has the necessary initial state for the target system. As a consequence, you cannot start the migration procedure on the target system again after a reset of this system.

Reset of source system

If you perform a reset on the source system, it is reset to the status before the downtime started. In addition, almost all shadow system artifacts are deleted.

We strongly recommend that you only perform a reset of the source system in the following cases:

- on a test system for test purposes
- you want to continue working productively on the source system
- the migration to the target system failed, or the target system is discarded

Note that after the reset you must start the complete *DMO with system move* procedure from the beginning. It is not possible to only enter the downtime again.

Reset of target system

The target database has been installed using the *Software Provisioning Manager* (SWPM) tool. (For more information, see the SAP Support Portal at https://support.sap.com/sltoolset🔗, tab ▶ *System Provisioning* ▶). However, the reset option of SUM does not restore the target database to the initial state after the installation with SWPM. This means that you cannot use the reset option of SUM for the target system during the `DMO with System Move`. Instead, delete first, among other things, the target database, and the operating system user. Afterwards, reinstall the target database using the SWPM.

This has the effect that the SUM directory no longer has its original state. As a consequence, you cannot restart the migration process on the target system immediately after the reset.

First delete the SUM directory on the target system. Then copy the backup of the SUM directory of the source system to the target system. This ensures a SUM directory with the required initial state.

After copying the backup, you can restart the procedure on the target system.

5.3 Roadmap Steps with DMO features

5.3.1 Initial Dialogs

By means of a dialog sequence at the beginning, the Software Update Manager collects the needed information for the wanted scenario to get the roadmap.

In the first dialogs, you specify the scenario category. That is, you decide if you want a scenario with or without `stack.xml` configuration file, and what kind of scenario (such as release upgrade, system conversion, or DMO without System Update). If you plan a scenario with `stack.xml` configuration file, you have to provide the path to the download directory with the `stack.xml`.

In a next step, the Software Update Manager checks the database of your source system. If it is not SAP HANA database and the database migration is not mandatory, a dialog prompts you to decide between a database migration to SAP HANA or to SAP ASE database. The dialog also appears when you want to perform the scenario *DMO without System Update*. When you selected a scenario category with `stack.xml` configuration file, you can also decide to keep the existing database.

Depending on the scenario category and the decision on DMO, you can select the scenario strategy, such as *Standard* or *Downtime-Optimized*.

Subsequent dialogs deal with

- additional parameters concerning archive authenticity, expert mode, or customer transports
- migration parameters concerning table comparison, migration key, migration repetition, system move
- configuration of benchmarking tool or table comparison check tool

5.3.2 Extraction

In this roadmap step, SUM extracts the required software.

The following actions are carried out:

- Provision of passwords for `DDIC` user and database user in the source system
- Check of relevant tool and system parameters

DMO-specific actions:

- Provision of target database type and the migration key
- Decision about Using the Migration Repetition Option for Testing [page 53]

- Decision about the option `Table Comparison with SUM` (see Table Comparison [page 52])
- Decision about the landscape reorganization for SAP HANA scale-out (see Landscape Reorganization [page 55])
- Implementation of SAP Notes required by SUM

> **i Note**
>
> During the update and migration procedure, SUM works with two kernel sets:
>
> - One kernel set for the source database. It is located in folder `SUM\abap\exe`
> - One kernel set for the target database. It is located in folder `SUM\abap\exe_2nd`.
>
> This can be relevant in case you want to check whether the existing version after SUM has extracted the kernel. If the tool asks you to provide a newer kernel version, copy it into the download folder.

Further features:

- The SUM UI can be accessed concurrently by several users. However, it is not possible to define different roles when using the URL of the SAP Host Agent.
- In the phase `PREP_PARSETUP/CHECK4NOTES_TOOL`, SUM displays a list of SAP Notes that are prerequisite for a successful update.
- To transport SAP Notes that cannot be implemented using the SAP Note Assistant (SNOTE), use the report `SCWN_TRANPORT_NOTES` as described in the SAP Note 1788379 or in the SCN blog *Provide SAP Note for SUM by transport, not SNOTE*

Related Information

SCN blog: Provide SAP Note for SUM by transport, not SNOTE

5.3.3 Configuration

In this roadmap step, SUM asks for all information required to run the update with DMO.

The following actions are carried out:

- Configuration of processes and other performance relevant parameters

DMO-specific actions:

- Provision of connection parameters and users of the target database
- Installation of target database client on the DMO host

> **i Note**
>
> If you encounter problems with the installation of the client, you can install it manually. Make sure that you use the correct directory for the installation.

- Extraction of kernels for both the source and the target databases
- Upload of additional packages, customer transport requests, and modifications

Further features:

- When you execute a migration to the target database, select either the *Standard* or *Downtime-optimized* scenario strategy in the initial dialogs of SUM. The option *Single System* is not intended for DMO. For more information about the options, see in the *SUM Guide* the section ▶ *Planning* ▶ *Initial Dialogs for the Specification of the Scenario* ▶.

- The number of `R3load` processes, which you can set in the phase `PREP_CONFIGURATION/INITSUBST`, is the only visible parameter that affects the migration performance in the downtime. Note that you can configure the number of processes dynamically at a later point in time.

- In the new DMO-specific phases, you provide connection data and user credentials for the target database.

- In the phase `PREP_CONFIGURATION/SUBMOD_MIG_CONFIG/HDB_INSTCLIENT`, you provide details required for the installation of the target database client.
  Note that you need root credentials to install the database client.

5.3.4 Checks

In this roadmap step, SUM checks if your system fulfills the requirements for the update and migration procedure (for example, whether the required free space is available).

The following actions are carried out:

- Calculation of the space for the shadow system
- System health checks (such as `nametab`, `transport system`)
- Checks of relevant tool and system parameters

Further features:

- In the phase `MIG2NDDB_HANA_BW_PARAMS`, which is relevant for the usage of specific reports related to SAP BusinessObjects Business Intelligence (BI), you provide parameters for SAP BW-specific cleanup tasks. This includes
  - temporary BW query bookmarks
  - sent BW query bookmarks
  - BW traces
  - BW statistics

- Temporary database space, which is required for the shadow system and is calculated during the execution of the roadmap step `Checks`, is too generous.
  You can use the command **`<SUM directory>/abap/bin/SAPup dmpspc`** to check the used space at different points of time.

- If you perform a conversion to SAP S/4HANA 1909 or a higher version, the recommended security profile parameters of the SAP kernel are automatically written and stored in the default profile file

  Only valid for 'OS Family': Windows
  ```
  \DIR_PUT\sapnames\prod\DEFAULT.PFL
  ```
  End of 'OS Family': Windows

  Only valid for 'OS Family': IBM i, UNIX and Linux
  ```
  /DIR_PUT/sapnames/prod/DEFAULT.PFL
  ```
  End of 'OS Family': IBM i, UNIX and Linux

  of the target system according to SAP Note 2926224 . You are informed in a dialog on the SUM UI that you can opt out from this feature and therefore skip the setting of the security parameters. This is, however, not recommended and only necessary for compatibility reasons.

5.3.5 Preprocessing

In this roadmap step, SUM creates the shadow system.

The shadow system is then used for various update activities while you can still use the original system in production operation. The SUM builds up the shadow system by cloning parts of the original system. All tables of the SAP NetWeaver Application Server are needed as shadow tables to operate the shadow system.

