System Copy for SAP ABAP Systems Based on UNIX : SAP HANA 2.0 Database - Using Software Provisioning Manager 2.0

This Guide is Valid for the Following Products:
- foundation on ABAP Platform 1809, version for SAP HANA
- SAP BW/4HANA 1.0 Support Release 1 or higher
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Document History

i Note
Before you start reading, make sure you have the latest version of this installation guide, which is available at https://support.sap.com/sitoolset > System Provisioning > Install a System using Software Provisioning Manager > Installation Option of Software Provisioning Manager 2.0 SP <Current Number>.

The following table provides an overview on the most important document changes:

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.0</td>
<td>2019-01-21</td>
<td>Updated version for Software Provisioning Manager 2.0 SP02 (SL Toolset 1.0 SP25)</td>
</tr>
<tr>
<td>1.1.0</td>
<td>2018-09-17</td>
<td>Updated version for Software Provisioning Manager 2.0 SP01 (SL Toolset 1.0 SP24)</td>
</tr>
<tr>
<td>1.0.0</td>
<td>2018-04-23</td>
<td>Initial version for Software Provisioning Manager 2.0 SP00 (SL Toolset 1.0 SP23)</td>
</tr>
</tbody>
</table>
1 About this Document - System Copy for SAP ABAP Systems Based on UNIX: SAP HANA 2.0 Database - Using Software Provisioning Manager 2.0

This document describes how to perform a homogeneous system copy of SAP Application Server ABAP systems on UNIX, using Software Provisioning Manager 2.0 SP02 (the “installer” for short) on. It covers the following SAP ABAP system product releases:

- SAP S/4HANA 1809 and Higher (based on foundation on ABAP Platform 1809, version for SAP HANA)
- SAP BW/4HANA 2.0 (based on foundation on ABAP Platform 1809, version for SAP HANA FPS1)
- SAP BW/4HANA 1.0 SRI (based on SAP NetWeaver 7.5)

For more information, see SAP Products Supported by Software Provisioning Manager 2.0 [page 8].

For information about supported operating system and database platforms, see the Product Availability Matrix at https://support.sap.com/pam.

The procedure described in this guide uses SAP HANA database-specific methods on the source system and the target system installation is done using Software Provisioning Manager 2.0 SP02 (the “installer” for short), which is part of SL Toolset 1.0 SP25.

For a detailed list of SAP system products and releases supported by Software Provisioning Manager 2.0, see SAP Products Supported by Software Provisioning Manager 2.0 [page 8] and SAP Note 2568783. For information about supported operating system and database platforms, see the Product Availability Matrix at https://support.sap.com/pam.

i Note
As an alternative to using Software Provisioning Manager, you can copy or refresh your system with a completely automated end-to-end framework available using SAP Landscape Management. For more information, see SAP Note 1709155 and https://help.sap.com/lama.

About Software Provisioning Manager 2.0 [page 7]
Naming Conventions [page 9]
New Features [page 10]
Constraints [page 11]
Accessing the SAP Online Documentation [page 13]
1.1 About Software Provisioning Manager 2.0

Software Provisioning Manager 2.0 is the new release of Software Provisioning Manager 1.0. Software Provisioning Manager as such is is the successor of the product- and release-specific delivery of provisioning tools, such as SAPinst and R3setup.

Make sure that you read the most recent version of SAP Note 2568783 (Release Note for Software Provisioning Manager 2.0).

Before you run Software Provisioning Manager 2.0, we recommend that you always download the latest version of it. Software Provisioning Manager 2.0 is - as Software Provisioning Manager 1.0 - part of the Software Logistics Toolset 1.0 (“SL Toolset” for short) which is quarterly shipped. This way, you automatically get the latest fixes and supported processes. For more information about Software Provisioning Manager 2.0 as well as products and releases supported by it, see SAP Note 2568783 and http://scn.sap.com/docs/DOC-30236.

Software Provisioning Manager 2.0 Versus Software Provisioning Manager 1.0

The Software Provisioning Manager 2.0 SP02 is part of Software Logistics Toolset 1.0 SP 25 and exists in parallel to Software Provisioning Manager 1.0 SP25. Both Software Provisioning Manager versions, however, cover different scenarios. The decision matrix is:

- Software Provisioning Manager 2.0 is used for:
  - Installation, system copy, and system rename of ABAP single stack systems on SAP HANA 2.0 database, based on the following products:
    - SAP S/4HANA 1809 or higher (based on foundation on ABAP Platform 1809, version for SAP HANA or higher)
    - SAP BW/4HANA 1.0 Support Release 1 or higher (based on SAP NetWeaver 7.5)
  - SAP Web Dispatcher installation and rename.

  - i Note
    - For SAP Web Dispatcher, you can either use Software Provisioning Manager 2.0 or Software Provisioning Manager 1.0.

  - SAP Host Agent standalone installation.

  - i Note
    - For SAP Host Agent standalone installation, you can either use Software Provisioning Manager 2.0 or Software Provisioning Manager 1.0.

- Software Provisioning Manager 1.0 is used for:
  - Installation, system copy, system rename of SAP Solution Manager 7.X and Diagnostics Agent.
  - Installation of standalone engines and clients.
**i Note**

For SAP Web Dispatcher or SAP Host Agent standalone installation, you can either use Software Provisioning Manager **1.0** or Software Provisioning Manager **2.0**.

- Installation, system copy, system rename, and dual-stack split of SAP systems whose database is not SAP HANA.
- Installation, system copy, and system rename of **Dual-stack** and **Java single stack** systems.
- Installation, system copy, and system rename of **ABAP single stack** systems whose database is SAP HANA database, but whose release is one of the following:
  - SAP BW/4HANA 1.0 or lower
  - SAP S/4HANA 1709 or lower
  - SAP NetWeaver AS for ABAP 7.52 or lower


**Naming Conventions**

“SAPinst” has been renamed to “Software Provisioning Manager” (“installer” for short), but the terms “SAPinst” and “sapinst” are still used in:

- The name of the technical framework of Software Provisioning Manager. For more information about the SAPinst Framework, see SAP Note [2393060](https://support.sap.com/).
- Texts and screen elements in the Software Provisioning Manager GUI
- Names of executables, for example sapinst
- Names of command line parameters, for example SAPINST_HTTPS_PORT
- Names of operating system user groups, such as the additional group sapinst

In this documentation, we generally refer to Software Provisioning Manager as the “installer”. We only use the term “Software Provisioning Manager” if this is required for technical reasons, and “Software Provisioning Manager **2.0**” if there is a significant difference compared to “Software Provisioning Manager **1.0**”.

**1.1.1 SAP Products Supported by Software Provisioning Manager 2.0**

Here you find the list of SAP products supported by Software Provisioning Manager 2.0.

<table>
<thead>
<tr>
<th>SAP Product</th>
<th>Based on the Following SAP System Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP S/4HANA 1809 Server</td>
<td>foundation on ABAP Platform 1809, version for SAP HANA</td>
</tr>
<tr>
<td>SAP ABAP Foundation 1809 on SAP HANA</td>
<td></td>
</tr>
</tbody>
</table>

System Copy for SAP ABAP Systems Based on UNIX : SAP HANA 2.0 Database - Using Software Provisioning Manager 2.0

About this Document - System Copy for SAP ABAP Systems Based on UNIX : SAP HANA 2.0 Database - Using Software Provisioning Manager 2.0
More Information

For more information about recommended application server platforms, see SAP Note 2620910.

1.2 Naming Conventions

This section contains the naming conventions used in this documentation.

- “installer” refers to “Software Provisioning Manager 2.0” and to “Software Provisioning Manager” in general.
- “SAP system” or “ABAP system” refers to SAP systems based on:
  - foundation on ABAP Platform 1809, version for SAP HANA or higher
  - Note: For the sake of simplicity, in the following we abbreviate this product as ABAP Platform 1809.
  - SAP BW/4HANA 1.0 Support Release 1 or higher.
- System Copy
  Duplication of an SAP system. Certain SAP parameters might change in a copy. When you perform a system copy, the installer installs all the instances again, but it uses a copy of the source system database to set up the database.
- Source System and Target System
  The SAP system containing the original database is called the source system and the system to which the database copy is to be imported is called the target system. Their SAP system names are abbreviated to SOURCE_SAPSID and TARGET_SAPSID. The terms source database and target database are also used in this description.
- Homogeneous System Copy
  During homogeneous system copy, you use the same operating system and database platform as the original system.
- Heterogeneous System Copy
  During heterogeneous system copy, you change either the operating system or the database system, or both. Heterogeneous system copy is a synonym for migration. This method is not described in this documentation because it is not supported by Software Provisioning Manager 2.0 [page 7].
- Database Copy
  Database-dependent part of the system copy.
Placeholders such as `<SAPSID>` are used in commands. They are used in the same way as in the SAP system installation documentation. You must replace them with the values valid for your site. The following additional placeholders are used:

<table>
<thead>
<tr>
<th>Placeholder</th>
<th>Meaning</th>
<th>How to find out</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;SAPSID&gt;</code></td>
<td>SAP system ID</td>
<td>—</td>
</tr>
<tr>
<td><code>&lt;S_HOST&gt;</code></td>
<td>System name of the source host</td>
<td>Command <code>hostname</code></td>
</tr>
<tr>
<td><code>&lt;T_HOST&gt;</code></td>
<td>System name of the target host</td>
<td>Command <code>hostname</code></td>
</tr>
<tr>
<td><code>&lt;S_SAPSID&gt;</code></td>
<td>SAP system ID of the source system</td>
<td><code>&lt;SAPSID&gt;</code> of the original system</td>
</tr>
<tr>
<td><code>&lt;T_SAPSID&gt;</code></td>
<td>SAP system ID of the target system</td>
<td><code>&lt;SAPSID&gt;</code> of the target system</td>
</tr>
<tr>
<td><code>&lt;S_DBSID&gt;</code></td>
<td>Database ID of the source system</td>
<td><code>&lt;DBSID&gt;</code> of the original system</td>
</tr>
<tr>
<td><code>&lt;T_DBSID&gt;</code></td>
<td>Database ID of the target system</td>
<td><code>&lt;DBSID&gt;</code> of the target system</td>
</tr>
</tbody>
</table>

**Note**

Database ID `<DBSID>` identifies the database instance. The installer prompts you for the `<DBSID>` when you are installing the database instance.

The `<DBSID>` can be the same on IBM i as the `<SAPSID>`.

## 1.3 New Features

The sections below provide an overview of the new features in Software Provisioning Manager 2.0 (the “installer” for short).

## Feature Description

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support of Standalone Enqueue Server 2 and Enqueue Replicator 2</td>
<td>For SAP systems based on ABAP Platform 1809 or higher, Software Provisioning Manager 2.0 installs the ASCS instance by default with the new Standalone Enqueue Server 2, and the ERS instance with the new Enqueue Replicator 2. For more information about the Standalone Enqueue Server 2 and the Enqueue Replicator 2, see the SAP Online Documentation [page 13] at Application Server ABAP Infrastructure &gt; Components of the Application Server for ABAP &gt; Standalone Enqueue Server 2 and Application Server ABAP Infrastructure &gt; Components of the Application Server for ABAP &gt; High Availability with Standalone Enqueue Server 2.</td>
<td>Software Provisioning Manager 2.0 SP01 (SL Toolset 1.0 SP24)</td>
</tr>
<tr>
<td>ABAP Platform 1809 or higher: Archive-Based Installation of all Installation Software</td>
<td>For SAP systems based on ABAP Platform 1809 or higher, the database server and client software is provided as installation archives, which you can download from <a href="https://launchpad.support.sap.com/#/software-center">https://launchpad.support.sap.com/#/software-center</a>. Physical SAP HANA 2.0 database server and client media, as well as physical database installation export media and language media are no longer required for the installation.</td>
<td>Software Provisioning Manager 2.0 SP01 (SL Toolset 1.0 SP24)</td>
</tr>
<tr>
<td>Homogeneous System Copy</td>
<td>Software Provisioning Manager 2.0 only supports homogeneous system copy using a SAP HANA database backup.</td>
<td>Software Provisioning Manager 2.0 SP00 (SL Toolset 1.0 SP23)</td>
</tr>
<tr>
<td>New Installer Option Download Software Packages for Maintenance Planner Transaction</td>
<td>If you perform an installation using a stack configuration file, you can now download the required software packages according to a Maintenance Plan. For more information, see <a href="https://blogs.sap.com/2018/06/01/software-provisioning-manager-new-option-for-standalone-download-service/">https://blogs.sap.com/2018/06/01/software-provisioning-manager-new-option-for-standalone-download-service/</a>.</td>
<td>Software Provisioning Manager 2.0 SP00 (SL Toolset 1.0 SP23)</td>
</tr>
<tr>
<td>Validity Check for SUM* . SAR Archive</td>
<td>If you perform an installation using a stack configuration file and choose to extract the SUM* . SAR archive, the validity of this archive is now checked by the installer.</td>
<td>Software Provisioning Manager 2.0 SP00 (SL Toolset 1.0 SP23)</td>
</tr>
</tbody>
</table>

### 1.4 Constraints

This section contains the constraints valid for the system copy procedures described in this documentation.

- Software Provisioning Manager 2.0 is only supported for SAP HANA 2.0 database.
- Only perform a system copy if you have experience in copying systems and thorough knowledge of the operating system, the database, and the ABAP Dictionary. Only perform a heterogeneous system copy (of a production, development, or test (QA) system) if you are a certified system support consultant or a certified SAP Technical Consultant.

- System copy is not supported for the Diagnostics Agent. For more information and guidance see the Diagnostics Agent Maintenance Procedures article at http://wiki.scn.sap.com/wiki/x/n4elfjgf.

- SAP does not support client transport as a system copy method. Transporting production clients is not supported at all. You can use client transport for the initial setup of an SAP system infrastructure. This documentation does not cover the client copy procedure.

- This documentation does not describe how to export and import a database with the installation tools for reorganization purposes. Use the appropriate tools for database reorganization, as SAP does not support this installation option.

- If you have made modifications in your development system and want to copy your quality assurance or production system onto the development system, see SAP Note 130906.

- This documentation describes how to copy data from one SAP system to another SAP system based on SAP Netweaver Application Server. This documentation does not describe how to copy data from non-SAP systems to SAP systems.

