

Upgrade Guide | PUBLIC
Software Update Manager 2.0 SP27
Document Version: 1.0 – 2026-10-05

Database Migration Option: Target Database MS SQL Server

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Document History

Document: Database Migration Option of SUM 2.0 SP27 to target database MS SQL Server

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

> ⚠ Caution
>
> Before you start, 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 SP27*.

Version	Date	Description
1.0	2026-10-05	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 the database platform MS SQL Server

1.2 New Features

The following table lists important new functions and improvements in the current version of the Software Update Manager 2.0 and the two previous versions.

New Features for the Individual SUM with DMO Versions

Feature	Description	Availability
DOWNCONF_DTTRANS Dialog Updated	The dialog now states that clicking *Next* will initiate downtime. There will be no further dialog asking if the user is sure they want to continue. For more information, see Performing a Manual Backup [page 14].	SUM 2.0 SP25
IBM Db2 on iSeries Support for Downtime-Optimized DMO	IBM Db2 on iSeries (DB4) is now supported as a source database for downtime-optimized DMO. For more information, see *Planning* > *Downtime-Optimized DMO* section or SAP Note 3707882	SUM 2.0 SP27
MaxDB Support for Downtime-Optimized DMO	MaxDB is now supported as a source database for downtime-optimized DMO. For more information, *Planning* > *Downtime-Optimized DMO*.	SUM 2.0 SP27

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.
<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
3705604	Central Note - Software Update Manager 2.0 SP27

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

SAP Note for the DMO

SAP Note Number	Description
3705626	Database migration option (DMO) of SUM 2.0 SP27

> → 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 MS SQL Server

If you are migrating your anyDB to MS SQL Server, read and implement the following notes before starting the migration:

SAP Note Number	Description
1581700	PAGE compression support for DDIC & Hom./Het. System Copy

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
1714734	Functions RSPC_SHUTDOWN and RSPC_STARTUP do not exist
1845061	Background user has no authorization for scheduling
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

SAP Note Number	Description
1784377	Checking pool tables and cluster tables
1788379	Transport of SAP NOTES
1845061	Background user has no authorization for scheduling
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.
  at the following URL on the SAP Help Portal: https://help.sap.com/docs/SAP_NETWEAVER.
  Select the SAP Netweaver version, then choose *Implement* > *Installation and Upgrade*.
- **SUM Guide:** *Updating SAP <technology> Systems on <operating system>: <source database>*

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

  This document describes how to update SAP systems 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 using SUM* > *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 45])

- prepare the MS SQL Server database as mentioned in Preparing Target Database MS SQL Server [page 23]

You can access the latest version of this document on the SAP Support Portal at http://support.sap.com/sltoolset *System Provisioning* > *System Provisioning Scenarios* > *Copy a System using Software Provisioning Manager* > *System Copy Option of Software Provisioning Manager 1.0 SP <version>*.

- **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* > *System Provisioning Scenarios* > *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 (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
- Database update of anyDB
- Update of your SAP software
- Database migration to target database