The shadow system is used to perform the modification adjustment of the ABAP Dictionary objects and the activation of new ABAP Dictionary objects that are part of the update. Finally, the Software Update Manager performs the shadow import and writes directly into the shadow tables.

Modifications to the contents of the original tables are indicated by triggers. These tables are copied and imported during downtime.

The following actions are carried out:

- Checks for locked objects
- ABAP Workbench locking

> **i Note**
>
> In contrast to the standard upgrade procedure, the Software Update Manager offers during the release upgrade with DMO a second phase `LOCKEU_PRE` to lock the ABAP Workbench. Thus, you can lock it either in phase `LOCKEU_PRE` or in phase `REPACHK2`, in which you have to perform the step at the latest.
>
> If you confirm the lock already in phase `LOCKEU_PRE`, the Software Update Manager does not stop in the `REPACHK2` phase to allow you to confirm the lock on the ABAP Workbench. This increases the time in which the Software Update Manager does not need user input after the last request for a mount directory.
>
> Furthermore, you may not perform any more transports into or out of the SAP system.

- Running the shadow system for preparation of new release (`ACT_UPG`, `PARDIST`, `SGEN`)
- (and subsequent to the following DMO-specific actions:) Transition to the downtime (system isolation)

DMO-specific actions:

- Uptime migration: Repository
- Execution of `SMIGR_CREATE_DDL`
- Execution of phases related to SAP Business Warehouse

Further features:

- In the phase `MIG2NDDB_HANA_BW_PARAMS`, provide parameters for SAP BW-specific cleanup tasks.
- Temporary database space, which is required for the shadow system and is calculated during the execution of the roadmap step `Checks`, is too generous.
  You can use the command **`<SUM directory>/abap/bin/SAPup dmpspc`** to check the used space at different points of time.

> **i Note**
>
> If the Software Update Manager stops in phase EU_CLONE_MIG_UT_RUN, for example due to an error, the option *Init* does not restart the whole data migration from the beginning. The Software Update Manager

considers the status of the `TSK`-files for the restart of the failed export processes. The `TSK`-files are located in the SUM directory and here in the subdirectory ▶ *abap* ❭ *load* ❭ *migrate_ut_run* ❭.

> ⚠ Caution
>
> **Database Backup**
>
> During the preparation of the SAP System for downtime (phases DOWNCONF*), SUM stops and prompts you for backup of the complete upgrade directory including all its subdirectories. Make sure that you also carry out a backup of both the **source** database and the **target** database!

5.3.6 Execution

In this roadmap step, the switch to the target system takes place.

The SUM completes the copy import action during downtime for all tables with set triggers. The `EU_SWITCH` phase completes the switch to the new system. All tables prepared in the shadow system are copied to the target system. The `KX_SWITCH_1` phase switches the SAP kernel. The `PARCONV_UPG` phase converts the application table, and the phase `TABIM_UPG` imports the remaining data. Finally, the `XPRAS_AIMMRG` phase starts the `XPRAS` required by the system.

The following **DMO-specific actions** are carried out:

- Migration of application data
- Repository & kernel switch
- Adoptions of structures to new release (phase `PARCONV`)
- Main import (phase `TABIM`)
- `XPRAS`

Further features:

- Migration of application data from source database to target database
- To change the number of `R3load` processes dynamically, use the following commands:
  cd <SUM directory>/abap/bin
  ./SAPup set procpar gt=scroll
- Consistency of the migrated content is checked by the command `COUNT(*)` on each table in the source and the target database
- Time estimation for the overall process and for long-running phases is written to the file `<SUM directory>/abap/log/SAPupStat.log`

> i Note
>
> If the Software Update Manager stops in phase EU_CLONE_MIG_DT_RUN, for example due to an error, note that the option *Init* will not restart the whole data migration from the beginning. The Software Update Manager takes into acount the status of the TSK-files in the SUM directory `migrate_dt_run` for the restart of the failed import processes.

5.3.7 Postprocessing

In this roadmap step, SUM saves the log files and prompts you to start certain follow-up activities.

The following actions are carried out:

- Cleanups
- Transaction `SPAU`
- Transport unlock

DMO-specific actions:

- Phases related to SAP Business Warehouse (SAP BW)
- Runtime evaluation

Further features:

- `Postprocessing` includes several SAP BW-specific phases
- Evaluation of the update and migration process is written to the file `<SUM directory>/abap/doc/UPGANA.XML`. To display this file in a human-readable form, store the file `UpgAnalysis.xsl` in the same directory.

> **i Note**
>
> The *SUM Analysis* utility visualizes the `UPGANA.XML`. You can access *SUM Analysis* in the SUM Utilities, which you can can open via the *More* menu on the SUM UI menu bar.

5.4 Special Features for DMO

5.4.1 SUM Utilities for DMO (Extended UI)

The *Utilities* menu item of the menu *More* of the Software Update Manager offers you some DMO-related utilities.

In the upper-right corner of the SL Common UI, you find the menus *Legend*, *More*, and *Help*. The *More* menu contains among other things the item *Utilities*, which opens a new window with an extended user interface (extended UI). It offers you several options to configure or monitor the current update procedure. And it contains also various utilities that are only relevant for the DMO execution.

During the steps `Migration Preparation` and `Execution`, to be more precise during the EU_CLONE* phases, the Software Update Manager creates several statistic files and stores them into the `doc` subdirectory. The extended UI allows you to visualize these generated statistic files using the SAPUI5 functionality.

> **i Note**
>
> Be aware that some options of the *Utilities* can only be used during the update procedure if the corresponding data is available in the system.

DMO Migration Preparation

This option offers provides you with visualized information regarding the migration preparation during the uptime. All visualizations are based on statistic files that are stored in directory `SUM/abap/doc/analysis` and generated during phase `EU_CLONE_MIG_*_PRP`.

Table Sequence	After the phase `EU_CLONE_MIG_*_PRP` has been completed, this view displays the final sequence of all tables which will be migrated during uptime and downtime. The graph shows two bars for each table: • One bar represents the real table size in Megabyte (MB). • The other bar represents the estimated migration time for this table in seconds, determined automatically based on the duration file from the previous run (see also Performance Optimization with Migration Duration File [page 19]). The Software Update Manager considers for the calculation the table size and the migration time of the previous migration run, and the current table size as well. You can click a column in the chart to open a popup with information about the name and the size of the table.
Table Splits	During the migration, several R3load processes run in parallel. All tables are distributed to these R3load processes (process slots). Some of the tables are split to avoid a process tail. This view shows the result of the table distribution to the R3load processes. The green bars represent the tables that were distributed during the migration. This visualization helps you understand the result of the table split algorithm and find out exactly which table was split. You can click a table to open a popup window with information about the selected table.

DMO Migration Post Analysis

This option offers provides you with visualized information regarding the migration execution after the migration phase `EU_CLONE_MIG_*_RUN` has been completed successfully.

Tail Viewer (R3load Processes)	Shows the number of running R3load processes depending on the time. You can see the migration duration, and you can verify if all processes run in parallel for the complete migration time. This view might be a good indicator in terms of evaluating the parallelization.