- SAP does not support all data archiving operations after a system copy. If you used data archiving in the source system, you might not always have access from the target system to the archive files that were created. For more information, see SAP Note 153433 and Data Management Landscape & Transformation Solutions at https://support.sap.com/dm.

  Access from the target system to archived files in the source system without a dedicated archive migration project is only supported as follows:
  - You have copied a source system that uses external data archiving. The target system has read-only access to this archive.
  - You have copied a source system that uses data archiving locally. You can either arrange network access for appropriate archive file sharing or copy all archive files to the file system of the target system.

  **i Note**

  **Only valid for SAP Business Warehouse:**

  If you use ADK-based archiving of request administration data in SAP Business Warehouse, you have to copy all archive files related to archiving object BWREQARCH to the file system of the target system. Only then write access (like deletion of requests, deletion of the complete data target content, further upload of data to other targets, changing the quality status of requests or InfoProvider rebuild) to requests with archived administration data is possible in the target system of the copy.

  In all other cases, contact Data Management Landscape & Transformation Solutions at https://support.sap.com/dm.

- When you perform a system copy, all product instances or usage types in the source system are copied to the target system. This means that none of the product instances or usage types in the target system can be excluded from the system copy, nor can you select product instances or usage types.

- “Dos and Don’ts” for system copy:
  - **Do:**
    - Follow the Open SQL standard.
○ Make sure that all communication runs through the database pool.

○ **Don’t:**
  ○ Save any system and infrastructure-specific data in business objects. Use a pointer to the central storage of such information, for example:
    ○ SAP system ID and SID (SAPSID = SID = SAP system name)
    ○ Host name
    ○ IP addresses
    ○ Services and ports
    ○ Logical destinations and logical system names
    ○ Other technical infrastructure names
  ○ Use file system persistency.
  ○ Set up dependencies between Java and ABAP.

### 1.5 Accessing the SAP Online Documentation

This section contains the paths for the product-specific online documentation referenced from this documentation.

The references to the SAP Online Documentation in this guide always refer to the following on the SAP Help Portal:

- SAP systems based on foundation on ABAP Platform 1809, version for SAP HANA ("ABAP Platform 1809" for short) or higher:

- SAP systems based on SAP BW/4HANA <1.0 SR1 or higher>:
  > Application Server for ABAP > SAP NetWeaver Library: Function-Oriented View

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System Copy for SAP ABAP Systems Based on UNIX : SAP HANA 2.0 Database - Using Software Provisioning Manager 2.0

About this Document - System Copy for SAP ABAP Systems Based on UNIX : SAP HANA 2.0 Database - Using Software Provisioning Manager 2.0
This quick guide describes the basic steps of the procedure of the homogeneous system copy of SAP HANA database using backup and recovery. Detailed information about the steps are available in the linked sections.

i Note
If the target system already exists and you only want to replace the content of the database, see Copying the Database Only – Refresh Database Content [page 139].

Prerequisites

- Your source system is an SAP system with SAP HANA as the primary database.
- You have installed SAP HANA Studio and added the source system using Add System on the Systems view.
- The version of the SAP HANA database server and SAP HANA Studio must have at least Version 2.0.
- The platform of the source database must have the same endianness as the platform of the target database. Thus, homogeneous system copies using backup and recovery are only possible with the following operating system platforms:

<table>
<thead>
<tr>
<th>Platform of the source database</th>
<th>Supported platform of the target database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux on Intel-based hardware platforms</td>
<td>Linux on Intel-based hardware platforms</td>
</tr>
<tr>
<td></td>
<td>Linux on IBM Power Systems (Little-Endian)</td>
</tr>
<tr>
<td>Linux on IBM Power Systems (Big-Endian)</td>
<td>Linux on IBM Power Systems (Big-Endian)</td>
</tr>
<tr>
<td>Linux on IBM Power Systems (Little-Endian)</td>
<td>Linux on Intel-based hardware platforms</td>
</tr>
<tr>
<td></td>
<td>Linux on IBM Power Systems (Little-Endian)</td>
</tr>
</tbody>
</table>

For more details, see the following sections:

- Planning the System Copy [page 17].
- Planning the Target System [page 22].

Context

This section describes a scenario such as the following: You want to copy the BW system PRD connected to the database PR1 to the BW system DEV connected to the database DV1. The name of the ABAP schema in PR1 is SAPPRD. Therefore, PRD is the source system (the system that is to be copied), PR1 is the source database (the database system that is to be copied), DEV is the target system (the copied system), and DV1 is the target database.
database (the target database system). SAPPRD is the (database) schema (the schema name) or the database user of the system.

Procedure

1. Install the target system with the target database.
   The version of the target database must be the same as or higher than the version of the source database.
   For more information, see Preparation [page 75].

2. Create a database backup using the SAP HANA Database Studio.
   For more information, see Creating the Database Backup [page 111].
   If your source database is a SAP HANA multitenant database container, create a backup of the tenant database.
   For more information, see Creating the Backup for a Tenant Database [page 111].
   a. In the SAP HANA Studio, right-click the database system that is to be copied and choose Backup....
      If you use SAP HANA multitenant database containers, right-click on the SYSTEMDB database of the system to be copied, and choose Backup Tenant Database....
   b. Select Complete Data Backup as the Backup Type and select File or Backint as Destination Type.
      If you select File as the Destination Type, proceed as follows: Under Backup Destination, specify the directory in which you want to store the backup files.
      For both backup types, proceed as follows: Under Backup Prefix, specify a prefix for the backup file.
   c. Ensure that the backup directory contains sufficient free space for the backup and that no backup that has the same prefix already exists there.
   d. Choose Next.
   e. Check your entries and choose Finish to start the backup or choose Back to correct your entries.
   f. Wait until the backup has been created and then close the dialog box.
   For more information, see the SAP HANA Administration Guide at http://help.sap.com/hana_platform System Administration.

3. Transfer the backup to the target database system.
   Copy all files of the backup to the directory that can be read from the target database system. The backup files are located in the directory of the source database system that is specified in step 1 and begin with the prefix that is specified in step 1.
   For more information, see Transferring the Backup to the Target Database System. [page 112].

4. Run the installer to install the target system and to import the backup.
   a. Start the installer as described in Running the Installer [page 124].
   c. Follow the instructions in the installer input screens and enter the required parameters.
      o In the SAP System Database screen, choose Homogeneous System Copy (SAP HANA-specific Backup/Recovery).
○ In the **Database Schema** screens, enter the schema names and the passwords that match the data in the backup. For example, if you install a DEV system and use a backup of the PRD system for the installation, you must specify SAPPRD as the schema in the screens instead of SAPDEV. The same applies to the DBA Cockpit schema.

○ In the **Database Recovery** screens, first enter the password of the `<sapsid>adm` user of the target database and the related SAPControl URL. The system prefills the SAPControl URL. It usually does not have to be changed. In addition, select **File** or **Backint** as the **Destination Type** in accordance with the backup type created in step 1.

○ In the next screen, enter the directory and the name (prefix) of the backup. As the directory, enter the directory to which you copied the backup files in step 2. As a prefix enter the prefix of the backup that you chose in step 1. In the case of a Backint backup, enter the database SID `<DBSID>` of the source system. In the case of a file backup, you can also specify whether you want the system to check whether the backup exists. If this check is deactivated and the backup does not exist, the installation will terminate with an error at a later time.

○ In the SAP HANA License screen, you can then choose whether or not you want to install a new SAP HANA license in the target database system. A new license is required because the backup that is to be implemented in the target database system derives from another source database, that is the hardware or the `<DBSID>` has changed.

For more information, see Installing the Target System [page 112].

5. Perform follow-up activities:

   a. Check the secondary database connections
      After you have copied the database, the target system has the same database connections - for example, for the DBA Cockpit as the source system - this might cause problems. Therefore, you must check the database connections in transaction `DBCO` and adjust them if required.

   b. Check the RFC connections
      After you have copied the database, the target system has the same RFC connections as the source system; this may cause problems. Therefore, you must check the RFC connections in transaction `SM59` and adjust them if required.

   c. Check the spool configuration
      After you have copied the database, the target system has the same spool configuration as the source system. Therefore, you must check the spool configuration in transaction `SPAD` and adjust it if required.

   d. Changing the logical system name
      If the System ID of the ABAP system has changed, use transaction `BDLS` to change the logical system name.

   e. Adjusting the SAP HANA calculation views
      If you copied a BW system, you must adjust the SAP HANA calculation to the new system names views after the migration. This is done when calling the report `RS_BW_POST_MIGRATION` with all options.

For more information, see:

○ Performing Follow-Up Activities in the Source System [page 141]

○ Performing Follow-Up Activities in the Target System [page 141]
3 Planning

1. You plan the system copy [page 17].
2. You plan the installation of the target system [page 22].

Next Steps

Preparation [page 75]

3.1 Planning the System Copy

1. Use Cases for System Copy [page 17]
2. System Copy Methods [page 18]
3. Creating a System Copy Plan [page 19]
4. Basic Planning Aspects and Parameters [page 19]

Next Steps

Planning the Target System [page 22]

3.1.1 Use Cases for System Copy

You can apply the system copy for the following:

- Setting up system landscapes, where the SAP systems have different system IDs (<SAPSID>).
- Providing systems for testing, demonstration, training, and standby.

To create these systems you can either perform an initial system copy or use a database export to overwrite the database of an already existing target system (refresh use case). Depending on the purpose of the system, it might be advisable to use the same SAP system ID, even though this prevents you from including the system in a system group for transports.

Note

You should perform a system copy in a test system first. This way you can identify customer-specific problems that might result from modifications.
• Changing the operating system.
  You can use different operating system releases for the source and target systems, but the SAP system release of the source and target systems must be the same.

• Changing the hardware.

**Note**
You can set up the SAP system infrastructure (development, quality assurance, and production system) without making a system copy as follows:

1. Install all SAP systems, starting with the development system. Customize the development system as described in the implementation documentation.
2. Transport the client-dependent and client-independent data to the quality assurance and production systems.

However, if you do not follow this concept, you can also install a system, customize it, and then perform a system copy.

### 3.1.2 System Copy Methods

You can choose between the following system copy methods:

Before making your decision, read the documentation SAP System Copy and Migration at [https://wiki.scn.sap.com/wiki/display/SL/System+Copy+and+Migration](https://wiki.scn.sap.com/wiki/display/SL/System+Copy+and+Migration) in order to make yourself familiar with the available system copy and migration procedures.

• **The database-specific procedure using tools provided by the database vendor**
  For more information, see Quick Guide [page 14].

• **Copy single instances only**
  The following options are supported:
  
  o You can refresh the content of an existing database without having to export the database content, but using a database backup.

  → **Recommendation**
  
  We recommend that you use option Refresh Database Content if you need to equalize the database content of two or more already existing and configured systems, for example in automatized system landscapes with “template” systems which have to correspond to precisely defined standards, such as predefined host names, network settings, users, security policies.

  For more information, see Copying the Database Only – Refresh Database Content [page 139].

  → **Caution**
  
  You cannot copy single product instances, usage types, or components!

• **Changing the system variant**
  If you want to change your system variant (for example, if you want to make your standard system a distributed or high-availability system), proceed as follows:
  
  1. Create a database backup.
2. For the import, choose the relevant system copy options as described in the process flows of the System Copy Procedure. For more information, see Quick Guide [page 14].

3.1.3 Creating a System Copy Plan

Create a plan to perform the system copy.

Procedure

1. When copying a system that contains production data, choose the moment for the copy carefully. This could be a month-end or year-end closing.
2. Consider the downtime of the source system (for preparations and copying) when planning the system copy.
3. Consider a test run.
   Perform a test run of the system copy. You can use the time taken by the test run to calculate the system downtime:
   - If you want your target system to replace your source system, try to perform a complete test run. This means that the entire database is exported from the source system, transferred to the target system, and imported there. System downtime is approximately equal to the total test time (that is, time for export, transport, and import).
   - If you do not want to replace your source system, a partial test run (export of the entire database or parts of it) can be sufficient to calculate the system downtime. The source system is only down for the time of the export. Calculating the system downtime is particularly important for very large databases (VLDB) or when tapes are being used. The test run is also to determine the amount of export data. Choose the best data transfer method (for example, FTP or tape). We recommend that you only perform read/write actions on local file systems.
4. Define a schedule for the test migration and the final migration.

3.1.4 Basic Planning Aspects and Parameters

This section provides information about basic planning aspects and parameters required for system copy.

Source System Prerequisites

Your source system is an SAP system with SAP HANA as the primary database, you have installed SAP HANA Studio and added the source system using Add System on the Systems view.
The version of the SAP HANA database server and SAP HANA Studio must have at least Version 2.0. For more information about SAP HANA Studio, see the SAP HANA Administration Tools section in the SAP HANA Administration Guide at http://help.sap.com/hana_platform System Administration.

The platform of the source database must have the same endianness as the platform of the target database. Thus, homogeneous system copies via backup and recovery are only possible between the following platforms:

<table>
<thead>
<tr>
<th>Platform of the source database</th>
<th>Supported platform of the target database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linux on Intel-based hardware platforms</td>
<td>Linux on Intel-based hardware platforms</td>
</tr>
<tr>
<td></td>
<td>Linux on IBM Power Systems (Little-Endian)</td>
</tr>
<tr>
<td>Linux on IBM Power Systems (Big-Endian)</td>
<td>Linux on IBM Power Systems (Big-Endian)</td>
</tr>
<tr>
<td>Linux on IBM Power Systems (Little-Endian)</td>
<td>Linux on Intel-based hardware platforms</td>
</tr>
<tr>
<td></td>
<td>Linux on IBM Power Systems (Little-Endian)</td>
</tr>
</tbody>
</table>

**Configuration Analysis and Hardware Configuration**

- In the event of a **major change in hardware configuration** (for example, new machine type, new hard disk configuration, new file system type), consult your SAP-authorized hardware partner.
- You need to determine the following:
  - Number of application servers
  - Expected size of the database
  - Additional disks or other hardware required
  - Required memory

**Note**

Refer to the section on hardware and software requirements in the SAP system installation documentation to determine the system requirements.

**Choosing an SAP system ID**

You can choose the new SAP system ID `<TARGET_SAPSID>` freely during a new installation.