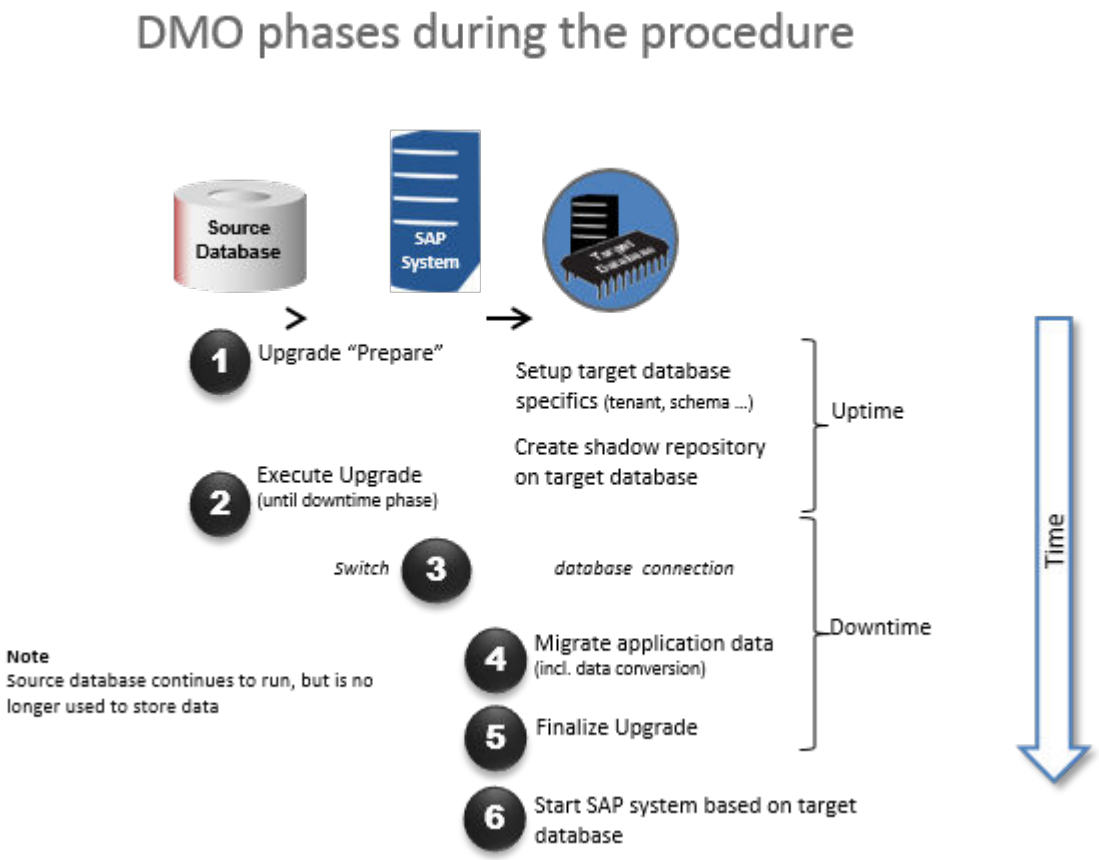
can be necessary. The processing sequence is based on the *shadow system* functionality of SUM. A shadow system basically consists of a *shadow instance* and a *shadow repository*:

- 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 29] 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 at a Glance

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

- Database Migration Option (DMO)
- 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 7] for the current prerequisites and restrictions.
  >
  > This note involves information regarding

- operating systems and databases
- minimum support packages
- 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 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.
  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 users started working on the new system based on the new database.

3 Planning

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

3.1 Performing a Manual Backup

A backup is not necessary, but optional. If you want to perform a backup for DMO (in phase DOWNCONF_DTTRANS), proceed as follows:

1. In case of downtime-optimized DMO, stop the replication
2. Stop your SAP system. In case of downtime-optimized DMO, also stop the temporary instance
3. Perform a backup of your source database
4. Perform a backup of your target database
5. Perform a backup of your SUM directory
6. Restart your SAP system. In case of downtime-optimized DMO, also restart the temporary instance
7. In case of downtime-optimized DMO, restart the replication

3.2 DMO with SAP Landscape Transformation

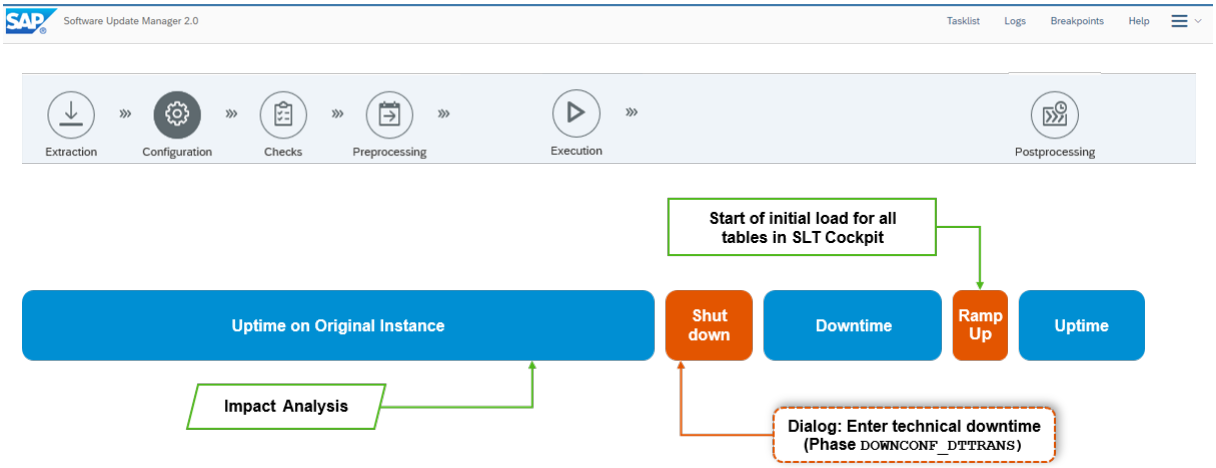
SAP Landscape Transformation (SLT) replication server uses a trigger-based replication approach to pass data from source system to target system.