Bucket Viewer (R3load Statistics)	During the migration preparation, the SUM prepares a sequence of several buckets that are processed by R3load processes. This view visualizes the R3load bucket statistic, such as migration time per bucket, number of rows per bucket, or CPU usage per bucket. You can click a bar in the bar chart to see the CPU usage (*real, usr, sys time*) of one bucket. Furthermore, you can click the chart legend label *Export* or *Import* to see the aggregated CPU usage.
Duration Viewer (Table Durations)	Displays information about the real migration time of long running tables and when such a table was processed during the migration. This view also visualizes the generated durations file. By clicking on a table, a popup window appears that provides information about the selected table.

5.4.2 System Move: Data Transfer

During the SUM with DMO run including system move, you transfer the SUM directory data to the target host using either a serial or parallel transfer mode.

During phase `HOSTCHANGE_MOVE_SOT`, SUM displays the dialog *DMO with System Move: Data Transfer*. This is the first point in time to trigger the SUM directory content transfer from the source system landscape to the target system landscape.

Only valid for 'OS Family': UNIX and Linux

> → Recommendation
>
> Linux only: We recommend using the `rsync` utility, if possible.

End of 'OS Family': UNIX and Linux

> i Note
>
> To avoid that SAP Host Agent cannot start the `SAPup` later on, keep the following in mind:
>
> 5444ys.öbgd5408
>
> - Do not use user `root` to transfer the SUM folder, use the `<sid>adm` user instead.
> - The SUM directory must not exceed 25 characters. You may use a symbolic link.

For the data transfer, you can choose between the serial and the parallel transfer mode.

> ⚠ Caution
>
> We strongly recommend using the parallel mode, at least for the serial mode. The shadow operations take a long time, and for the serial mode they are executed during downtime.

Serial data transfer mode

If you opt for the serial data transfer in phase `HOSTCHANGE_MOVE_SOT`, you can choose *Next* to continue with the DMO procedure on the source host. SUM exports then all files to the file system. As soon as SUM reaches the phase `HOSTCHANGE_STOP`, you are prompted to manually transfer at once the SUM directory including all files to the target host. After the transfer, you can continue with DMO procedure on the target host. See below a graphical overview of the *DMO with System Move* and serial data transfer mode:

Overview: DMO with System Move (sequential mode)
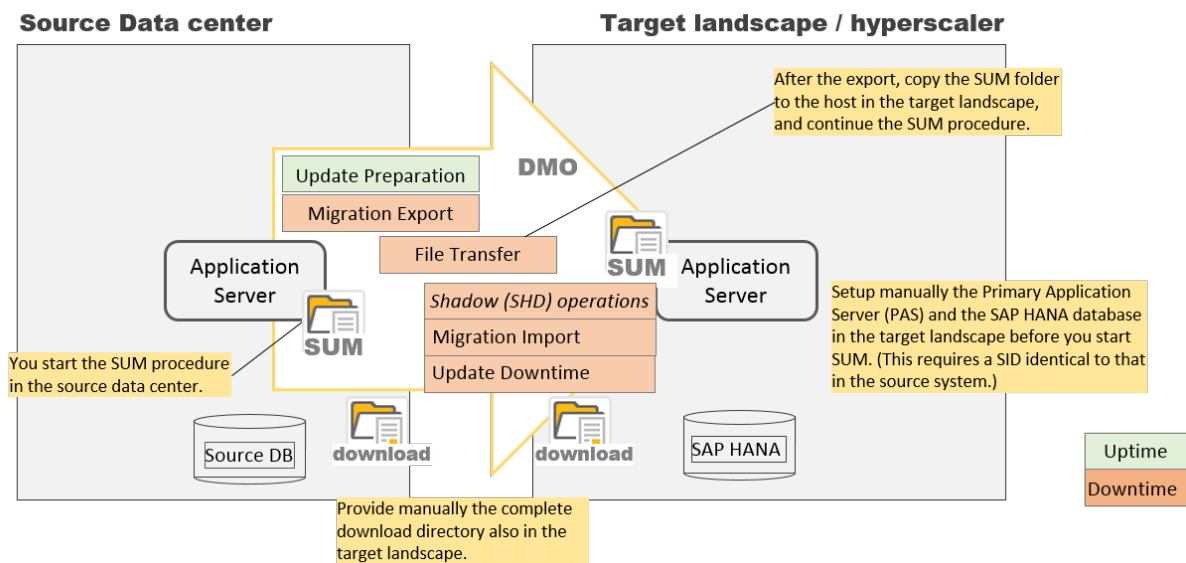
Parallel data transfer mode

If you opt for the parallel data transfer in phase `HOSTCHANGE_MOVE_SOT`, transfer the SUM directory including all files to the target host. Then you continue the DMO procedure on the source host. SUM starts to create export files that you copy to the target system.

Meanwhile, you start SUM with DMO on the target host in parallel to the current SUM with DMO procedure on the source host. The SUM in the target system landscape starts the import of the copied files, while other export files are still being created on the source system. This means that one `SAPup` executable on the source system landscape works (export) parallel to one `SAPup` executable on the target system landscape (import).

In addition, you have to synchronize manually directories that are listed on the dialog *DMO with System Move: Data Transfer* in phase `HOSTCHANGE_MOVE_SOT`. Flag files are used to notify the `SAPup` in the target system landscape about which files are ready to be imported.

You can continuously synchronize the directories. Perform a final synchronization, as soon SUM has reached the phase `HOSTCHANGE_STOP`.

> **i Note**
>
> The directories named `*crc*` are only existing if you have chosen to use Table Comparison [page 52]: The
> Software Update Manager uses from the directory ▶ *<SUM directory>* ▶ *abap* ▶ *load* ▌ the

> subdirectories `migrate_dt_crc` for a table comparison on all tables, and `migrate_dt_crclst` for a table comparison on selected tables only.

See below a graphical overview of the *DMO with System Move* and parallel data transfer mode:

Overview: DMO with System Move (parallel mode)
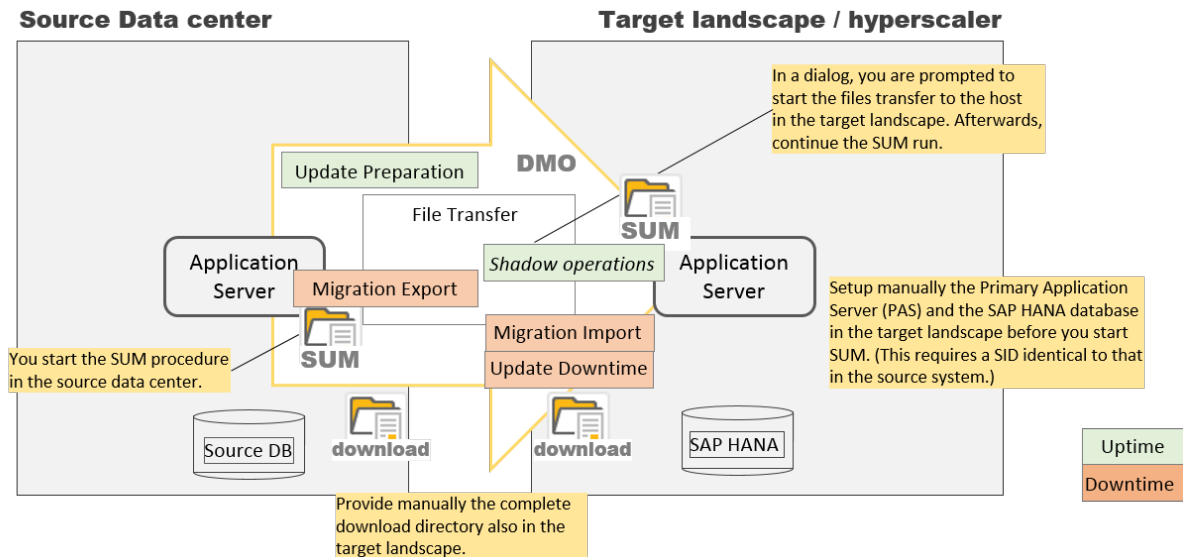
Only valid for 'OS Family': UNIX and Linux

Linux only: Parallel data transfer mode using a script

The SUM provides you with the script `dmosystemmove.sh` for an automatic transfer of the files. For it, enter the target host name in the appropriate field of the dialog *DMO with System Move: Data Transfer* in phase `HOSTCHANGE_MOVE_SOT`.