**Caution**

To meet the requirements of the Workbench Organizer, you must choose different SAP system IDs for different SAP systems.

Make sure that your SAP system ID:
- Is unique throughout your organization
Do not use an existing <SAPSID> when installing a new SAP system.

- Consists of exactly three alphanumeric characters
- Contains only uppercase letters
- Has a letter for the first character
- Does not include any of the reserved IDs listed in SAP Note 1979280.
- If you want to install an additional application server instance, make sure that no Gateway instance with the same SAP System ID (SAPSID) exists in your SAP system landscape.

**SAP License**

Once the installation is completed and the SAP system copy has been imported, you require a new license key for the target system. The license key of the source system is not valid for this system.

For more information about SAP license keys, see http://support.sap.com/licensekey or SAP Note 94998.

**Archiving files**

Data that has been archived in the source system (data that does not reside in the database but was moved to a different storage location using SAP Archive Management) must be made accessible in the target system. Adapt the file residence information in the target system.

For more information, see the SAP Online Documentation [page 13] at <Release> Product Documentation > Operations Guide.

Access to archive files is platform-independent.

**When Using SAP Landscape Transformation Replication Server**

If you use SAP Landscape Transformation Replication Server in your system landscape, we recommend that you stop replication and remove existing database triggers before you start the system copy. For more information about SAP Landscape Transformation Replication Server and its dependencies, see SAP Note 1605140.

**More Information**

3.2 Planning the Target System

This planning checklist guides you through the planning steps required for the target system installation.

Planning Checklist [page 22]

3.2.1 Planning Checklist

This section includes the planning steps that you have to complete for the following installation options.

- Standard, distributed, or high-availability system
- Additional application server instance

Detailed information about the steps are available in the linked sections.

Prerequisites

1. You have planned your SAP system landscape according to the release-specific (Master) Installation Guide for your SAP NetWeaver application as described in Before You Start [page 23].
2. You have decided on your installation option (see Installation Options Covered by this Guide [page 24]).

Standard, Distributed, or High-Availability System

**Note**

In a standard system [page 24], all mandatory instances except the database instance are normally installed on one host. Therefore, if you are installing a standard system, you can ignore references to other hosts.

The SAP HANA database is normally pre-installed by SAP partners before you start the installation. For more information about how to install the SAP HANA database, see the SAP HANA Server Installation and Update Guide at https://help.sap.com/hana_platform Installation and Upgrade. The database instance is remotely installed by Software Provisioning Manager (the “installer”) from the primary application server host.

However, if you are installing a standard system [page 24] on Linux, you can install SAP systems on the same host as the SAP HANA database, without applying additional environment settings. For more information, see SAP Note 1953429.

**Note**

You cannot install multiple SAP systems in a single tenant database (MCOD). Instead, you must use different tenant databases for each SAP System.
1. If you want to install an SAP ABAP system along with the required Support Package stack and ABAP Add-Ons in one implementation run, you need to plan the desired installation target using the maintenance planner at https://apps.support.sap.com/sap/support/mp. In the maintenance planner, a stack XML file with the desired Support Package stack and Add-On information is generated, which you then hand over to Software Provisioning Manager (the “installer” for short) by calling it with command line parameter SAPINST_STACK_XML=<Absolute_Path_To_Stack_XML_File>. Included constraints and defaults defined in the stack XML file are then used for the initial installation by Software Provisioning Manager and for the application of Support Package stacks and Add-Ons by the Software Update Manager (SUM). For more information, see Installation Using a Stack Configuration File (Optional) [page 37].

→ Recommendation

We recommend that you perform the installation using a stack configuration file for all new products such as SAP S/4HANASAP on Premise.

2. You check the hardware and software requirements [page 39] on every installation host.
3. You plan how to set up user and access management [page 51].
4. You identify Basic SAP System Installation Parameters [page 52].
5. You decide on the transport host to use [page 68].
6. You decide whether you want to integrate LDAP Directory Services in your SAP system [page 171].
7. To install a high-availability system, you read Planning the Switchover Cluster for High Availability [page 68].
8. Continue with Preparation [page 78].

Additional Application Server Instance

1. You check the hardware and software requirements [page 39] for every installation host on which you want to install one or more additional application server instances.
2. You identify Basic SAP System Installation Parameters [page 52].
3. Continue with Preparation [page 78].

3.2.2 Before You Start

Make sure that you have read the release-specific “Installation Guide” - also called “Master Guide” for SAP BW/4HANA - for your SAP S/4HANA application and the central release note 2568783 of Software Provisioning Manager 2.0, before you continue.

This guide is the central document leading you through the overall implementation process for your SAP system installation. It contains important information about the overall implementation sequence, that is activities you have to perform before and after the installation process described in this installation guide.

You can find a printed version of this guide in your installation package or you can download the latest version from https://help.sap.com.
The following table lists the “Installation Guide” - or “Master Guide” - of the SAP system application for which you can use this documentation, along with the available quick link or path to the appropriate download location:

<table>
<thead>
<tr>
<th>Document</th>
<th>Internet Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;Version 1809 or higher&gt; Product Documentation Installation Guide</td>
</tr>
<tr>
<td>Master Guide - SAP BW/4HANA &lt;1.0 SR1 or higher&gt;</td>
<td><a href="https://help.sap.com/viewer/p/SAP_BW4HANA/">https://help.sap.com/viewer/p/SAP_BW4HANA/</a></td>
</tr>
<tr>
<td></td>
<td>Installation and Upgrade</td>
</tr>
</tbody>
</table>

### 3.2.3 Installation Options Covered by this Guide

This section shows the installation options covered by this installation guide. You have to decide what exactly you want to install because the steps you have to perform vary according to the installation option you choose.

**i Note**

Regardless of whether you are installing a standard, distributed, or high-availability system, the SAP HANA database is normally installed on a dedicated database server. It is normally pre-installed by SAP partners before you start the installation of the SAP system instances. During the installation of the SAP system, Software Provisioning Manager (the “installer”) accesses the SAP HANA database remotely to perform the necessary database-specific installation steps.

However, if you are installing a standard system on Linux, you can install SAP systems on the same host as the SAP HANA database, without applying additional environment settings. For more information, see SAP Note 1953429.

For more information about how to install the SAP HANA database, see the SAP HANA Server Installation and Update Guide at https://help.sap.com/hana_platform Installation and Upgrade.

After you have decided on the installation option that you want to use, continue with Planning [page 22].

### 3.2.3.1 Standard System

In a standard system, all main instances except the SAP HANA database instance run on a single host.

There are the following instances:
- ABAP Central services instance (ASCS instance)
  - Contains the ABAP message server and the Standalone Enqueue Server
i Note

ASCS instance with new “Standalone Enqueue Server 2” versus ASCS instance with classic “Standalone Enqueue Server”:

○ SAP systems based on ABAP Platform 1809 or higher: By default, the ASCS instance is installed with the new Standalone Enqueue Server 2. From a Software Provisioning Manager 2.0 perspective, the installation procedure for the ASCS instance with “Standalone Enqueue Server 2” is the same as for the ASCS instance with the classic “Standalone Enqueue Server”. There are no additional or different installation parameters.

  For more information, see the SAP Online Documentation [page 13] at Application Server ABAP Infrastructure ➔ Components of the Application Server for ABAP ➔ Standalone Enqueue Server 2 ➔ Application Server ABAP Infrastructure ➔ Components of the Application Server for ABAP ➔ Standalone Enqueue Server 2.

○ SAP systems based on SAP BW/4HANA 1.0 SR1 (based on SAP NetWeaver 7.5): The ASCS instance is installed with the classic “Standalone Enqueue Server” by default. You cannot switch to the new “Standalone Enqueue Server 2” after the installation has completed.

Since - from a Software Provisioning Manager 2.0 perspective - the “Standalone Enqueue Server 2” is installed with the ASCS instance the same way as the classic “Standalone Enqueue Server”, both are abbreviated as “Standalone Enqueue Server” in this documentation.

○ Optionally, you can install the ASCS instance with an integrated SAP Web Dispatcher. For more information, see ASCS Instance with Integrated SAP Web Dispatcher [page 34].

○ Optionally, you can install the ASCS instance with an integrated gateway. For more information, see ASCS Instance with Integrated Gateway [page 36].

- SAP HANA database instance (DB)
- Primary application server instance (PAS instance)
If you are installing a standard system on Linux, you can install SAP systems on the same host as the SAP HANA database, without applying additional environment settings, as shown in the figure below. For more information, see SAP Note 1953429.
3.2.3.2 Distributed System

An SAP system consists of SAP instances. An SAP instance is a group of processes that are started and stopped at the same time.

In a distributed system, every instance can run on a separate host:

- ABAP Central services instance (ASCS instance)
  Contains the ABAP message server and the Standalone Enqueue Server

  **Note**
  ASCS instance with new “Standalone Enqueue Server 2” versus ASCS instance with classic “Standalone Enqueue Server”:
  - **SAP systems based on ABAP Platform 1809 or higher**: By default, the ASCS instance is installed with the new Standalone Enqueue Server 2. From a Software Provisioning Manager 2.0 perspective, the installation procedure for the ASCS instance with “Standalone Enqueue Server 2” is the same as for the ASCS instance with the classic “Standalone Enqueue Server”, there are no additional or different installation parameters.
    For more information, see the [SAP Online Documentation](https://help.sap.com) at Application Server ABAP Infrastructure > Components of the Application Server for ABAP > Standalone Enqueue Server 2 and Application Server ABAP Infrastructure > Components of the Application Server for ABAP > Standalone Enqueue Server 2.
  - **SAP systems based on SAP BW/4HANA 1.0 SR1 (based on SAP NetWeaver 7.5)**: The ASCS instance is installed with the classic “Standalone Enqueue Server” by default. You cannot switch to the new “Standalone Enqueue Server 2” after the installation has completed.
    Since - from a Software Provisioning Manager 2.0 perspective - the “Standalone Enqueue Server 2” is installed with the ASCS instance the same way as the classic “Standalone Enqueue Server”, both are abbreviated as “Standalone Enqueue Server” in this documentation.
  - Optionally, you can install the ASCS instance with an integrated SAP Web Dispatcher. For more information, see ASCS Instance with Integrated SAP Web Dispatcher.
  - Optionally, you can install the ASCS instance with an integrated gateway. For more information, see ASCS Instance with Integrated Gateway.

- SAP HANA database instance (DB)
  The ABAP stack uses its own database schema in the database.

- Primary application server instance (PAS)

The graphics below assume that you use the global directories of the ASCS instance as global file system. That means that the host with the ASCS instance is the SAP global host. However, you can also separately install the global directories on any host of your SAP system landscape.

You can also use the SAP transport host or the host with the global file system (SAP global host) as your primary application server instance host.

Optionally, you can install one or more additional application server instances. For more information, see Installation of an Additional Application Server Instance.
3.2.3.3 High-Availability System

**Note**

SAP HANA can also have HA solutions. For more information contact your hardware partner and see the SAP HANA overview in the SAP HANA Data Center, which is available at [http://www.saphana.com/docs/DOC-2010](http://www.saphana.com/docs/DOC-2010).

An SAP system consists of SAP instances. An SAP instance is a group of processes that are started and stopped at the same time.

In a high-availability system, every instance can run on a separate host.

There are the following instances:

- ABAP central services instance (ASCS instance)
  
  Contains the ABAP message server and the Standalone Enqueue Server

**Note**

ASCS instance with new “Standalone Enqueue Server 2” versus ASCS instance with classic “Standalone Enqueue Server”:

- **SAP systems based on ABAP Platform 1809 or higher**: By default, the ASCS instance is installed with the new Standalone Enqueue Server 2. From a Software Provisioning Manager 2.0 perspective, the installation procedure for the ASCS instance with “Standalone Enqueue Server 2” is the same as for the ASCS instance with the classic “Standalone Enqueue Server”. There are no additional or different installation parameters.

  For more information, see the SAP Online Documentation [page 13] at [Application Server ABAP Infrastructure > Components of the Application Server for ABAP > Standalone Enqueue Server 2](http://www.sap.com/docs).
and [Application Server ABAP Infrastructure ➤ Components of the Application Server for ABAP ➤ Standalone Enqueue Server 2]

○ SAP systems based on SAP BW/4HANA 1.0 SR1 (based on SAP NetWeaver 7.5): The ASCS instance is installed with the classic “Standalone Enqueue Server” by default. You cannot switch to the new “Standalone Enqueue Server 2” after the installation has completed.

Since - from a Software Provisioning Manager 2.0 perspective - the “Standalone Enqueue Server 2” is installed with the ASCS instance the same way as the classic “Standalone Enqueue Server”, both are abbreviated as “Standalone Enqueue Server” in this documentation.

○ Optionally you can install the ASCS instance with an integrated SAP Web Dispatcher. For more information, see ASCS Instance with Integrated SAP Web Dispatcher [page 34].

○ Optionally you can install the ASCS instance with an integrated gateway. For more information, see ASCS Instance with Integrated Gateway [page 36].

● ERS instance for the ASCS instance (mandatory)
The ERS instance contains the replication table, which is a copy of the lock table of the Standalone Enqueue Server in the ASCS instance.

i Note

ERS instance with new “Enqueue Replicator 2” versus ERS instance with classic “Enqueue Replication Server”:

○ SAP systems based on ABAP Platform 1809 or higher: By default, the ERS instance is installed with the new “Enqueue Replicator 2”. From a Software Provisioning Manager 2.0 perspective, the installation procedure for the ERS instance with the “Enqueue Replicator 2” is the same as for the ERS instance with the classic “Enqueue Replication Server”, there are no additional or different installation parameters.

For more information, see the SAP Online Documentation [page 13] at [Application Server ABAP Infrastructure ➤ Components of the Application Server for ABAP ➤ Standalone Enqueue Server 2]
and [Application Server ABAP Infrastructure ➤ Components of the Application Server for ABAP ➤ Standalone Enqueue Server 2 ➤ High Availability with Standalone Enqueue Server 2].

○ SAP systems based on SAP BW/4HANA 1.0 SR1 (based on SAP NetWeaver 7.5): The ERS instance is installed with the classic “Enqueue Replication Server” by default. You cannot switch to the new “Enqueue Replicator 2” after the installation has completed.