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:



3.3 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 9].

3.4 ASCS Instance Split

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

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*

3.5 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.

3.6 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<*>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 directory so that SUM can consider it during the next run.

The Software Update Manager scans the download directory in the `SCANDIR_EXE` phase for existing files. The files found are listed in the log file `checks.log` or in the associated notification pop-up window. You can check the list to see if the migration duration file was also found. It is tagged with the *CLONEDURATIONS* keyword.

After the tables have been split in the `EU_CLONE_MIG*PRP` phases, you find in the SUM Utilities for DMO (Extended UI) [page 36] the information whether the duration file meets the requirements and was therefore used. To do this, select the *Table Splits* view in the *DMO Migration Preparation* menu.

> ### Note
>
> The <*> in the file name `migrate<*>dur.xml` is a placeholder for the middle part of the file name, which can change depending on the selected scenario. Example: For a standard DMO run, the file `migrate_dt_dur.xml` is created (where DT stands for "downtime").
>
> 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. if there are different table sizes, `SAPup` adapts the migration time accordingly.

3.7 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 checking all pool tables or cluster tables in the source system before the migration.

Context

For example, you can check whether

- corrupt or initial cluster records exist
- the pool tables contained in a certain table pool are readable
- the BCD numbers in a table are correct

We recommend that you perform the check using the cluster data check that is integrated in SUM. To use it, select the option *Check Cluster Data* in the initial dialogues of the Software Update Manager, which are described in the *SUM Guide* in section *Making Entries for Scenarios Without Configuration File*.

This check is similar to the SAP_BASIS report `SDBI_CLUSTER_CHECK`. It is performed by the `R3load` executable in discard mode and uses the same technology as the benchmarking tool. However, the check integrated in SUM is more performant than the report `SDBI_CLUSTER_CHECK`. Its runtime is significantly lower because the check can work with highly parallelized processing.

In addition to the report `SDBI_CLUSTER_CHECK`, further reports are available such as `SDBI_POOL_CHECK`. For more information about the cluster data check and the reports, see SAP Note 1784377.

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

Procedure

- Option 1 (recommended): Check cluster tables using the built-in cluster data check.

  In the initial dialogs of SUM to get the roadmap, select the scenarios without configuration file and choose *Check Cluster Data*. Then follow the instructions in the subsequent dialogs.
- Option 2: Check pool and cluster tables using the 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 7].

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 9], 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 9].

> ⚠ 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 MS SQL Server

Prepare the target database MS SQL Server for the SUM with DMO run.

Context

If your target database is MS SQL Server database, you must have successfully installed an MS SQL Server database and performed some preparatory steps for the DMO. If you have to install the database and to maintain the parameters, use the Software Provisioning Manager tool to install and configure the database for the DMO scenario.

> ⓘ Note
>
> **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

Follow the instructions in section *7 Database Migration Option Preparation* of the *System Copy Guide* for ABAP and Windows. See Other Required Documentation [page 9].

4.11 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.

4.12 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:

Procedure

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

4.13 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.

4.14 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 9], 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.

4.15 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*.

4.16 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

> **Note**
>
> - 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 instance on which you run the Software Update Manager:

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

> **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

4.17 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.

> ⓘ 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 9]) 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.

However, you must delete the target database on your MS SQL Server first to ensure that all data of the target database is removed. Furthermore, you need to prepare the target database again using SWPM as described in Preparing Target Database MS SQL Server [page 23].

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 the AS instance 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*.

> **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

> **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 Roadmap Steps with DMO features

5.2.1 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). 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 on the target 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, table count verification, table migration key, migration repetition, system move
- configuration of benchmarking tool or table comparison check tool

5.2.2 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 39]
- Decision about the option `Table Comparison with SUM` (see Table Comparison [page 37])
- Implementation of SAP Notes required by SUM

> **Note**
>
> During the update and migration procedure, SUM works with the kernel set that is located in the SUM directory in subfolder `\abap\exe` or `/abap/exe`. This can be relevant in case you want to check 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.
>
> A kernel for the source database is not necessary, as the shadow system runs on the target database.