> ⚠ Caution
>
> Preconditions to use the script:
>
> - The operating system on the source host and the target host are identical
> - You use the utility `rsync` with version 3.0 or higher
> - You have established a connection with user <sid>adm using the secure shell (`ssh`) network protocol as follows:
>   1. Set up a password free `ssh` connection and generate a key on the source PAS host with the command **`ssh-keygen`**. Do not enter a password for the key.
>   2. Transfer the key from the source PAS host to the target PAS host with the command **`ssh-copy-id <targethostname>`**.
>   3. Test the login from the source host to the target host with the command *ssh <targethostname>*.
>   4. The script executes first a full transfer of the SUM directory, then a continuous transfer of the subsequent changes. You can check it in the log files `DMOSYSTEMMOVEFULL.LOG` or `DMOSYSTEMMOVE.LOG`.

> Note that the steps above are intended only as examples. You can use different type of keys. Consult the `man` page for further details.
>
> If you do not carry out the setup above, you must not fill in the field *TARGET HOSTNAME*! In this case, transfer the files from source PAS host to the target PAS host manually.

End of 'OS Family': UNIX and Linux

5.4.3 Table Comparison

This section covers the built-in Table Comparison tool.

After the migration of tables in both the uptime and the downtime, SUM compares with the function `Table Comparison with SUM` based on calculated checksums the content of target database tables with the table contents on the source database. In a dialog in roadmap step `Extraction`, SUM offers the following options:

- *Do not compare table contents*
- *Compare the content of all tables*
- *Compare only the content of selected tables*

The last option offers the possibility to check and compare the table contents of certain tables only. If you choose this option, you are prompted afterwards to enter the location of the file that includes the table names to be checked.

The comparison of the tables run in parallel processes. The number of the processes is defined by the number of `R3load` processes that you set in the configuration dialog in phase `PREP_CONFIGURATION/INITSUBST`.

> → Recommendation
>
> Note that the scope of the selected tables influences the runtime of the subsequent phases. That is, the more tables have to be compared, the longer are the affected phases during uptime or downtime.
>
> To avoid in particular a long downtime, we strongly recommend comparing the content of selected tables only, such as important application tables. We also highly recommend executing the table comparison not on the productive system but on a separate system such as a test system or a copy of the productive system.

The function `Table Comparison with SUM` calculates after the migration the checksum for an entire table on both the target database and the source database and compares the values. If the values are not equal, SUM displays an error message depending on uptime or downtime

- either in the `Preprocessing` roadmap step in phase `MAIN_SHDIMP/SUBMOD_MIG_UPTIME_RUN/ EU_CLONE_MIG_UT_CRC_RUN`
- or during the `Execution` roadmap step in phase `MAIN_SWITCH/SUBMOD_MIG_SWITCH/ EU_CLONE_MIG_DT_CRC_RUN`

In parallel, the system generates an LST-file, which informs you about the affected tables, the possible fixing or ignoring options and their consequences during the `Repeat` phase. The location of the file is displayed in the dialog, which accompanies the error message.

In case of errors, SUM offers you the following options:

1. Exit the program.
2. Fix the errors in the affected tables on the target database. You can fix
   - all errors
   - the severe errors only and accept the non-severe errors

   Afterwards, you repeat the phase so that the table comparison runs again and the phase continues at the point it stopped.
3. Fix the errors in the affected tables on the source database. Afterwards, you initialize the phase to restart it from the beginning. The tables will be migrated and checked again.

> ⚠ Caution
>
> - The function `Table Comparison with SUM` is only available for update and migrations procedures with Unicode SAP systems.
> - This function is only intended for SAP tables that belong to the ABAP dictionary. Other tables such as system catalog or database schema tables will not be processed.
> - This migration tool mode is similar to the stand-alone migration tool Table Comparison, which is described in section Table Comparison [page 63]. However, while this function can be part of the update and migration procedure dependent on your decision in roadmap step `Extraction`, the stand-alone migration tool Table Comparison is designed for other tools such as the System Copy procedure.

5.4.4 Using the Migration Repetition Option for Testing

The option *Migration Repetition* allows the repetition of the downtime migration for testing purposes.

Context

To optimize the SUM with DMO procedure, it is necessary to manually adapt some parameters such as the number of `R3load` processes to the performance of the application server, and to repeat the migration afterwards. However, the Reset Option [page 39] only allows the reset of the complete procedure. This means that all check and preprocessing phases will have to be passed again during the next run.

The option to jump back to the beginning of the downtime migration offers a fast test cycle by repeating the downtime migration phase only. This way, the repeated migration will start from the beginning with the number of R3loads you detected as optimum. In addition, SUM will consider the table duration files from the previous run for the table split calculation automatically (see for more information: Performance Optimization with Migration Duration File [page 19]).

> ⚠ Caution
>
> Use this option for test migrations only and not for any productive run, since the procedure will stop during the downtime.

You deal with the *Migration Repetition* option in the following dialogs during the run:

Procedure

1. Dialog *Migration Parameters* during the initial dialogs sequence after the start of the Software Update Manager:

   You select in this dialog in section *Migration Repetition Option* the option *Enable migration repetition option*. As a result, SUM stops after the downtime migration phase and displays an additional dialog that allows you to repeat the downtime migration (see step 3).

2. Dialog *Preparations for Downtime* (phase `DOWNCONF_DTTRANS`)

   If you have enabled the *Migration Repetition Option*, this dialog displays an additional warning that the SUM will stop after the downtime migration phase and allows you to repeat the phase. Be aware that you must not use this option for a productive run.

   > **i Note**
   >
   > if you want to disable the option now, set the following parameter in the file `SUM\abap\bin\SAPup_add.par`:
   >
   > **/migrate_option/OPTIMIZECLONING = 0**
   >
   > The file `SAPup_add.par` is located in the subdirectory `bin` of the SUM directory. If this file does not exist yet, create it manually.

3. Dialog *Test cycle* (after phase `EU_CLONE_MIG_DT_RUN`)

   If the *Migration Repetition* option is still enabled, SUM displays the dialog *Test cycle* after the downtime migration phase in which you are asked if you want to repeat the phase.

   Select *Yes*, if you want to initialize the downtime migration again and repeat it. As long as the *Migration Repetition* option is enabled, this dialog is shown after the downtime migration again and offers the possibility of another test cycle, if desired.

   Select *No*, if you want that the DMO run continues without any additional dialogs or steps related to the test cycle.

5.4.5 Targeting SAP HANA Multitenant Database Containers

You can also choose as target database an SAP HANA system that supports SAP HANA multitenant database containers (SAP HANA MDC).