Since - from a Software Provisioning Manager 2.0 perspective - the “Enqueue Replicator 2” is installed with the ERS instance the same way as the classic “Enqueue Replication Server”, both are abbreviated as “ERS instance” in this documentation.

● SAP HANA database instance (DB)
● Primary application server instance (PAS)

The graphics below each assumes that you run the ASCS instance and the ERS instance on the switchover cluster infrastructure. However, you can also run other SAP system instances that are a single point of failure (SPOF) on a switchover cluster infrastructure, for example the database instance.

Both the ERS instance and the ASCS instance must be controlled by the cluster software, but the ERS instance must be in a failover group different from the failover group of the ASCS instance.
i Note

With the classic Standalone Enqueue Server in principle the so-called “polling” interface could be used. The ERS instance would not be clustered in that case. But because the HA partners on Unix typically do not use this approach, it is not described in detail in this guide. For more information about the polling concept, see the SAP Online Documentation [page 13] at SAP NetWeaver Application Server for ABAP > Components of SAP NetWeaver Application Server for ABAP > Standalone Enqueue Server > High Availability with the Standalone Enqueue Server.

To increase high availability by creating redundancy, we recommend that you install additional application server instances on hosts different from the primary application server instance host. For more information, see Installation of an Additional Application Server Instance [page 31].

The following figure shows an example for the distribution of the SAP system instances in a high-availability system.

i Note

On Linux, you can install SAP systems on the same host as the SAP HANA database as a high-availability setup with system replication, as shown in the figure below. For more information, see SAP Note 1953429. This approach is described as a special scenario setup in section SAP Systems Based on Application Server ABAP on One Host with SAP HANA Database - High-Availability Setup Based on SAP HANA System [page 184].
3.2.3.4 Additional Application Server Instance

You can install one or more additional application server instances for an existing SAP system. Additional application server instances are optional and can be installed on separate hosts.

An additional application server instance can run on:

- The host of any instance of the existing SAP system (exceptions see below)
- On a dedicated host

Note

If you want to install additional application server instances running on an operating system other than the primary application server instance, see Heterogeneous SAP System Installation [page 183]. For example, you need to do this if your primary application server instance runs on Linux for z System but the additional application server instance is to run on Windows.
Additional Application Server Instance for a Standard System

For example, the following figure shows a standard system with additional application server instances that run:

- On the main host of the SAP system, that is, on the host where the primary application server instance runs
- On dedicated hosts

For more information, see Standard System [page 24].

Additional Application Server Instance for a Distributed System

The following figure shows a distributed system with additional application server instances that run:

- On the main host of the SAP system, that is, on the host on which the primary application server instance runs
- On dedicated hosts

We do not recommend installing additional application server instances on the SAP global host.
Additional Application Server Instance for a Distributed System

For more information, see Distributed System [page 27].

Additional Application Server Instance for a High-Availability System

The following figure shows a high-availability system with additional application server instances that run:

- On the host of the primary application server instance
- On dedicated hosts
3.2.3.5 **ASCS Instance with Integrated SAP Web Dispatcher**

You can install an SAP Web Dispatcher integrated in the ASCS instance. If you select this option, an SAP Web Dispatcher is installed running within the ASCS instance. No separate SAP Web Dispatcher instance and no dedicated `<SAPSID>` are created for the SAP Web Dispatcher. We recommend this if you want to use the SAP Web Dispatcher for the system to which the ASCS instance belongs.

**i Note**

We only recommend this option for special scenarios. For more information, see SAP Note 908097. For an SAP Web Dispatcher installation, a standalone installation (see below) continues to be the default scenario.

For more information, see High-Availability System [page 28].
The SAP Web Dispatcher is located between the Web client (browser) and your SAP system that is running the Web application.

It acts as single point of entry for incoming requests (HTTP, HTTPS), defined by the IP address, port, and URL, and forwards them in turn to the application server (AS) of the SAP system.

The SAP Web Dispatcher receives information about the SAP system that it needs for load distribution (load balancing) from the message server and application server via HTTP.

**Installation of “Standalone” SAP Web Dispatcher with its own <SAPSID> and Instance**

If you want to install an SAP Web Dispatcher for another system - that is not for the system for which you use the ASCS instance and with its own SAP system ID and instance number - you have to install SAP Web Dispatcher separately as described in the documentation which you can find under [http://support.sap.com/sitoolset](http://support.sap.com/sitoolset) ➔ System Provisioning ➔ Installation Option of Software Provisioning Manager ➔ Guide for SAP Web Dispatcher for SAP NetWeaver 7.0 or Higher ➔
More Information

For more information about the architecture and the functions of SAP Web Dispatcher, see the SAP Web Dispatcher documentation in the SAP Online Documentation [page 13] at:

Application Server Infrastructure » Components of SAP NetWeaver Application Server » SAP Web Dispatcher

Related Information

Parameters for Additional Components to be Included in the ASCS Instance (Optional) [page 67]

3.2.3.6 ASCS Instance with Integrated Gateway

You can install a gateway integrated in the ASCS instance. If you select this option, a gateway is installed within the ASCS instance.

i Note

No separate standalone gateway instance and no dedicated <SAPSID> are created for the gateway.
The gateway enables communication between work processes and external programs, as well as communication between work processes from different instances or SAP systems.

You can also install a standalone gateway instance. For more information, see the documentation *Installation Guide – Installation of a Standalone Gateway Instance for SAP Systems Based on SAP NetWeaver* at [http://support.sap.com/sitoolset System Provisioning > Installation Option](http://support.sap.com/sitoolset).

**Related Information**

Parameters for Additional Components to be Included in the ASCS Instance (Optional) [page 67]

### 3.2.4 Installation Using a Stack Configuration File

The option to perform an installation using a stack configuration file (also called “up-to-date installation” or “UDI” for short) improves the process of provisioning an up-to-date SAP system by creating a unified consumption experience and a direct close collaboration between the involved tools, namely:

- LMDB in SAP Solution Manager
- Software Provisioning Manager (the “installer” for short)
Software Update Manager ("SUM")

The installer then can take over more default settings that are already predefined in the Maintenance Planner.

**Prerequisites**

- To be able to use the Maintenance Planner at https://apps.support.sap.com/sap/support/mp, your SAP Solution Manager system must have at least one of the following release and Support Package (SP) level:
  - SAP Solution Manager 7.2
  - SAP Solution Manager 7.1 SP06 or higher
  - SAP Solution Manager 7.0 SP 23 and you must have applied the following SAP Notes:
    - 1646604
    - 1783371
    - 1743695
- You must have implemented SAP Note 1940845 in your SAP Solution Manager system.
- For additional information about involved tools and supported SAP system releases, see SAP Note 2277574.

**Features**

An installation using a stack configuration file provides the following features:

- You can use a stack configuration file generated by the Maintenance Planner at https://apps.support.sap.com/sap/support/mp. The parameters contained in the stack configuration file can then be processed by the installer to get better integrated with SUM and to simplify the process of installation for a new system on a target software level. This makes IT administration easier by reducing the efforts in Total Cost of Ownership (TCO). For more information, see the Best Practice Guide to Planning Landscape Changes at https://wiki.scn.sap.com/wiki/display/SL/Landscape+Management++the+Process.

- When processing a stack configuration file, the installer can take over more default settings that are already predefined in the Maintenance Planner and offers more possibilities for automation as compared to when running without it. For more information about the benefits by comparing the existing process with the new improved process, see Up-To-Date Installation at https://blogs.sap.com/2016/10/21/up-to-date-installation-2/.

**i Note**

The procedure and the screenshots provided in the linked document are only an example to show how an up-to-date installation works in general for an example SAP product, and what the benefits are. This document is not intended to serve as a detailed instruction for an up-to-date-installation of any supported SAP product.

- You can use the installer to directly download the installation software from SAP by providing the Maintenance Plan to the installer while running installer option Download Software Packages for Maintenance Planner Transaction.
  For more information, see Downloading Software Packages for a Maintenance Planner Transaction [page 105]
Integration

For the additional input parameters that you need to specify, see Additional Parameters When Using a Stack Configuration File (Optional). You can find the link to this section in Related Information below.

In addition, each section in this guide describing steps that are completely or at least partially automatized when using a stack configuration file is marked with an appropriate note at the beginning. These are the following sections as listed in the adjacent section Related Information:

- Additional Parameters When Using a Stack Configuration File (Optional) [page 65]
- Running the Installer [page 124]
- Configuring the Change and Transport System [page 154]
- Applying the Latest Kernel and Support Package Stacks [page 157]
- Installing Additional Languages and Performing Language Transport [page 158]

3.2.5 Hardware and Software Requirements

Ensure that your hosts meet the hardware and software requirements for your operating system and the SAP instances. Otherwise you might experience problems when working with the SAP system.

Prerequisites

- Make sure that the host name meets the requirements listed in SAP Note 611361.
- Contact your OS vendor for the latest OS patches.
- Check your keyboard definitions.
- If you want to install a printer on a host other than the primary application server instance host (for example, on a separate database instance host), check whether the printer can be accessed under UNIX.

Procedure

1. Check the Product Availability Matrix at http://support.sap.com/pam for supported operating system releases.
2. Check the hardware and software requirements using:
   - The Prerequisite Checker: Standalone (optional) before the installation process
   - For more information, see Running the Prerequisites Check Standalone [page 40].
○ Integrated in the installation tool (mandatory) as part of the installation process
   For more information, see Running the Installer [page 124].
○ The hardware and software requirements tables in Requirements for the SAP System Hosts [page 41].

3. If you want to install a production system, the values provided by the Prerequisite Checker and the
   hardware and software requirements checklists are not sufficient. In addition, do the following:
   ○ You use the Quick Sizer tool available at http://sap.com/sizing.
   ○ You contact your hardware vendor, who can analyze the load and calculate suitable hardware sizing
     depending on:
     ○ The set of applications to be deployed
     ○ How intensively the applications are to be used
     ○ The number of users

### 3.2.5.1 Running the Prerequisites Check in Standalone Mode (Optional)

This section describes how to run the prerequisites check in standalone mode. Running the prerequisites
check in standalone mode is optional.

#### Context

When you install an SAP system, the installer automatically starts the prerequisites check and checks the
hardware and software requirements in the background. As an optional step during planning, you can also run
the prerequisites check in standalone mode to check the hardware and software requirements for your
operating system and the SAP instances before the actual installation.

→ Recommendation

We recommend that you use both the prerequisites check and the requirements tables for reference.

#### Procedure

1. Download and unpack the Software Provisioning Manager archive to a local directory as described in
   Downloading and Extracting the Software Provisioning Manager 2.0 Archive [page 100].
2. Make either the separate SAPEXE<Version>.SAR archive or the complete kernel medium available as
   described in Downloading the SAP Kernel [page 101].
3. Start the installer as described in Running the Installer [page 124].
4. On the Welcome screen, choose <SAP_Product> <Database> Preparations Prerequisites Check.
5. Follow the instructions in the installer dialogs and enter the required parameters.

**Note**

To find more information on each parameter during the *Define Parameters* phase, position the cursor on the required parameter input field, and choose either `F1` or the *HELP* tab. Then the available help text is displayed in the *HELP* tab.

After you have finished, the *Parameter Summary* screen appears. This screen summarizes all parameters that you have entered and that you want to have checked. If you want to make a change, select the relevant parameters and choose *Revise*.

6. To start the prerequisites check, choose *Next*.

**Results**

The *Prerequisite Checker Results* screen displays the results found. If required, you can also check the results in file `prerequisite_checker_results.html`, which you can find in the installation directory.

**Related Information**

- Downloading and Extracting the Software Provisioning Manager 2.0 Archive [page 100]
- Downloading the SAP Kernel [page 101]

**3.2.5.2 Requirements for the SAP System Hosts**

Every installation host must meet at least the requirements listed in the following tables. Most of the requirements are valid for every installation host whereas some requirements are instance-specific and are marked accordingly.

**Note**

The information here and in the following sections is **not** intended to replace the operating system documentation. For more information, see your operating system documentation.

**Related Information**

- General Installation Information for Your Operating System [page 42]
- Hardware Requirements [page 42]
- Software Requirements [page 47]
- Other Requirements [page 50]
3.2.5.2.1 General Installation Information for Your Operating System

Before checking the hardware and software requirements, we recommend that you make yourself familiar with some general information about installation of SAP systems on your operating system platform.

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX</td>
<td>Before you start the installation, make sure that you have read SAP Note 1972803. In addition, we also recommend that you check the information available in the SAP on AIX space on the SAP Community Network at <a href="https://www.sap.com/community/topic/aix.html">https://www.sap.com/community/topic/aix.html</a>.</td>
</tr>
<tr>
<td>HP-UX</td>
<td>Before you start the installation, make sure that you have read SAP Note 1075118. In addition, we also recommend that you check the information available in the SAP on HP-UX Best Practices space on the SAP Community Network at <a href="https://www.sap.com/community/topic/hp-ux.html">https://www.sap.com/community/topic/hp-ux.html</a>.</td>
</tr>
<tr>
<td>Linux</td>
<td>Before you start the installation, make sure that you have read the SAP Notes for your Linux distribution listed in the central SAP Note 2369910. In addition, we also recommend that you check the information available in the SAP on Linux space on the SAP Community Network at <a href="https://www.sap.com/community/topic/linux.html">https://www.sap.com/community/topic/linux.html</a>.</td>
</tr>
<tr>
<td>Solaris</td>
<td>Before you start the installation, make sure that you have read SAP Note 1669684. In addition, we also recommend that you check the information available in the SAP on Oracle Solaris space on the SAP Community Network at <a href="https://www.sap.com/community/topic/oracle-solaris.html">https://www.sap.com/community/topic/oracle-solaris.html</a>.</td>
</tr>
</tbody>
</table>

3.2.5.2.2 Hardware Requirements

Every installation host must meet at least the hardware requirements listed in the following tables. Most of the requirements are valid for every installation host whereas some requirements are instance-specific and are marked accordingly.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardware requirements</td>
<td>Your hardware must be 64-bit capable.</td>
</tr>
<tr>
<td>Requirement</td>
<td>Values and Activities</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Processing units</td>
<td>For application server instances and database instances: The number of physical or virtual processing units usable by the operating system image must be equal to or greater than 2. For an ASCS instance running on a separate host: One physical or virtual processing unit usable by the operating system image might be sufficient. Examples of processing units are processor cores or hardware threads (multithreading). In a virtualized environment, ensure that adequate processor resources are available to support the workloads of the running SAP systems.</td>
</tr>
<tr>
<td>Optical media drive</td>
<td>ISO 9660 compatible</td>
</tr>
</tbody>
</table>
Hard disk space

- **General Requirements:**
  1. 2 GB of temporary disk space for each set of installation archives (SAP kernel, RDBMS client, database installation export, languages) or - if you want to install SAP BW/4HANA 1.0 SR1 - for each physical installation medium. For more information, see Providing the Installation Software [page 98].
  2. 2 GB of temporary disk space for the installation.
  3. If an advanced disk array is available (for example, RAID), contact your hardware vendor to make sure that the data security requirements are covered by this technology.