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

5.2.3 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

> **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 kernel for target database
- 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 *Running the Software Update Manager* > *Roadmap Steps with DMO Features* > *Initial Dialogs*.
- 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 phase `HDB_MIGCONFIG`, you specify the hostname of the SAP HANA database. This hostname will be used for the SAP HANA User Store (hdbuserstore) entry or ABAP Secure Storage (ABAP SSFS) entry in phase `HDB_SETUPCONNECT`.
  For high availability (HA) systems, you specify the virtual database hostname. For scale-out scenarios you specify the physical hostname. In addition, the SUM tool queries the SAP HANA monitoring views to collect all relevant hostnames and use them for the SAP HANA User Store or ABAP Secure Storage entries.

5.2.4 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.

5.2.5 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

  > **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:

- 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.

> **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*.

5.2.6 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 `XPRA`s required by the system.

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

- Migration of application data
- Repository and 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
- You can change the number of `R3load` processes dynamically in the SUM Utilities (Extended UI).
- Consistency of the migrated content is checked by the command `SELECT COUNT(*) FROM "<table_name>"` on each table.
- Time estimation for the overall process and for long-running phases is written to the file `<SUM directory>/abap/log/SAPupStat.log`

> **Note**
>
> If the Software Update Manager stops in phase `EU_CLONE_MIG_DT_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 in the SUM directory for the restart of the failed import processes.

5.2.7 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.

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

5.3 Special Features for DMO

5.3.1 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.

> **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 16]). 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.

5.3.2 Table Comparison

This section covers the built-in Table Comparison tool.

After the migration of tables in both the uptime and the downtime, SUM applies the function `Table Comparison with SUM`. It compares the contents of the target database tables with the table contents in

the source database based on calculated checksums. 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 then prompted to specify the location of the file that includes the table names to be checked. The file must be in TXT format, and each line in the file contains one table name without a separator character at the end.

The comparison of the tables runs 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. Use a separate system instead 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. 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 are 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 are not processed.
> - This migration tool mode is similar to the stand-alone migration tool Table Comparison, which is described in section Table Comparison [page 45]. 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.

5.3.3 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 29] 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 16]).

> ⚠ 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.

> ### 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.

5.3.4 Resuming the Migration After Resolving Errors

There are the following options for resuming the migration after you resolve an error:

- Continue with current data transfer
  If you choose this option, the system resumes the migration process and continues to copy data to the target system. This is the default option.
- Re-prepare: Keep the current status
  If you choose this option, the system will repeat the table split calculation based on the current settings, including the specified number of R3load processes. The system then resumes the migration process.
- Re-prepare: Start from the beginning
  If you choose this option, the system will repeat the table split calculation based on the current settings, including the specified number of R3load processes. The system then restarts the migration process from the beginning. Note that this means that any data copied to the target will be deleted.

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 9], 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

> **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 remote application server instances using the `Software Provisioning Manager` tool. This is, however, not obligatory. Advanced and experienced system administrators can also perform the necessary steps and configurations manually without this tool.

> ⓘ 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 46])
- table comparison standalone (see Table Comparison [page 45])

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 37]. 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 9].

> **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 processes to estimate their speed.

> ⓘ Note
>
> The Software Update Manager does not shut down the ABAP system during the benchmarking migration in any case.

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 (not required for the discard mode)
- You have prepared the download directory with the kernel files for the target system

Access

To access the benchmark migration tool, select in the initial dialogs for the scenario specification (*Get Roadmap*) the scenario category without `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. 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 39].

Roadmap Step *Configuration*

3. Dialog *Download Directory*
   a. Download Directory: Specify the download directory that contains, for example, the required kernel files so that the Software Update Manager can update the kernel automatically.
      - Note that the folder for the duration files must be existing, but not filled.
      - 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.
4. Dialog *Parameters for Procedure*: Configure the number of parallel SQL and `R3load` processes.

> **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.

5. 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.

   > **Note**
   >
   > Note that not every source database requires a password. Therefore, this dialog appears only when a password is necessary.

Roadmap Step *Execution*

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

Roadmap Step *Postprocessing*

7. Dialog *Benchmarking completed*: The procedure is finished. Analyze the utility *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. For more information, see also SUM Utilities for DMO (Extended UI) [page 36].

8. Fill in the evaluation form that SUM displays after the update and migration procedure is finished.
9. Optional: Save migration duration files for performance optimization, as described in chapter Performance Optimization with Migration Duration File [page 16].
10. Clean up the procedure at the end, so that you can the next time from the beginning.

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
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*.
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.

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