Context

If you target to an SAP HANA database with SAP HANA MDC option, the Software Update Manager offers a special sequence of dialogues to prepare the migration to that SAP HANA system.

> **i Note**
>
> **Database ID of tenant restricted to 3 characters**
>
> During the DMO run, SUM collects connection information to the SAP HANA database using the dialog *SAP HANA Database or Database Tenant*. However, the requested database ID (that is, the database name of the tenant) is restricted to 3 characters. This means that you can only use a tenant with a 3 characters long database name.

Procedure

1. Enter the target Hostname of an SAP HANA database that supports SAP HANA MDC.

   In the dialog *Database Migration Initialization*, you enter in the field *Target Hostname* an SAP HANA database that supports SAP HANA MDC. Furthermore, you enter here the system-ID, the instance number, and the database schema of the target database.

2. Decide for the automatic creation of the tenant.

   If the given system-ID of the target database does not exist, the dialog *MultiDB Tenant Creation* appears. You have now the option to choose *Create Tenant* with the result that the tenant will be created automatically during the migration.

   The second option *Do not create tenant* brings you back to the dialog *Database Migration Initialization*.

3. Enter the password for the SAP HANA MDC superuser `SYSTEMDB`

   To enable the creation of the tenant, it is necessary to authenticate with the password for the SAP HANA MDC superuser `SYSTEMDB`.

4. Enter the new password for the tenant database user `SYSTEM` and confirm it.

5. Continue with the update and migration procedure.

5.4.6 Landscape Reorganization

If you run an SAP HANA scale out landscape as a target for a migration of SAP BW powered by SAP HANA, you can perform a landscape reorganization.

You can enable the landscape reorganization in phase `HDB_MIGCONFIG` during the preprocessing phases of the migration. If you decide not to run the SAP HANA landscape reorganization, which is usually the case for SAP ERP or SAP S/4HANA, SUM performs the phases for the scale up scenario.

If you run SAP HANA 1.0 with SPS 10 or higher, the SQL-files for the SAP HANA table placement are loaded and executed automatically without a dialogue. You can disable this automated load of table placement SQL-files in phase `HDB_MIGCONFIG` and run the same dialogs as for SAP HANA 1.0 SPS 09 in case you have to modify the SQL-files delivered by SAP.

SAP HANA scale out

The scale out scenario means the deployment of multiple server nodes in case memory requirements exceed the available memory of a single server node after the migration to SAP HANA database. For this, several phases are carried out during the SUM with DMO run.

If your SAP HANA version is SPS 09 or lower, you have to perform the following manual phases:

- `REQ_LANDSCAPE_REORG`
  In this phase, SUM prompts you in a dialogue to import an SQL-file from SAP Note 1958346 into the database.
- `REQ_LANDSCAPE_REORG_2`
  In this phase, SUM prompts you in a dialogue to import an SQL-file for SAP BW powered by SAP HANA from SAP Note 1908075 into the database.

> **i** Note
>
> Scale out scenarios with multiple worker nodes to scale memory are not yet generally released for **SAP Business Suite on HANA**. It is recommended to scale up memory by using a hardware configuration that maximizes the available database memory. For more information, see the SAP Notes 1774566 and 1825774 .
>
> For more information about the scale-out scenario for SAP S/4HANA, see SAP Note 2408419 and the guide *SAP S/4HANA Scale-Out* that is attached to this SAP Note.

If your SAP HANA version is SPS 10 or higher, the following phases load and execute the SQL-files automatically:

- `SQLDB_LANDSCAPE_REORG`
  In this phase, SUM imports an SQL-file from SAP Note 1958346 into the database.
- `SQLDB_LANDSCAPE_REORG_2`
  In this phase, SUM imports a procedure for the SQL-files for SAP BW powered by SAP HANA from SAP Note 1908075 into the database.
- `SQLDB_LANDSCAPE_REORG_EXEC`
  In this phase, SUM executes the procedure loaded in phase `SQLDB_LANDSCAPE_REORG_2`.

The following landscape reorganization phases run automatically:

- `HDB_CHK_LANDSCAPE_REORG_PRE`
  In this phase, SUM checks whether the prerequisites for the landscape reorganization are met.
- `HDB_LANDSCAPE_REORG`
  In this phase, the landscape reorganization is performed.
- `HDB_CHK_LANDSCAPE_REORG_POST`
  In this phase, SUM checks whether the landscape reorganization has been performed correctly.

SAP HANA scale up

Even if you run an SAP HANA single-node system with a scale up scenario, you must import a file with specific SQL-information to enable the optimal table partition. For this, the following phases are carried out during the SUM with DMO run.

If your SAP HANA version is SPS 09 or lower, you have to perform the following manual phase:

- REQ_SCALEUP_PREREQ
  In this phase, SUM prompts you in a dialogue to import an SQL-file from one of the following notes into the database according to your product:
  - BW on SAP HANA: SAP Note 1908075📁
  - SAP Business Suite on HANA or SAP S/4HANA: SAP Note 1899817📁

If your SAP HANA version is SPS 10 or higher, the following phases load and execute the SQL-files automatically:

- `SQLDB_SCALEUP_PRER`
  In this phase, SUM imports a procedure for the SQL-files from one of the following notes into the database according to your product:
  - BW on SAP HANA: SAP Note 1908075📁
  - SAP Business Suite on HANA or SAP S/4HANA: SAP Note 1899817📁
- `SQLDB_SCALEUP_PREREQ _EXEC`
  In this phase, SUM executes the procedure loaded in phase `SQLDB_SCALEUP_PREREQ`.

5.4.7 Table Partitioning as of Start Release 7.00

If the start release of your SAP system is SAP NetWeaver 7.0 or a higher version, automatic partitioning of large tables is provided for the DMO run.

If a table in the source system has more than 1 billion rows, it will be partitioned automatically. The default partitioning is configured in such a way that HASH partitioning is used with the entire primary key.

Exceptions to the default settings are defined in the file `SUM/abap/control/SMIGR_HASHPART.TXT`. This file should not be modified. It has the following format:

<tabname>:FIELD1,FIELD2,...

> ⁂ Example
>
> **`BSEG:MANDT,BUKRS,BELNR,GJAHR`**

The following placeholders can be used for *<tabname>*:

- *** is a placeholder for a string of arbitrary length
- *?* is a placeholder for a single character

You can define additional filters for development classes using the following format:

<tabname>,DEVCLASS=<devclass>:FIELD1,FIELD2,...

> ⁂ Example
>
> **`CE1++++,DEVCLASS=KEG0:PERIO`**

If you would like to add or change settings, create the file `SUM/abap/control/SMIGR_HASHPART_ADD.TXT` and put your additions there. They will overwrite the settings from the delivered file.

5.4.8 Overriding Partitioning

If HASH partitioning is not suitable, or the capabilities of SUM regarding partitioning are not sufficient, you can override the partitioning settings applied by SUM.

Context

In DMO scenarios, the tables are already created during the uptime of the procedure, whereas the data migration takes place during the downtime for the application tables. As a consequence, the tables are empty when the SUM has stopped in the downtime dialog.

At that point in time, the content has not yet been migrated and the changes to the partitioning are not very costly. You can add or change the partitioning for application tables directly on the SAP HANA database while you are waiting in the downtime dialog of SUM, that is, when the `Preprocessing` roadmap step has finished and before you choose *Next*.

Procedure

Add or change the partitioning for application tables directly on the SAP HANA database, as described in *SAP HANA Administration Guide* chapter *Partitioning Operations*.