- **Instance-Specific Requirements:**
  If you install several instances on one host, you have to add up the requirements accordingly.

  **Note**
  If you are installing a standard system on Linux, you can install SAP systems on the same host as the SAP HANA database. In this case, you must make sure that you include the disk space requirements for the SAP HANA database instance. The host needs to be able to support the SAP HANA database plus AS ABAP. Before installation, carefully estimate the sizing for your system, making sure that the host meets these combined requirements. For more information on sizing, see SAP Note 1793345.

- For more information about space requirements for the file systems and directories of the instances, see SAP Directories [page 87] and the appropriate database-specific information listed below.
  1. ABAP central services instance (ASCS):
     - Minimum 2 GB
     - If you install the ASCS instance with an integrated SAP Web Dispatcher, for the installation as such you require at least 1 GB of hard disk space in addition. For production use of the SAP Web Dispatcher, you need to reserve at least 5 GB.
     - If you install the ASCS instance with an integrated SAP Gateway, you require at least 1 GB of hard disk space in addition.
  2. ERS instance for the ASCS instance (if required):
     - Minimum 2 GB
  3. Primary application server instance:
     - Minimum 2 GB (SAP NetWeaver BW server: Minimum 30 GB)
     - Plus 1 GB for the SAP HANA database client software
  4. Additional application server instance:
     - Minimum 2 GB (SAP NetWeaver BW server: Minimum 30 GB)
     - Plus 1 GB for the SAP HANA database client software
  5. SAP Host Agent:
     - Minimum 0.5 GB
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAM</td>
<td>Only valid for 'Platform': AIX</td>
</tr>
</tbody>
</table>

**i Note**

**AIX:** Keep in mind that the operating system itself requires about 10% of the available RAM.

End of 'Platform': AIX

The following lists the RAM requirements for each SAP instance.

If you install **several instances on one host**, you have to add up the requirements accordingly.

**i Note**

If you are installing a standard system on **Linux**, you can install SAP systems on the **same host** as the SAP HANA database. In this case, you must make sure that you include the RAM requirements for the SAP HANA database instance. For more information, see SAP Note [1953429](https://support.sap.com).

- **ABAP central services instance (ASCS instance)**
  - Minimum 1 GB
  - If you install the ASCS instance with an integrated SAP Web Dispatcher, see SAP Note [2007212](https://support.sap.com) for memory consumption in productive use.

- **ERS instance for the ASCS instance (if required):**
  - Minimum 1 GB

- **Primary application server instance:**
  - Minimum 3 GB (BW server: Minimum 2 GB)

- **Additional application server instance:**
  - Minimum 3 GB

- **SAP Host Agent:**
  - Minimum 1 GB

<table>
<thead>
<tr>
<th>Platform: HP-UX</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HP-UX:</strong> Refer to SAP Note <a href="https://support.sap.com">1112627</a> for the commands to display the RAM size on HP-UX.</td>
<td></td>
</tr>
</tbody>
</table>

End of 'Platform': HP-UX

<table>
<thead>
<tr>
<th>Platform: Linux</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Linux:</strong> Refer to SAP Note <a href="https://support.sap.com">1382721</a> for the commands to display the RAM size on Linux.</td>
<td></td>
</tr>
</tbody>
</table>

End of 'Platform': Linux
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AIX: Paging space</strong></td>
<td>You need hard disk drives with sufficient paging space. You can calculate the required paging space as follows:</td>
</tr>
<tr>
<td></td>
<td>• Optimistic strategy:</td>
</tr>
<tr>
<td></td>
<td>You need at least 20 GB for the <strong>primary application server instance</strong> and at least another 10 GB for every <strong>additional application server instance</strong>.</td>
</tr>
<tr>
<td></td>
<td>• Defensive strategy:</td>
</tr>
<tr>
<td></td>
<td>3 * RAM, at least 20 GB</td>
</tr>
<tr>
<td></td>
<td>In addition, for the <strong>database instance</strong> you need:</td>
</tr>
<tr>
<td></td>
<td>• 0.75 * RAM, if RAM is greater than 8 GB</td>
</tr>
<tr>
<td></td>
<td>• 1 * RAM, if RAM is less than 8 GB</td>
</tr>
<tr>
<td></td>
<td>For the latest information about recommended paging space, see SAP Note <a href="#">1121904</a>.</td>
</tr>
<tr>
<td><strong>HP-UX: Swap space</strong></td>
<td>You need hard disk drives with sufficient space for swap. You can calculate the required swap space as follows:</td>
</tr>
<tr>
<td></td>
<td>2 * RAM, at least 20 GB</td>
</tr>
<tr>
<td></td>
<td><strong>SAP NetWeaver Process Integration 7.5 or higher</strong>: 2 * RAM or 80 GB, whichever is higher</td>
</tr>
<tr>
<td></td>
<td>For more information about HP-UX swap space recommendations and about how to set up swap space, see SAP Note <a href="#">1112627</a>.</td>
</tr>
<tr>
<td><strong>Linux: Swap space</strong></td>
<td>You need hard disk drives with sufficient space for swap. We recommend that you use the amount of swap space as described in SAP Note <a href="#">1597355</a>.</td>
</tr>
<tr>
<td></td>
<td>You might decide to use more or less swap space based on your individual system configuration and your own experience during daily usage of the SAP system.</td>
</tr>
<tr>
<td><strong>Oracle Solaris: Swap space</strong></td>
<td>You need hard disk drives with sufficient space for swap.</td>
</tr>
<tr>
<td></td>
<td>At least 20 GB are required. For more information, see SAP Note <a href="#">570375</a>.</td>
</tr>
</tbody>
</table>
Software Requirements

Every installation host must meet at least the software requirements listed in the following tables. Most of the requirements are valid for every installation host whereas some requirements are instance-specific and are marked accordingly.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AIX: Operating system version</strong></td>
<td>Your operating system platform must be 64-bit.</td>
</tr>
<tr>
<td></td>
<td>Check the Product Availability Matrix (PAM) at <a href="http://support.sap.com/pam">http://support.sap.com/pam</a> for supported operating system versions.</td>
</tr>
<tr>
<td></td>
<td>Contact your OS vendor for the latest OS patches.</td>
</tr>
<tr>
<td></td>
<td>Minimal OS requirements for the specific SAP Kernel releases are listed in SAP Note 1780629.</td>
</tr>
<tr>
<td></td>
<td>You require at least AIX 6.1 TL7 SP10 to be able to run the installer.</td>
</tr>
<tr>
<td><strong>HP-UX: Operating system version</strong></td>
<td>Your operating system platform must be 64-bit.</td>
</tr>
<tr>
<td></td>
<td>Check the Product Availability Matrix (PAM) at <a href="http://support.sap.com/pam">http://support.sap.com/pam</a> for supported operating system versions.</td>
</tr>
<tr>
<td></td>
<td>To check the operating system version on your installation hosts, use the following command:</td>
</tr>
<tr>
<td></td>
<td><code>uname -r</code></td>
</tr>
<tr>
<td></td>
<td>See SAP Note 939891 for information about support time frames of HP-UX.</td>
</tr>
<tr>
<td><strong>Linux: Operating system version</strong></td>
<td>Your operating system platform must be 64-bit.</td>
</tr>
<tr>
<td></td>
<td>Check the Product Availability Matrix (PAM) at <a href="http://support.sap.com/pam">http://support.sap.com/pam</a> for supported operating system versions.</td>
</tr>
<tr>
<td></td>
<td>Operating systems supported by SAP HANA are listed in SAP Note 2235581.</td>
</tr>
<tr>
<td></td>
<td>Contact your OS vendor for the latest OS patches.</td>
</tr>
<tr>
<td></td>
<td>To check the operating system version on your installation hosts, use the following command:</td>
</tr>
<tr>
<td></td>
<td><code>cat /etc/*-release</code></td>
</tr>
<tr>
<td><strong>Oracle Solaris: Operating system version</strong></td>
<td>Your operating system platform must be 64-bit.</td>
</tr>
<tr>
<td></td>
<td>Check the Product Availability Matrix (PAM) at <a href="http://support.sap.com/pam">http://support.sap.com/pam</a> for supported operating system versions.</td>
</tr>
<tr>
<td></td>
<td>To check the operating system version on your installation hosts, use the following command:</td>
</tr>
<tr>
<td></td>
<td><code>/bin/uname -r</code></td>
</tr>
<tr>
<td>Requirement</td>
<td>Values and Activities</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SAP Kernel Releases and Versions</td>
<td>For more information about release and roadmap information for the kernel versions and how this relates to SAP NetWeaver support packages, including important notes on downward compatibility and release dates, see the document Understanding Kernel Releases for the SAP NetWeaver AS ABAP at <a href="https://archive.sap.com/documents/docs/DOC-54170">https://archive.sap.com/documents/docs/DOC-54170</a>. To use regular Software Provisioning Manager (SWPM&lt;Version&gt;.SAR) with SAP kernel 7.49 or higher on RHEL 6 or SLES 11 or Oracle Linux 6, you must install the required libstdc++ RPM packages. For more information, see SAP Note <a href="https://archive.sap.com/documents/docs/DOC-54170">2195019</a>.</td>
</tr>
<tr>
<td>AIX: Kernel parameters</td>
<td>To adjust AIX Virtual Memory Management settings, see SAP Note <a href="https://archive.sap.com/documents/docs/DOC-54170">973227</a>.</td>
</tr>
<tr>
<td>HP-UX: Kernel parameters</td>
<td>To run an SAP system, make sure that you check and, if necessary, modify the HP-UX kernel.</td>
</tr>
<tr>
<td><strong>Caution</strong></td>
<td>We recommend that a UNIX system administrator performs all kernel modifications.</td>
</tr>
<tr>
<td>Proceed as follows:</td>
<td></td>
</tr>
<tr>
<td><strong>Caution</strong></td>
<td>If a kernel value is already larger than the one suggested in the SAP Note, do not automatically reduce it to match the SAP requirement.</td>
</tr>
<tr>
<td></td>
<td>You have to analyze the exact meaning of such a parameter and, if required, to reduce the parameter value. In some cases this might improve the performance of your SAP applications.</td>
</tr>
<tr>
<td>2. If necessary, modify the kernel parameters in one of the following ways:</td>
<td></td>
</tr>
<tr>
<td>○ Manually, as described in SAP Note <a href="https://archive.sap.com/documents/docs/DOC-54170">172747</a>.</td>
<td></td>
</tr>
<tr>
<td>○ Interactively, using the HP-UX System Administrator Manager (SAM) or System Management Homepage (SMH).</td>
<td></td>
</tr>
<tr>
<td>Linux: Kernel parameters</td>
<td>Check SAP Note <a href="https://archive.sap.com/documents/docs/DOC-54170">2369910</a> for Linux kernel versions certified by SAP.</td>
</tr>
<tr>
<td></td>
<td>To check the Linux kernel parameters for your Linux distribution, see one of the following SAP Notes:</td>
</tr>
<tr>
<td>● RHEL6: SAP Note <a href="https://archive.sap.com/documents/docs/DOC-54170">1496410</a></td>
<td></td>
</tr>
<tr>
<td>● RHEL7: SAP Note <a href="https://archive.sap.com/documents/docs/DOC-54170">2002167</a></td>
<td></td>
</tr>
<tr>
<td>● SLES 11: SAP Note <a href="https://archive.sap.com/documents/docs/DOC-54170">1310037</a></td>
<td></td>
</tr>
<tr>
<td>● SLES 12: SAP Note <a href="https://archive.sap.com/documents/docs/DOC-54170">1984787</a></td>
<td></td>
</tr>
<tr>
<td>Requirement</td>
<td>Values and Activities</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Oracle Solaris</strong>: Kernel parameters</td>
<td>To run an SAP system, you must check and, if necessary, modify the Oracle Solaris kernel parameters or resource controls. &lt;br&gt; &lt;br&gt; - Oracle Solaris 10: SAP Note 724713  &lt;br&gt; - Oracle Solaris 11: SAP Note 1797712</td>
</tr>
<tr>
<td><strong>HP-UX</strong>: OS patches</td>
<td>To check the minimum required OS patches, see SAP Note 837670.</td>
</tr>
<tr>
<td><strong>Oracle Solaris</strong>: OS patches</td>
<td>Check the relevant SAP Note for required Oracle Solaris patches: &lt;br&gt; &lt;br&gt; - Sun Solaris 10 on SPARC: SAP Note 832871  &lt;br&gt; - Oracle Solaris 11: SAP Note 1797712</td>
</tr>
<tr>
<td><strong>AIX</strong>: National Language Support (NLS)</td>
<td>Make sure that National Language Support (NLS) and corresponding locales are installed. &lt;br&gt; &lt;br&gt; You can check this as follows: &lt;br&gt; &lt;br&gt; - Enter the following commands to check whether National Language Support (NLS) is installed: &lt;br&gt;     swlist -v</td>
</tr>
<tr>
<td><strong>HP-UX</strong>: National Language Support (NLS)</td>
<td>Make sure that National Language Support (NLS) and corresponding locales are installed. &lt;br&gt; &lt;br&gt; You can check this as follows: &lt;br&gt; &lt;br&gt; - Ensure that the required locales such as the following are available: &lt;br&gt;     de_DE, en_US &lt;br&gt; - Check SAP Note 187864 for information about corrected operating system locales and SAP blended Code Pages.</td>
</tr>
<tr>
<td><strong>Linux</strong>: National Language Support (NLS)</td>
<td>Make sure that National Language Support (NLS) and corresponding locales are installed. &lt;br&gt; &lt;br&gt; You can check this as follows: &lt;br&gt; &lt;br&gt; - Ensure that the required locales such as the following are available: &lt;br&gt;     de_DE, en_US &lt;br&gt; - Check SAP Note 187864 for information about corrected operating system locales and SAP blended Code Pages.</td>
</tr>
<tr>
<td><strong>Oracle Solaris</strong>: National Language Support (NLS)</td>
<td>Make sure that National Language Support (NLS) and corresponding locales are installed. &lt;br&gt; &lt;br&gt; Enter the following command to check which locales are available: &lt;br&gt;     locale -a &lt;br&gt;     The following locale must be available: en_US.ISO8859-1</td>
</tr>
<tr>
<td>System language</td>
<td>For the installation, you must choose English as the operating system language on all hosts that run SAP software.</td>
</tr>
</tbody>
</table>
Requirement | Values and Activities
---|---
IP Multicast Configuration | Make sure that you have applied the operating system patches required for IP Multicast Configuration. For more information, see SAP Note [1931675](#).