You can access the *SAP HANA Administration Guide* at https://help.sap.com/hana_platform *System Administration* *SAP HANA Administration Guide* .

6 Follow-Up Activities

This part of the document contains information about the follow-up activities that you need to perform after you have updated your SAP system.

6.1 Configuring Domain Controller for Transport Management System

After an update, distribute the information about the new release to all systems in the transport domain.

Context

This procedure is described in the *SUM Guide* in section ▶ *Follow-Up Activities* ❯ *Transport Management System: Distributing the Configuration* ❯. However, due to the database change, it is necessary to configure the domain controller before you update the configuration.

Procedure

1. Log on to the system that is configured as the domain controller.

2. Call transaction `STMS` and choose ▶ *Overview* ❯ *Systems* ❯

3. In the system overview, select the updated SAP System that runs on the target database and choose ▶ *SAP System* ❯ *Change* ❯ or double-click the system ID. The dialog for *Transport Management System (TMS) configuration* appears.

4. Choose the tab *Transport Tool*, replace the current parameters `DBHOST` and `DBTYPE` with the parameters of your target database and save your changes.

5. Go back to the system overview.

6. Select the system again and choose ▶ *SAP System* ❯ *Update Configuration* ❯. A message box is displayed first, in which you select *Yes* to confirm.

7. Choose ▶ *Extras* ❯ *Distribute and Activate Configuration* ❯. A message box is displayed first, in which you select the option that is suitable for your requirements.

6.2   BW: Using the Application-Specific Upgrade Toolbox

After an update of an SAP BW system, consider also the application-specific upgrade toolbox (ASU Toolbox).

Context

The ASU toolbox allows you to manage the preparation and follow-up activities you need to perform for the technical update. For more information, see the *Upgrade and Update Guide: SAP NetWeaver* `<Release>` *ABAP* (mentioned in section Other Required Documentation [page 10], and see SAP Note 1000009 as well.

Procedure

Execute the ASU Toolbox after the update using transaction `/ASU/START` and select the appropriate ASU content definition.

6.3   Checking and Adapting SecureStore with Customer-Specific Key

If you have encrypted your SecureStore with a customer-specific key and not with the default key, you have to execute some checks and adaptations.

Context

> **i Note**
>
> During the database migration from source database to target database, the Software Update Manager saves the old SecureStore in ▶ *SUM* ❯ *abap* ❯ *sapnames* ❯ *rsecssfs* ❙ before it creates a new one. This allows you to retrieve old entries if necessary.

The procedure depends firstly on the SAP NetWeaver release on which your SAP system is based:

- SAP NetWeaver release lower than 7.40
- SAP NetWeaver release 7.40 and higher

Then it depends on the type of the `SECSTORE` error message, that you see.

Procedure

All SAP NetWeaver releases

1. Start transaction `SECSTORE` and choose *Check Entries and Execute*.

2. Filter the result by error messages.

SAP NetWeaver release lower than 7.40

3. `SECSTORE 030` (`Incorrect global key for entry …`): Restore a legacy key-file that was used in the source system, and repeat the check afterwards.

   For more information, see the SAP Help Portal for your SAP NetWeaver release at http://help.sap.com/nw. Choose ▌▶ *Application Help* ❯ *SAP NetWeaver Library: Function-Oriented View* ❯ *Security* ❯ *System Security* ❯ *System Security for SAP NetWeaver Application Server for ABAP Only* ❯ *Secure Storage (ABAP)* ❯ *Importing Keys after a System Copy* ◗.

4. `SECSTORE 031` (`System-dependent data for entry … changed: …`): Perform a record migration.

   For more information, see SAP Note. 816861.

SAP NetWeaver release 7.40 and higher

5. `SECSTORE 089` (`Key … for entry … is missing in the secure storage in the file system`): Reimport the encryption keys that were used in the source system and stored in the secure storage in the file system. Repeat the check afterwards.

   For more information, see SAP Help Portal for your SAP NetWeaver release at http://help.sap.com/nw. Choose ▌▶ *Application Help* ❯ *SAP NetWeaver Library: Function-Oriented View* ❯ *Security* ❯ *System Security* ❯ *System Security for SAP NetWeaver Application Server for ABAP Only* ❯ *Secure Storage (ABAP)* ❯ *Key Management* ❯ *Using Individual Encryption Keys* ❯ *Importing Missing Encryption Keys* ◗.

6. `SECSTORE 030` (`Incorrect global key for entry …`): Restore a legacy key-file that was used in the source system.

   For more information, see the information on the SAP Help Portal for your SAP NetWeaver release at http://help.sap.com/nw. Choose ▌▶ *Application Help* ❯ *SAP NetWeaver Library: Function-Oriented View* ❯ *Security* ❯ *System Security* ❯ *System Security for SAP NetWeaver Application Server for ABAP Only* ❯ *Secure Storage (ABAP)* ❯ ❯ *Key Management* ❯ *Legacy Method for Using Individual Encryption Keys* ❯ *Importing Keys after a System Copy* ◗.

7. `SECSTORE 031` (`System-dependent data for entry … changed:…`): Perform a record migration.

   For more information, see SAP Note 816861.

6.4 Manual Actions for Remote Application Server Instances

The Software Update Manager cannot prepare the remote hosts for the new database connection during the update and migration procedure. This means that actions such as installing the database client software or changing the required environment variables are not possible.

This also means that the Software Update Manager cannot automatically start existing application server instances on remote hosts. As a consequence, you must manually reinstall and start application server instances on a remote host.

> → Recommendation
>
> We recommend that you reinstall application server instances using the `Software Provisioning Manager` tool.

> i Note
>
> Note that the change of the database connection does not affect the remote `SAP ABAP Central Services (ASCS)` instance. That is, the Software Update Manager handles the ASCS instance during the update and migration procedure without special constraints.

7   Migration Tools

The Software Update Manager (SUM) offers migration tools as stand-alone options besides the standard update and migration procedure. These options are bundled as migration tools and run in the `migtool mode` of the SUM.

The migration tools in this context are basically use cases of the Software Update Manager. They are bundled separately and are not part of a standard SUM maintenance or of a standard DMO migration.

Currently the migration tools consist of

- benchmarking tool (see Benchmark Migration [page 64]
- table comparison standalone (see Table Comparison [page 63])

These migration tools can be started within the SUM. Select on the `Welcome` dialog of the Software Update Manager that you want to perform a scenario without stack configuration file. On the next dialog screen, SUM displays a list with possible scenarios. Among them, you find the migration tools for benchmarking and table comparison.

For more information about the migration tools, see also the blog DMO: table comparison and migration tools 🔗 in the SAP Community.

7.1   Table Comparison

Table Comparison offers you the possibility to compare export and import table checksums for your database.

This migration tool mode is similar to the built-in function that is described in Table Comparison [page 52]. However, while this function can be part of the update and migration procedure dependent on your decision in roadmap step `Extraction`, the stand-alone migration tool `Table Comparison` is designed for other tools such as the `System Copy` procedure.

For more information, see the section ▐▶ *9 Additional Information* ❯ *Table Comparison with Software Update Manager* ❯ of the *System Copy guide* for ABAP technology, which is mentioned in Other Required Documentation [page 10].

> **i Note**
>
> Keep in mind that only tables can be checked, but not views.

7.2   Benchmark Migration

Benchmark Migration offers you the possibility to simulate certain processes or only a part of it with the objective of estimating their speed.

A database migration consists of two processes:

- The export of data from the source system
- The import of data into the target system

The Software Update Manager offers a benchmarking of these two processes with the migration tool mode Benchmark Migration. You can simulate the export and import processes or the export process only to estimate their speed.

Prerequisites

- You use an SAP system based on AS ABAP
- You have the latest SAP Host Agent installed and configured
- Your target database is available to ensure a complete procedure
- You have prepared the download directory with the kernel files for the target system

Access

To access the benchmark migration tool, select on the *Welcome* page of the Software Update Manager the scenario category <u>without</u> `stack.xml` configuration file. A dialog with a list of possible scenarios appears. Select from the list the option *Benchmarking Tool* and choose *Next*.

7.2.1 Benchmarking the Migration: Export Mode

This section covers the benchmarking of the export of data from the source system. To carry out the benchmarking, SUM displays a sequence of dialogues, which you have to maintain.

Procedure

Get Roadmap

1. After you have chosen to work without a stack configuration file and selected the option *Benchmarking Tool*, choose the benchmarking mode *Benchmark export (discarding data)* and click *Next*.
2. Dialog *Migration Parameters*
   a. Table Selection: Select if the migration benchmark shall relate to all tables, that is, to the whole database, or to selected tables only.

- If you choose *All tables*, you can specify additionally whether the benchmarking shall be performed for the whole database or on a sampling basis. Enter for this a value from 1 to 100 in percentage, where 100% means the whole database.

  If you enter a lower value, the system determines internally the size of all tables, sorts them according to the size, and selects the tables based on a sequence until the given size of the database is reached.

  In addition, you specify in percentage the maximum size of the largest table in the sample based on the database size.

  > ### Example
  >
  > Assuming that the source database has a size of 1 TB and you want to export 10%. This means that 102.4 GB of the database will be the sample. However, the number of tables depends on their size. If, for example, the database contains among others one table with 102 GB, the sample would contain only this table.
  >
  > Therefore, you specify the size of the largest table in the sample based on the size of the database. For example, 1% percent as maximum size means 1% of 1 TB database size. Hence, the largest table in the sample must not be bigger than 10.24 GB. In this case, the minimum number of tables in the sample is theoretically 10 tables with a size of 10.24 GB. The number increases with the number of smaller tables.

- If you choose *Selected tables*, enter the name and the path of the txt-file that includes the table names. The txt-file contains each table in one line.

  b. Declustering during Migration: Activate the option *Target database declustered*, if you already know that the database will be declustered during the actual update and migration procedure, for example if you plan to update to SAP Kernel 7.40 or higher.

  This option allows you to receive the best possible simulation result.

  c. Migration Repetition Option: Activate the option *Enable migration repetition option* to stop the benchmarking tool after the downtime migration phase and to enable a simple repetition of the latter to optimize the procedure by adjusting the parameters (such as R3load processes).

  You must not use this option for a productive run. For more information, see Using the Migration Repetition Option for Testing [page 53].

Roadmap Step *Configuration*

3. Dialog *Parameters for Procedure*: Configure the number of parallel SQL and `R3load` processes.

   > ### i Note
   >
   > For the benchmarking, *Uptime* means the `Preparation` roadmap steps, in which the tables for the export are determined, and *Downtime* means the `Execution` roadmap step, in which the table content is exported.

Roadmap Step *Preprocessing*

4. Dialog *Required System Passwords*: Database-specific password. Provide the password of the user `System` of the source database.

   Moreover, the Software Update Manager can ask for the name and the password of the SAP HANA database security user. However, this dialog appears only if the database user `SYSTEM` is deactivated. In this case, the Software Update Manager asks for a security user that has the system privilege `USER ADMIN`. It uses this security user to activate the user `SYSTEM` if necessary. Then, the user `SYSTEM` is used for a short time and deactivated again afterwards.

Roadmap Step *Execution*

5. During the roadmap step *Execution*, the benchmarking is executed.

Roadmap Step *Postprocessing*

6. Dialog *Benchmarking completed*: Analyze the log file `EUMIGRATEEXP.LOG` for benchmarking results.

   Check in the log file the section with the migration speeds. It starts with the entry *Bucket evaluation*. After the analysis, close the log file and continue the procedure.

7. Fill in the evaluation form that SUM displays after the update and migration procedure is finished.

8. Clean up the procedure at the end, so that you can the next time from the beginning.

7.2.2 Benchmarking the Migration: Export and Import

This section covers the benchmarking of the export of data from the source system and the import of data into the target system as well. To carry out the benchmarking, SUM displays a sequence of dialogues, which you have to maintain.

Procedure

Get Roadmap

1. After you have chosen to work without a stack configuration file and selected the option *Benchmarking Tool*, choose the benchmarking mode *Benchmark export and import* and click *Next*.

2. Dialog *Database Migration Option: Target Database*: Select your target database from the list of the available target database types.

3. Dialog *Migration Parameters*

   a. Table Selection: Select if the migration benchmark shall relate to all tables, that is, to the whole database, or to selected tables only.

      ○ If you choose *All tables*, you can specify additionally whether the benchmarking shall be performed for the whole database or on a sampling basis. Enter for this a value from 1 to 100 in percentage, where 100% means the whole database.
      If you enter a lower value, the system determines internally the size of all tables, sorts them according to the size, and selects the tables based on a sequence until the given size of the database is reached.
      In addition, you specify in percentage the maximum size of the largest table in the sample based on the database size.

> **⁘ Example**
>
> Assuming that the source database has a size of 1 TB and you want to export 10%. This means that 102.4 GB of the database will be the sample. However, the number of tables depends on their size. If, for example, the database contains among others one table with 102 GB, the sample would contain only this table.
>
> Therefore, you specify the size of the largest table in the sample based on the size of the database. For example, 1% percent as maximum size means 1% of 1 TB database size. Hence, the largest table in the sample must not be bigger than 10.24 GB. In this case, the minimum

> number of tables in the sample is theoretically 10 tables with a size of 10.24 GB. The number increases with the number of smaller tables.

- ○ If you choose *Selected tables*, enter the name and the path of the txt-file that includes the table names. The txt-file contains each table in one line.

b. Migration Key: Provide the migration key for the data import.

c. Declustering during Migration: Activate the option *Target database declustered*, if you already know that the database will be declustered during the actual update and migration procedure, for example if you plan to update to SAP Kernel 7.40 or higher.

   This option allows you to receive the best possible simulation result.

d. Migration Repetition Option: Activate the option *Enable migration repetition option* to stop the benchmarking tool after the downtime migration phase and to enable a simple repetition of the latter to optimize the procedure by adjusting the parameters (such as R3load processes).

   You must not use this option for a productive run. For more information, see Using the Migration Repetition Option for Testing [page 53].

e. DMO with System Move: Activate *Enable the migration with System Move* if you want to move of the primary application server from source to target system.

Roadmap Step *Configuration*

4. Dialog *Download Directory*

   a. Download Directory: Specify the download directory that contains the iso that the Software Update Manager can update the kernel automatically.

      You can skip this step when only customer transports are imported.

   b. Archive Verification: Activate the option *Check the authenticity of SAP archives* if you want to check the authenticity of all the archives in the download directory.

      For more information, see the chapter "Verifying SAP Archives" in section " Running the Software Update Manager" of the SUM guide.