### 3.2.5.2.4 Other Requirements

Every installation host must meet at least the requirements listed in the following tables. Most of the requirements are valid for every installation host whereas some requirements are instance-specific and are marked accordingly.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
</table>
| **Minimum Web Browser** | Make sure that you have at least one of the following web browsers installed on the host where you run the installer GUI:  
  - Microsoft Internet Explorer 11 or higher  
  - Microsoft Edge  
  - Mozilla Firefox  
  - Google Chrome  
  Always use the latest version of these web browsers.  
  You need a web browser to be able to run the SL Common GUI, and to display the Evaluation Form and send it to SAP. |
| **AIX: Additional software** | Make sure that the following additional file sets are installed:  
  - bos.adt = Base Application Development  
  - bos.perf = performance and diagnostics tools  
  - perfagent.tools = performance monitoring tools  
  - bos.perf.libperfstat = Performance Statistics Library |
| **Host name** | To find out physical host names, open a command prompt and enter *hostname*.  
  For more information about the allowed host name length and characters allowed for SAP system instance hosts, see SAP Note [611361](#).  
  Only valid for 'Platform': HP-UX  
  For HP-UX, see SAP Note [1503149](#) in addition.  
  End of 'Platform': HP-UX  
  If you want to use virtual host names, see SAP Note [962955](#). |
Requirement | Values and Activities
--- | ---
Login shell | The installer only prompts you for this parameter if you use a login shell other than the recommended C shell (csh).

For more information, see SAP Note [202227](#).

Only valid for `Platform`: HP-UX

For HP-UX, see SAP Note [1038842](#) in addition.

End of `Platform`: HP-UX

SAP Host Agent installation:

- Make sure that `/bin/false` can be used as a login shell.

- Only valid for `Platform`: AIX
  - AIX only: Add `/bin/false` to the list of valid login shells (attribute `shells`) in `/etc/security/login.cfg`.

End of `Platform`: AIX

HP-UX: Mount and file system configuration

For recommendations about block size and mount option configuration, see SAP Note [1077887](#).

Shared file systems for decentralized systems

If application servers are installed decentralized, a “shared” file system must be installed, for example Network File System (NFS).

AIX: C++ Runtime environment

Minimal C++ runtime requirements for the specific SAP Kernel releases are listed in SAP Note [1780629](#).

Linux: C compiler

Make sure that the C compiler gcc is installed.

### 3.2.6 Planning User and Access Management

You have to plan how to configure user and access management for the SAP system to be installed.

Before you add a newly installed SAP system to your system landscape, you must decide which kind of user management you want to use:

- Central User Administration (CUA)
- An LDAP directory as the data source for user data

#### Procedure

To specify the initial data source of the User Management Engine (UME), proceed as described in Specifying the Initial Data Source of the User Management Engine [page 120].
More Information

For more information about configuring the user management of your SAP system to be installed, see the SAP Online Documentation [page 13] at:

Security  Identity Management  User and Role Administration of Application Server ABAP  Configuration of User and Role Administration  Directory Services  LDAP Connector

3.2.7 Basic Installation Parameters

The installer prompts for input parameters during the Define Parameters phase of the installation.

You can install your SAP system either in Typical or Custom mode:

- **Typical**
  
  If you choose Typical, the installation is performed with default settings. This means that the installer prompts you only for a small selection of installation parameters. These parameters include at least the following:
  
  - SAP system ID and database connectivity parameters
  - Master password
  - SAP system profile directory – only for systems with instances on separate hosts
  - Individual encryption key for the secure storage
  
  For more information about the installation parameters, see the corresponding tables below in this document. If you want to change any of the default settings, you can do so on the Parameter Summary screen.

- **Custom**
  
  If you choose Custom, you are prompted for all parameters. At the end, you can still change any of these parameters on the Parameter Summary screen.

---

**Note**

You cannot change from Custom to Typical mode or from Typical to Custom mode on the Parameter Summary screen.

---

**Note**

- If you want to install an ASCS instance with an integrated SAP Web Dispatcher [page 34], you must choose Custom. Otherwise, you are not prompted for the SAP Web Dispatcher installation parameters [page 67] during the Define Parameters phase of the ASCS instance installation.
- If you want to install an ASCS instance with an integrated Gateway [page 36], you must choose Custom. Otherwise, you are not prompted for the SAP Gateway installation during the Define Parameters phase of the ASCS instance installation.

The tables in the sections below list the basic SAP system installation parameters that you need to specify before installing your SAP system. For all other installation parameters, use the tool help on the installer screens.
Related Information

SAP System Parameters [page 54]
SAP System Database Parameters [page 63]
Additional Parameters When Using a Stack Configuration File (Optional) [page 65]
Parameters for Additional Components to be Included in the ASCS Instance (Optional) [page 67]
### 3.2.7.1 SAP System Parameters

The tables in this section lists the basic SAP system installation parameters that you need to specify before installing your SAP system. For all other installation parameters, use the tool help on the installer screens.

#### General Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP System ID <code>&lt;SAPSID&gt;</code></td>
<td>The SAP system ID (<code>&lt;SAPSID&gt;</code>) identifies the entire SAP system. The installer prompts you for the <code>&lt;SAPSID&gt;</code> when you execute the <strong>first</strong> installation option to install a new SAP system. If there are further installation options to be executed, the installer prompts you for the <strong>profile directory</strong>. For more information, see the description of the parameter <strong>SAP System Profile Directory</strong>.</td>
</tr>
</tbody>
</table>

#### Example

This prompt appears when you install the ASCS instance, which is the first instance to be installed in a distributed system.

#### Caution

Choose your SAP system ID carefully since renaming requires considerable effort.

Make sure that your SAP system ID:

- Is unique throughout your organization. Do not use an existing `<SAPSID>` when installing a new SAP system.
- Consists of exactly three alphanumeric characters
- Contains only uppercase letters
- Has a letter for the first character
- Does not include any of the reserved IDs listed in SAP Note [1979280](#).
- If you want to install an additional application server instance, make sure that no Gateway instance with the same SAP System ID (SAPSID) exists in your SAP system landscape.

#### Caution

If you are installing a standard system **on one Linux host**, you can install your SAP system on the **same host** as the SAP HANA database.

In this case, you must use a **different** SAP system ID (SID) for the SAP HANA database than the one you later specify for the installation of the AS ABAP system.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP System Instance Numbers</td>
<td>Technical identifier for internal processes. It consists of a two-digit number from 00 to 97. The instance number must be unique on a host. That is, if more than one SAP instance is running on the same host, these instances must be assigned different numbers. If you do not enter a specific value, the instance number is set automatically to the next free and valid instance number that has not yet been assigned to the SAP system to be installed or to SAP systems that already exist on the installation host. To find out instance numbers of SAP systems that already exist on the installation host, look for subdirectories ending with <code>&lt;Instance Number&gt;</code> of local (not mounted) <code>/usr/sap/&lt;SAPSID&gt;</code> directories. For more information about the naming of SAP system instances, see SAP Directories [page 87].</td>
</tr>
</tbody>
</table>

⚠️ Caution

**AIX only:** If you are using NIM Service Handler (NIMSH), do not use 01 or 02 for the instance number. The installer uses the instance number for the internal message server port `39<Instance Number>`. The NIM client daemon uses reserved ports 3901 and 3902.

End of 'Platform': AIX

**Caution**

**HP-UX only:** Do not use:

- 75 for the instance number because this number is already used by the operating system. For more information, see SAP Note 29972.
- 02 as the instance number because this number is used to determine the port number for report `RSLGCOLL`, which is `14<Instance Number>` by default. However, port 1402 is already used by the OS process `rstlisten`. If you still decide to use 02 as the instance number, the instance fails to start during the installation process. You then have to manually change the port number for report `RSLGCOLL` to continue with the installation. For more information, see Running the Installer [page 124].

End of 'Platform': HP-UX
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Host Name</td>
<td>Virtual host name (network name) of the SAP&lt;SAPSID&gt; cluster group containing the ASCS instance.</td>
</tr>
<tr>
<td></td>
<td>Virtual host name (network name) of the SAP&lt;SAPSID&gt; ERS cluster group containing the ASCS instance (only applies if Enqueue Replicator 2 is used).</td>
</tr>
<tr>
<td></td>
<td>You can assign a virtual host name for the instance to be installed, by specifying it in the &lt;Instance_Name&gt; Host Name field of the &lt;Instance_Name&gt; Instance screen. Then this instance is installed with this virtual host name.</td>
</tr>
<tr>
<td></td>
<td>After the installation has completed, all application servers can use this virtual host name to connect to the instance. If you do not provide the virtual host name, the instance is installed automatically using the physical host name of the host where you run the installer.</td>
</tr>
<tr>
<td></td>
<td>You must have already reserved the virtual host name (network name) and its IP address on a DNS server before you run the installer. For more information, see Using Virtual Host Names [page 96].</td>
</tr>
<tr>
<td>Note</td>
<td>Fully qualified host names, IPv4, IPv6 are not accepted as virtual host names.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SAP System Profile Directory</th>
<th>/&lt;sapmnt&gt;/&lt;SAPSID&gt;/profile or /usr/sap/&lt;SAPSID&gt;/SYS/profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>The installer retrieves parameters from the SAP system profile directory of an existing SAP system.</td>
<td></td>
</tr>
<tr>
<td>SAP profiles are operating system files that contain instance configuration information.</td>
<td></td>
</tr>
<tr>
<td>The installer prompts you to enter the location of the profile directory when the installation option that you execute is not the first one belonging to your SAP system installation, for example if you are installing a distributed system or an additional application server instance to an existing SAP system. See also the description of the parameters SAP System ID and Database ID.</td>
<td></td>
</tr>
<tr>
<td>/usr/sap/&lt;SAPSID&gt;/SYS/profile is the soft link referring to /&lt;sapmnt&gt;/&lt;SAPSID&gt;/profile.</td>
<td></td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Master Password            | Common password for all users that are created during the installation:  
  - Operating system users (for example `<sapid>adm`)  
    △ Caution  
    If you did not create the operating system users manually before the installation, the installer creates them with the common master password (see Operating System Users). In this case, make sure that the master password meets the requirements of your operating system.  
  - ABAP users: `SAP*`, `DDIC`, and `EARLYWATCH`.  
  - Secure Store key phrase  
    For more information, see line Key Phrase for Secure Store Settings and line Individual Encryption Key for the Secure Storage in this table.  

Basic Password policy

The master password must meet the following requirements:  
- It must be 8 to 14 characters long  
- It must contain at least one letter (a-z, A-Z)  
- It must contain at least one digit (0-9)  
- It must not contain \ (backslash) or " (double quote).

Additional restrictions depending on SAP HANA database:  
- It must consist of at least one number, one lowercase letter, and one uppercase letter.  
- It can only contain the following characters: `! @ # $ % ^ & * ( _ - + = [ ] \ | ; : ' “ ” , . /` and must not start with a number or an underscore (_).

Depending on the installation option, additional restrictions may apply.

| Message Server Access Control List | You can specify if you want to have a message server Access Control List (ACL) created.  
  The ACL is created as a file in the `/<sapmnt>/<SAPSID>/global` directory. If it exists, it defines the hosts from which the message server accepts requests.  
  △ Caution  
  Only trigger the creation of this file if you do not plan to install any additional instances for this system. With the creation of this ACL, you overwrite existing settings and prevent instances from being installed on additional hosts. If you decide to install an additional instance later, you need to remove this file manually before the installation and create it again after the installation of the additional instance.  
  For more information, see the information about `ms/acl_info` in SAP Notes 1495075 and 826779.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
</table>
| Individual Encryption Key for the Secure Storage | You can set a randomly generated individual encryption key for the secure storage in the file system and the secure storage in the database. If you skip this step, the system is installed with a default key which provides obfuscation only, but it can be changed later.  
- For more information on the secure storage in the file system, see the SAP Online Documentation [page 13] at:
- For more information on the secure storage in the database, see the SAP Online Documentation [page 13] at:
| DNS Domain Name for SAP System | If you want to use HTTP-based URL frameworks such as Web Dynpro applications, you have to specify the DNS domain name for the SAP system.  
The DNS Domain Name is used to calculate the Fully Qualified Domain Name (FQDN), which is configured in profile parameter SAPLOCALHOSTFULL. FQDN is the fully qualified domain name for an IP address. It consists of the host name and the domain name:  
<Host_Name>.<Domain_Name>  
The DNS Domain Name is needed to define the URLs for the ABAP application servers. It is appended to the server name to calculate the FQDN.  
- Example  
  If your application server host is called kirk.wdf.sap.com, the DNS Domain Name is wdf.sap.com. |
| SAP Host Agent Upgrade (Optional) | If there already exists an SAP Host Agent on the installation host, the installer asks you if you want to upgrade it to a newer patch level version. If you want the existing version to be upgraded, you must provide the new target version of the SAPHOSTAGENT<Version>.SAR archive.  
For more information, see Downloading the SAP Kernel [page 101] |
Ports

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABAP Message Server Port</td>
<td><strong>⚠️ Caution</strong></td>
</tr>
<tr>
<td></td>
<td>The message server port number must be unique on the host where the message server for the SAP system is running. If there are several message servers running on one host, the message server ports must all be unique. If you do not specify a value, the default port number is used.</td>
</tr>
</tbody>
</table>

**ABAP Message Server Port**

There is an external message server port and an internal message server port.

The ABAP message server uses both the internal and the external message server ports. The default profile contains the configuration for both message server ports.

- **external** message server port uses the parameter `rdisp/msserv` with default value `{ABAP_Message_Server_Instance_Number}.

- **internal** message server port uses the parameter `rdisp/msserv_internal` with default value `{ABAP_Message_Server_Instance_Number}.

During the installation of an SAP system from scratch or an additional application server instance to an existing SAP system, the message server is configured to only accept secure connections. The DEFAULT.PFL profile parameter `system/secure_communication` is set to ON (`system/secure_communication = ON`) if the kernel supports secure connections to the message server. For more information, see SAP Note 2040644.
## Operating System Users

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating System Users and Groups</strong></td>
<td>The installer processes the operating system users as follows:</td>
</tr>
<tr>
<td></td>
<td>• If the operating system users do not exist, the installer creates the following users:</td>
</tr>
<tr>
<td></td>
<td>○ The SAP system administrator user <code>&lt;sapsid&gt;adm</code></td>
</tr>
<tr>
<td></td>
<td>○ Database administrator users</td>
</tr>
<tr>
<td></td>
<td>The installer sets the master password for these users by default. You can overwrite and change the</td>
</tr>
<tr>
<td></td>
<td>passwords either by using the parameter mode Custom or by changing them on the parameter summary</td>
</tr>
<tr>
<td></td>
<td>screen.</td>
</tr>
<tr>
<td></td>
<td>• If the operating system users already exist, the installer prompts you for the existing password,</td>
</tr>
<tr>
<td></td>
<td>except if the password of these users is the same as the master password.</td>
</tr>
<tr>
<td></td>
<td>• Make sure that the user ID and group ID of these operating system users are unique and the same</td>
</tr>
<tr>
<td></td>
<td>on each relevant application server instance host.</td>
</tr>
<tr>
<td></td>
<td>The <code>sapinst_instdir</code> directory belongs to a group named <code>sapinst</code>. If this group is not available,</td>
</tr>
<tr>
<td></td>
<td>it is created automatically as a local group. For security reasons, we recommend removing the</td>
</tr>
<tr>
<td></td>
<td>operating system users from the group <code>sapinst</code> after the execution of the installer has completed.</td>
</tr>
<tr>
<td></td>
<td>During the <strong>Define Parameters</strong> phase of the installer, you can specify that the operating system</td>
</tr>
<tr>
<td></td>
<td>users are to be removed automatically from the group <code>sapinst</code> after the execution of the installer</td>
</tr>
<tr>
<td></td>
<td>has completed.</td>
</tr>
<tr>
<td></td>
<td>For more information about the group <code>sapinst</code>, see Creating Operating System Users and Groups [page</td>
</tr>
<tr>
<td></td>
<td>82].</td>
</tr>
<tr>
<td></td>
<td>For more information about the <code>sapinst_instdir</code> directory, see Useful Information about the Installer</td>
</tr>
<tr>
<td></td>
<td>[page 130].</td>
</tr>
</tbody>
</table>

## User Management Engine Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Java Administrator User</strong></td>
<td>The installer creates this user in the ABAP system.</td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>This user is only created during the installation of the application server ABAP for an SAP NetWeaver 7.5 Process Integration (PI) system or for an SAP Solution Manager 7.2 system.</td>
</tr>
<tr>
<td></td>
<td>After the installation, this user is available both in the ABAP and in the Java system.</td>
</tr>
<tr>
<td></td>
<td>The installer sets the user name <code>&lt;J2EE_ADMIN&gt;</code> and the master password by default.</td>
</tr>
<tr>
<td></td>
<td>If required, you can choose another user name and password according to your requirements.</td>
</tr>
</tbody>
</table>
### Java Guest User

**i Note**
This user is only created during the installation of the application server ABAP for an SAP NetWeaver 7.5 Process Integration (PI) system or for an SAP Solution Manager 7.2 system.

This user is for employees who do not belong to a company or who have registered as company users and who are waiting for approval. Guest users belong to the default group `Authenticated Users`.

The installer creates this user in the ABAP system.

After the installation, it is available both in the ABAP and in the Java system.

The installer sets the user name `J2EE_GUEST` and the master password by default.

If required, you can choose another user name and password according to your requirements.

For more information about supported UME data sources and change options, see SAP Note 718383.

### Communication User

**i Note**
This user is only created during the installation of the application server ABAP for an SAP NetWeaver 7.5 Process Integration (PI) system or for an SAP Solution Manager 7.2 system.

The installer creates this user in the ABAP system.

After the installation, it is available both in the ABAP and in the Java system.

This user is used for the communication between the ABAP system and the Java system.

The installer sets the user name `SAPJSF` and the master password by default.

If required, you can choose another user name and password according to your requirements.

For more information about supported UME data sources and change options, see SAP Note 718383.
### System Landscape Directory

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SLD Destination for the System</strong></td>
<td>The System Landscape Directory (SLD) registers the systems and the installed software of your entire system landscape.</td>
</tr>
<tr>
<td></td>
<td>You can choose between the following options:</td>
</tr>
<tr>
<td></td>
<td>• <strong>Register in existing SLD</strong></td>
</tr>
<tr>
<td></td>
<td>Choose this option to register the SAP system you are installing in an existing SAP System Landscape Directory (SLD) by specifying the SLD connection parameters listed below in this table.</td>
</tr>
<tr>
<td></td>
<td>• <strong>No SLD destination</strong></td>
</tr>
<tr>
<td></td>
<td>Choose this option if you do <strong>not</strong> want to register the SAP system you are installing in an existing SAP System Landscape Directory (SLD).</td>
</tr>
<tr>
<td></td>
<td>You then have to configure the SLD destination manually after the installation has finished.</td>
</tr>
<tr>
<td><strong>SLD Host</strong></td>
<td>The host name of the existing SLD.</td>
</tr>
<tr>
<td><strong>SLD HTTP(S) Port</strong></td>
<td>HTTP port of the SAP system based on AS Java on which the System Landscape Directory (SLD) resides. The following naming convention applies:</td>
</tr>
<tr>
<td></td>
<td>5&lt;Primary_Application_Server_Instance_Number&gt;0.</td>
</tr>
<tr>
<td></td>
<td><strong>Example</strong></td>
</tr>
<tr>
<td></td>
<td>If the primary application server instance number of the AS Java on which the System Landscape Directory (SLD) resides is 01, the SLD HTTP Port is 50100.</td>
</tr>
</tbody>
</table>
### 3.2.7.2 SAP System Database Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSTEM_ID</td>
<td>The <code>SYSTEM_ID</code> identifies the tenant database instance. This is the result of the following query:</td>
</tr>
<tr>
<td></td>
<td><code>select SYSTEM_ID from M_DATABASE</code></td>
</tr>
<tr>
<td></td>
<td>If your SAP HANA <code>SYSTEM_ID</code> is the same as the chosen SAP System ID <code>&lt;SAPSID&gt;</code>, there are following restrictions:</td>
</tr>
<tr>
<td></td>
<td>● The ABAP system and SAP HANA database have to be installed on different hosts.</td>
</tr>
<tr>
<td></td>
<td>● Database installation has to done on the ABAP host. Otherwise Database installation procedure with Software Provisioning Manager (the “installer”) could overwrite the environment files (<code>sapenv.*</code>) of the SAP HANA database and the database will not start any more after reboot.</td>
</tr>
<tr>
<td></td>
<td>▶️ <strong>Caution</strong></td>
</tr>
<tr>
<td></td>
<td>If you are installing a standard system on one Linux host, you can install your SAP system on the same host as the SAP HANA database.</td>
</tr>
<tr>
<td></td>
<td>In this case, you must use a different SAP system ID (SID) for the SAP HANA database than the one you later specify for the installation of the AS ABAP system.</td>
</tr>
<tr>
<td>DATABASE_NAME, &lt;DBSID&gt;</td>
<td>The <code>&lt;DBSID&gt;</code> identifies the tenant database. This is the result of the following query:</td>
</tr>
<tr>
<td></td>
<td><code>select DATABASE_NAME from M_DATABASE</code></td>
</tr>
<tr>
<td>Database schema</td>
<td>The ABAP database schema is named <code>SAPHANADB</code>. This name cannot be changed.</td>
</tr>
<tr>
<td></td>
<td>The schema name must be present in the database backup to be restored. You must specify the same password as in the backup. The password is not changed by the installer.</td>
</tr>
</tbody>
</table>
### Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtual Host Name</td>
<td>Virtual host name (network name) of the SAP(&lt;\text{SAPSID}&gt;) cluster group</td>
</tr>
<tr>
<td></td>
<td>You can assign virtual host names to the SAP HANA database instance by starting the installer with the \texttt{SAPINST_USE_HOSTNAME} property. For more information, see Running the Installer [page 124].</td>
</tr>
<tr>
<td></td>
<td>After the installation has completed, all application servers can use this virtual host name to connect to the SAP HANA database instance. The virtual host name is also a global host name. If you do not provide the virtual host name, the instance is installed automatically using the physical host name of the host where you run the installer.</td>
</tr>
<tr>
<td></td>
<td>You must have already reserved the virtual host name (network name) and its IP address on a DNS server before you run the installer. For more information, see Using Virtual Host Names [page 96].</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
</tr>
<tr>
<td></td>
<td>Fully qualified host names, IPv4, IPv6 are not accepted as virtual host names.</td>
</tr>
<tr>
<td>Database Backup Location</td>
<td>The location of the database backup from the source system</td>
</tr>
<tr>
<td></td>
<td>This directory is searched for the SAP HANA database backup files created from the source system.</td>
</tr>
<tr>
<td></td>
<td>For more information, see Creating and Transferring the Database Backup [page 110].</td>
</tr>
<tr>
<td>Database Backup Name</td>
<td>The name of the SAP HANA database backup from the source system</td>
</tr>
<tr>
<td></td>
<td>If you are using SAP HANA multitenant database container, specify the backup of the database tenant. The Backup Name must correspond to a set of backup files located in the Backup Location.</td>
</tr>
<tr>
<td></td>
<td><strong>Example</strong></td>
</tr>
</tbody>
</table>
|                         | For example, a data backup consists of the following files: \begin{verbatim}
SCO\_INITIAL\_databackup\_0\_1
SCO\_INITIAL\_databackup\_3\_1
\end{verbatim} In this example, the value of the input field Backup Name is \texttt{SCO\_INITIAL}. |
|                         | This name is required to identify the backup to be recovered if there is more than one backup.                                                                                                             |
|                         | For more information, see Creating and Transferring the Database Backup [page 110].                                                                                                                        |
### 3.2.7.3 Additional Parameters When Using a Stack Configuration File (Optional)

The parameters in this section are only required if you use a stack configuration file generated from the Maintenance Planner.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport Domain</td>
<td>The ABAP Transport Management System (TMS) must be configured before ABAP correction packages can be applied. You can also run the configuration or even reconfigure the TMS after the installation has finished.</td>
</tr>
<tr>
<td></td>
<td>To be able to transport changes between the SAP systems in your system landscape, you need to configure the Transport Management System (TMS) for all SAP systems in your system landscape and configure one transport domain controller. To start the TMS in your ABAP system for later reconfiguration, call transaction STMS. At least one transport landscape with this system as transport domain controller is required before you can apply corrections, support packages, or upgrades to the SAP system.</td>
</tr>
<tr>
<td></td>
<td>The name of the Transport Domain must not contain blank characters. You cannot change the name afterwards without reconfiguring the transport domain controller and thereby the entire Transport Domain.</td>
</tr>
<tr>
<td></td>
<td>By default use <code>DOMAIN_&lt;SAPSID&gt;</code> for the Transport Domain of a single transport landscape with this system as transport domain controller.</td>
</tr>
<tr>
<td>Directory with Transport Files</td>
<td>Location of the ABAP transport files that are to be included after the ABAP load during the installation. All transport files in this directory are imported with the transport control program (tp).</td>
</tr>
<tr>
<td>Location of SPAM/SAINT Update Archive</td>
<td>A SPAM/SAINT update contains updates and improvements to the Support Package Manager (SPAM) and the Add-On Installation Tool (SAINT). Provide the full path to the SPAM/SAINT update archive.</td>
</tr>
<tr>
<td></td>
<td>SPAM/SAINT is delivered with the ABAP load. SAP recommends that you always use the latest version of SPAM/SAINT before applying Support Packages.</td>
</tr>
<tr>
<td>Decide whether you want to prepare for the Software Update Manager run at the end of the installation</td>
<td>With the Software Update Manager 1.0 (SUM), you can apply support packages stacks at the end of the installation.</td>
</tr>
<tr>
<td></td>
<td>- Do not start SUM automatically</td>
</tr>
<tr>
<td></td>
<td>- Start SUM automatically at the end of the installation. Choose to start SUM automatically, if you want to have the SUM STARTUP script called in the default <code>&lt;Update Directory&gt;/SUM</code> directory at the end of the installation.</td>
</tr>
</tbody>
</table>
### Extract the SUM*.SAR Archive

If you choose to extract the SUM*.SAR archive, the provided archive is validated and extracted to the default update directory:

**UNIX and IBM:** `/usr/sap/<SAPSID>/`

### SUM HTTP port

If you are running several SAP system updates on the same host, you have to use different port numbers for each update. You can adjust the default SUM HTTP port by entering the required port number in the SUM HTTP Port field. When doing so you set the SUM GUI Port number to `(HTTP port number+2)`. Dependencies See also the Software Update Manager documentation at: [http://support.sap.com/sitoolset](http://support.sap.com/sitoolset) → System Maintenance → Software Update Manager (SUM) 1.0 SPS<Number> → Guides for SUM 1.0 SP<Number>.

### SUM Batch Input File

You can specify a batch file with some default values for the update. SUM then starts with parameter `batchfile=<XML file with input parameters>`. Enter the full path to the existing batch file.

Placeholders like `@PARAMETER_VALUE@` inside the file are replaced by values known from the installation.

### Install Additional SAP System Languages

A set of default languages is delivered with the installation export. From the language archives or · if you want to install SAP BW/4HANA 1.0 SR1 · language media delivered with your product version, you can select additional languages that you want to have installed during SAP system installation.