5. Dialog *Target Database Client*: Specify the installation path to the database client. If the client is not yet installed, you specify the future path after the installation. In this case, you also have to specify the installation files in a subsequent dialog.

6. Dialog *Database Migration Initialization*: Specify the parameters for the migration initialization of the target database: hostname , SID , instance number.

   > **i Note**
   >
   > - ○ The SUM displays in the dialog the SID of your source database. If the SID of the target database is different, adapt the SID accordingly.
   > - ○ If your target database can only be reached via IP name and not via host name (for example for a cloned system), edit the `etc/hosts` file because the hdbsllib used for the connection resolves and uses the host name.

7. Dialog *Required Migration Specific Passwords*. Provide the migration-specific passwords for different users on the target database, such as:

   > **⋆ Example**
   >
   > - ○ User `SYSTEM`.
   >   Moreover, the Software Update Manager can ask for the name and the password of the SAP HANA database security user. However, this dialog appears only if the database user `SYSTEM` is

> deactivated. In this case, the Software Update Manager asks for a security user that has the system privilege `USER ADMIN`. It uses this security user to activate the user `SYSTEM` if necessary. Then, the user `SYSTEM` is used for a short time and deactivated again afterwards.
> - User `DBACOCKPIT` (only if it does not yet exist on the target database and SUM has to create it)
> - User `SAP<SID>` (Note: SUM will create it on the target database)

8. Dialog *MultiDB Tenant Creation*: If you target to an SAP HANA database with SAP HANA MDC option, decide on the tenant.

   You can use or recreate an existing tenant, or you can use another tenant.

9. Dialog *Schema Name in Target Database*: Determine the database schema in the target database.

10. Dialog *SAP HANA Migration Parameters*: Decide if you want to enable the automatic load of table placement statements for the SAP HANA database.

Roadmap Step *Preprocessing*

11. **Dialog** *Required System Passwords*: Database-specific password. Provide the password of the user `System` on the source database. You can be prompted under certain conditions to enter name and password of the SAP HANA database security user that has the system privilege `USER ADMIN`.

12. Dialog *Parameters for Procedure*: Configure the number of parallel SQL and `R3load` processes.

> **i Note**
>
> For the benchmarking, *Uptime* means the `Preparation` roadmap steps, in which the tables for the export are determined, and *Downtime* means the `Execution` roadmap step, in which the table content is exported.

Roadmap Step *Execution*

13. During the roadmap step *Execution*, the benchmarking is executed.

Roadmap Step *Postprocessing*

14. **Dialog** *Benchmarking completed*: The procedure is finished. Analyze now the log files for the results.

    Check also the *DMO Migration Post Analysis* in the *SUM Utilities*. To access the *SUM Utilities*, open the *More* menu in the upper-right corner on the menu bar.

15. Fill in the feedback form that SUM displays.

16. Clean up the procedure at the end. Afterwards you can start the SUM from the beginning.

7.2.3 Benchmarking on Tables with more than 2 Billion Entries

Note that benchmarking does not work on tables with more than 2 billion entries. To overcome this issue, you have some options that you can carry out beforehand.

If you want to run a migration benchmarking on a system with tables that have more than 2 billion entries, an error may occur similar to the following:

```
A1EEIMP 007 Task failed with error: (IMP) DbSlExeModify failed in insert for table
'<tablename>' with 99

A1EEIMP 007 (IMP) SQL error = 2055
```

```
A1EEIMP 007 (IMP) maximum number of rows per table or partition reached
```

To avoid the error and to overcome this limitation, you may choose one of the following options:

1. **Partition Manually**

   You set a breakpoint for phase `HDB_LANDSCAPE_REORG2` and manually partition the relevant tables with the following statements:

   1. Log on to the source database with the technical SQL user of the SAP system
   2. Determine the row count (`<row_count_source>`):
      `SELECT COUNT(*) FROM "<table_name>"`
   3. Connect to the SAP HANA target database for the following statements using the SAP HANA Studio or SAP HANA Cockpit:

      1. Calculate the number of partitions:
         `select FLOOR(<row_count_source> /1000000000)+1 from dummy;`
         Replace `<row_count_source>` with the actual number of rows in the source database.
         We recommended creating one partition per 1 billion rows, for example, 6 partitions for 5.2 billion rows.
      2. Determine the partition columns. Choose all primary key fields as partition fields.
         Determine the primary key columns with:
         `SELECT COLUMN_NAME FROM INDEX_COLUMNS WHERE TABLE_NAME = '<table name>'`
         `AND CONSTRAINT = 'PRIMARY KEY'`
      3. Alter table with Hash Partition: **`ALTER TABLE "<table_name>" PARTITION BY`**
         `HASH(<primary key column list>) PARTITIONS <num_partitions>`
         Example for a table TAB1 has the primary key fields COL1, COL2 and COL3, and where 6 partitions should be created:
         `ALTER TABLE "TAB1" PARTITION BY HASH("COL1", "COL2", "COL3") PARTITIONS 6`

2. **Use report SMIGR_CREATE_DDL**

   The report `SMIGR_CREATE_DDL` exists on systems based on SAP_BASIS 731 or higher. Each of which must also have a sufficient support package level.

   You may run the report to create the following required files:

   - `SQLFiles.LST` (= text file containing a list of all SQL files generated)
   - `<package_name>.SQL` (= files containing SQL statements for the respective package)

   Copy the files into the download directory before you start the benchmarking run.

3. **Use files from a previous benchmarking run**

   If you have already executed a benchmarking run on the same system, you can copy the relevant files `SQLFiles.LST` and `<package_name>.SQL` (see also option 2) into the download directory of SUM. Afterwards you can start the benchmarking again.

8   Troubleshooting

This part of the document contains additional information about how to proceed when you want to correct known problems that have occurred during the update.

Known problems and issues

Symptom	Solution
You run a dialogue instance installation after a DMO, and the database SID is shown incorrectly in the dialogue.	Set the parameter `j2ee/dbname = <YOUR_HDB_SID>` in the default profile and start the installation again.
The SAP HANA database client installation on HP-UX or other UNIX-based operating systems except for Linux fails with an error.	See SAP Note 1929357 for more information and for instructions to solve the issue.
RFC connection errors occur during the `Postprocessing` roadmap step.	If RFC connection errors occur, check the connection information for `DBACOCKPIT` to the target database after the downtime processing of SUM and during `Postprocessing` roadmap step. If the user is locked, choose *Activate user now* and *Reset connect attempts*.
The system does not accept the password of user `SYSTEM` in phase `DBQUERY_PRE`.	Move the 720 database administration tools to the subdirectory `/abap/exe` of your SUM directory.
Error in the `Postprocessing` roadmap step in phase `RUN_PSA_VERSION_CREATE`.	Check with transaction `SECSTORE` your system for any inconsistent entries. Repair the connection to the SAP BW client following SAP Note 816861 after you have applied the new license.
Some secondary indexes, which are to be created on selected databases only, can be inconsistent after the migration. These inconsistencies are found in phase `RUN_RSDB02CK_END` and reported in the log file.	To fix the inconsistencies, use transaction `SE14` or `SE11` and repeat the phase after the correction.
The creation of a logical index for the master data terminates after the migration to the SAP HANA database. The error messages issued during the execution of the query are for example: *table config error; column store error: fail to create scenario/ Index does not exist*	See SAP Note 1695112 for further information and for a solution.

:

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