If you want to install additional languages, you must provide the directory with the additional language packages for the ABAP installation load, for example with subdirectories like `DATA_UNITS/ES`.

For more information, see [Installation Using a Stack Configuration File (Optional)](page 37).

### Related Information

- [Installation Using a Stack Configuration File](page 37)
3.2.7.4 Parameters for Additional Components to be Included in the ASCS Instance (Optional)

You only need to specify the following parameters during the ASCS instance installation if you perform an integrated installation of additional components.

**i Note**
You must choose *Custom* parameter mode. Otherwise you are not prompted for the parameters related to these additional components during the *Define Parameters* phase.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install a gateway integrated in the ASCS instance</td>
<td>When processing the screens for the ASCS instance installation, you are prompted to mark this checkbox on the screen <em>Additional Components to be Included in the ASCS Instance.</em></td>
</tr>
</tbody>
</table>
| Install an SAP Web Dispatcher integrated in the ASCS instance | When processing the screens for the ASCS instance installation, you are prompted to mark this checkbox on the screen *Additional Components to be Included in the ASCS Instance.*  
If you mark the checkbox for SAP Web Dispatcher, you are prompted for the additional parameters required for the SAP Web Dispatcher installation on the subsequent screens:  
Message Server Host  
The name of the host on which the message server is located (profile parameter `rdisp/mshost`)  
Message Server HTTP Port  
HTTP port of the message server (profile parameter `ms/server_port_<xx>`)  
Password for the Internet Communication Management (ICM) user  
In order to use the web administration interface for the Internet Communication Manager (ICM) and SAP Web Dispatcher, an administration user `webadm` is created by the installer.  
You have to assign a password for this user. |

**Related Information**

ASCS Instance with Integrated SAP Web Dispatcher [page 34]  
ASCS Instance with Integrated Gateway [page 36]
3.2.8 SAP System Transport Host

The transport host contains the transport directory used by the SAP transport system to store transport data and change SAP system information, such as software programs, write dictionary data, or customizing data. If you have several SAP systems it depends on your security requirements whether you want them to share a transport directory or whether you use separate directories.

When you install an SAP system, you have to decide which transport host and directory you want to use for your SAP system:

- **Use the transport directory that the installer creates during the installation of the SAP system by default on the global host.**
  
  The installer by default creates the transport directory on the global host in `/usr/sap/trans`.

- **Use a transport directory located on a host other than the default host:**
  
  - You can use an **existing** transport directory and host in your SAP system landscape.
  
  - You can set up a **new** transport directory on a different host.

In either case, you must prepare this host for use by the new SAP system. For more information, see Exporting and Mounting the Global Transport Directory [page 117].

More Information

- [Required File Systems and Directories](#) [page 87]
- See the [SAP Online Documentation](#) [page 13] at:

  Solution Life Cycle Management ➤ Software Logistics ➤ Change and Transport System ➤ Change and Transport System – Overview ➤ Basics of the Change and Transport System ➤ Transport Management System – Concept

3.2.9 Planning the Switchover Cluster for High Availability

This section describes basic aspects of planning the switchover cluster for a high-availability system.

You can reduce unplanned downtime for your SAP system by setting up a switchover cluster. This setup installs critical software units – known as “single points of failure” (SPOFs) – across multiple host machines in the cluster. In the event of a failure on the primary node, proprietary switchover software automatically switches the failed software unit to another hardware node in the cluster. Manual intervention is not required. Applications trying to access the failed software unit might experience a short delay but can then resume processing as normal.

Switchover clusters also have the advantage that you can deliberately initiate switchover to release a particular node for planned system maintenance. Switchover solutions can protect against hardware failure and operating system failure but **not** against human error, such as operator errors or faulty application software. Additional downtime might be caused by upgrading your SAP system or applying patches to it.

Without a switchover cluster, the SAP system SPOFs – central services instance, the database instance, and the central file share – are vulnerable to failure because they cannot be replicated. All of these can only exist **once** in a normal SAP system.
You can protect software units that are not SPOFs against failure by making them redundant, which means simply installing multiple instances. For example, you can add additional application server instances. This complements the switchover solution and is an essential part of building high availability (HA) into your SAP system.

→ Recommendation

We recommend switchover clusters to improve the availability of your SAP system.

A switchover cluster consists of:

- A hardware cluster of two or more physically separate host machines to run multiple copies of the critical software units, in an SAP system the SPOFs referred to above
- Switchover software to detect failure in a node and switch the affected software unit to the standby node, where it can continue operating
- A mechanism to enable application software to seamlessly continue working with the switched software unit – normally this is achieved by virtual addressing (although identity switchover is also possible)

Prerequisites

You must first discuss switchover clusters with your hardware partner because this is a complex technical area. In particular, you need to choose a proprietary switchover product that works with your operating system.

We recommend that you read the following documentation before you start:

- Check the SAP High Availability pages at https://wiki.scn.sap.com/wiki/display/SI/SAP+High+Availability. They contain crucial information about high-availability cluster certification and certified high-availability partners.
- The ERS instance is essential for a high-availability system and should be controlled by the cluster software. You need one ERS instance for the ASCS instance installed in your system.

Features

i Note

The diagrams in this section are only examples. Only the instances relevant to the switchover are shown.

These diagrams summarize the overall setup and do not show the exact constellation for an installation based on one of the available technologies.

You need to discuss your individual HA setup with your HA partner.
Switchover Setup for Systems based on ABAP Platform 1809 or higher

The following diagrams show the essential features of a switchover setup for systems based on ABAP Platform 1809 or higher, that is with the new Standalone Enqueue Server 2 in the ASCS instance and Enqueue Replicator 2 in the ERS instance:

- ASCS instance and ERS instance must reside in different failover groups.
- The failover groups of the ASCS instance and ERS instance can reside on the same or on different nodes.

There can be more than two nodes for the ERS instance and for the ASCS instance.

**i Note**

The example in this diagram describes a setup where the ERS instance and the ASCS instance reside on different nodes, and where the failover groups of the ASCS instance and ERS instance reside on different nodes.

However, the ERS instance and the ASCS instance can also reside on the same node, and the failover groups of the ASCS instance and ERS instance can also reside on the same nodes. These setups are not shown in this example.
The following diagram shows an example of a switchover cluster for systems based on ABAP Platform 1809 or higher in more detail:

**Note**
The failover groups of the ERS instance and ASCS instance can also reside on the same node. This is **not** shown in this example.

Switchover Setup with ERS Instance and ASCS Instance in Different Failover Groups and on Different Nodes (Schematic View)

For more information, see the SAP Online Documentation [page 13](#) at **Application Server ABAP Infrastructure ➤ Components of the Application Server for ABAP ➤ Standalone Enqueue Server 2** and **Application Server ABAP Infrastructure ➤ Components of the Application Server for ABAP ➤ Standalone Enqueue Server 2 ➤ High Availability with Standalone Enqueue Server 2**.

**Switchover Setup for Systems based on SAP BW/4HANA 1.0 SR1**
The following diagrams show the essential features of a switchover setup for systems based on **SAP BW/4HANA 1.0 SR1**, that is with the classic Standalone Enqueue Server in the ASCS instance and the Enqueue Replication Server in the ERS instance:

The failover groups of the ASCS instance and ERS instance must reside in different failover groups but on the same nodes.
Switchover Setup with ERS Instance and ASCS Instance in Different Failover Groups

Switchover cluster to protect SCS services - SPOF

ASCS Instance and ERS Instance in Different Failover Groups

Transparent load balancing

Redundant (additional) application server instances - non-SPOF

Switchover Setup with ERS Instance and ASCS Instance in Different Failover Groups (Overview)
The following diagram shows an example of a switchover setup for systems based on **SAP BW/4HANA 1.0 SR1** in more detail:

![Diagram of Switchover Setup with ERS Instance and ASCS Instance in Different Failover Groups (Schematic View)](image)

For more information, see the SAP Online Documentation [page 13] at Application Server ABAP Infrastructure > Components of the Application Server for ABAP > Standalone Enqueue Server 2 and Application Server ABAP Infrastructure > Components of the Application Server for ABAP > Standalone Enqueue Server > High Availability with Standalone Enqueue Server.

**Constraints**

This documentation concentrates on the switchover solution for the central services instance. For more information about how to protect the Network File System (NFS) software and the database instance by using switchover software or (for the database) replicated database servers, contact your HA partner.

This documentation concentrates on the switchover solution for the central services instance. For more information about how to protect the central file share and the database instance by using switchover software or (for of the database) replicated database servers, contact your HA partner.

Make sure that your hardware is powerful enough and your configuration is robust enough to handle the increased workload after a switchover. Some reduction in performance might be acceptable after an
emergency. However, it is not acceptable if the system comes to a standstill because it is overloaded after switchover.
4 Preparation

This preparation checklist guides you through the required preparation steps:

1. You prepare the system copy [page 76].
2. You prepare the installation of the target system [page 78].

Next Steps

System Copy Procedure [page 110]
5 General Technical Preparations for the System Copy

To , you need to prepare the source system and perform some subsequent actions on the target system. This is not necessary when performing a test run.

Context

The following section describes important preparations on the source system before you perform a .

- SAP systems based on foundation on ABAP Platform 1809, version for SAP HANA (“ABAP Platform 1809” for short) or higher:
  For more information about SAP System Administration, see the Administering the ABAP Platform section in the Online Documentation [page 13].

- SAP systems based on SAP BW/4HANA<1.0 SR1 or higher>:
  For more information about SAP System Administration, see the Administration section in the Online Documentation [page 13].

Procedure

1. Before you start a , check the minimum kernel patch level required by the support package level of the source system.
   It might be necessary to replace the SAP kernel delivered with the installation kit and installed during the installation of the target system by a newer kernel patch level before starting the target system. If you have to replace the delivered SAP kernel, you can do this after the installation of the primary application server instance.

2. Check if canceled or pending update requests exist in the system. If canceled or pending updates exist, you must update these again or delete them from all clients. Proceed as follows:
   b. Delete the default values for the client, user, and time.
   c. Choose all update requests.
   d. Check if table VBDATA contains any entries. If there are entries, update or delete the corresponding update requests.
   e. To check whether this action was successful, call transaction SE16 for table VBDATA.

3. Stop scheduling of all released jobs.
   Go to transaction SE38 and run report BTCTRNS2. For more information, see SAP Note 37425.

4. Adapt the operation mode timetable to make sure that no switching of operating modes takes place while a system is being (transaction SM63).
5. Write down the logical system names of all clients:
   - If you plan to overwrite an existing system with a system copy, make sure you write down the logical system names of all clients in the system that will be overwritten (transaction SCC4). Since the logical system names will be overwritten, in the event of differences, you must change them back to their original names (as they existed in the system that is overwritten) in the follow-up actions after the.

6. Before you run the export of the SAP HANA database, check the fragmentation of the rowstore and – if required – defragment it as described in SAP Note 1813245.
6 Preparing the Target System Installation

This preparation checklist guides you through the preparation steps required for the target system installation.

Preparation Checklist [page 78]

6.1 Preparation Checklist

This section includes the preparation steps that you have to perform for the following installation options:

- Standard, distributed, or high-availability system
- Additional application server instance

Detailed information about the steps are available in the linked sections.

Standard, Distributed, or High-Availability System

i Note

In a standard system [page 24], all mandatory instances except the database instance are normally installed on one host. Therefore, if you are installing a standard system, you can ignore references to other hosts.

The SAP HANA database is normally pre-installed by SAP partners before you start the installation. For more information about how to install the SAP HANA database, see the SAP HANA Server Installation and Update Guide at https://help.sap.com/hana_platform Installation and Upgrade. The database instance is remotely installed by Software Provisioning Manager (the “installer”) from the primary application server host.

However, if you are installing a standard system [page 24] on Linux, you can install SAP systems on the same host as the SAP HANA database, without applying additional environment settings. For more information, see SAP Note 1953429.

1. You make sure that the SAP HANA target database is installed on the SAP HANA target host [page 79].
2. You decide how to set connectivity data for your SAP HANA database [page 81].
3. You check that the required operating system users and groups [page 82] are created.
4. You set up file systems [page 87] and make sure that the required disk space is available for the directories to be created during the installation.
5. If you want to use virtual host names, you have to specify a virtual host name in the <Instance_Name> Host Name field of the <Instance_Name> Instance. For more information, see Virtual Host Name in Basic Installation Parameters [page 52]).
6. If you want to install a high-availability system, you perform switchover preparations [page 96].
7. If you want to share the transport directory trans from another system, export [page 117] this directory to your installation hosts.

8. You install the SAP front-end software [page 97] on the desktop of the user.

9. If required, you configure host names for the SAP HANA database [page 97].

10. You check that the required installation software [page 98] is available for each installation host.

11. If you decided to use a generic LDAP directory, you have to create a user for LDAP directory access [page 177].

12. You continue with Installation [page 112].

Additional Application Server Instance

You have to perform the following preparations on the host where you install the additional application server instances:

1. You check that the required operating system users and groups [page 82] are created.

2. You set up file systems [page 87] and make sure that the required disk space is available for the directories to be created during the installation.

3. If you want to use virtual host names, you have to specify a virtual host name in the <Instance_Name> Host Name field of the <Instance_Name> Instance. For more information, see Virtual Host Name in Basic Installation Parameters [page 52].

4. If you want to share the transport directory trans from another system, export [page 117] this directory to your installation hosts.

5. You install the SAP front-end software [page 97] on the desktop of the user.

6. You check the time zones of the ABAP application server and the SAP HANA system [page 98].

7. You check that the required installation software [page 98] is available on each installation host.

8. You continue with Installation [page 112].

6.2 Installing the SAP HANA Target Database

Make sure that the SAP HANA target database has been installed before you start the target SAP system installation.

For more information about how to install the SAP HANA database, see the SAP HANA Server Installation and Update Guide at https://help.sap.com/hana_platform Installation and Upgrade.

The version of the SAP HANA target database must be the same as or higher than the version of the source database.

For more information about how to check the version, see the SAP HANA Administration Guide at https://help.sap.com/hana_platform System Administration.

The SAP HANA database is normally part of the SAP HANA appliance. It is normally pre-installed by SAP partners before you start the installation using Software Provisioning Manager (the “installer”). The installer accesses the SAP HANA database remotely to perform the necessary database-specific installation steps.
Optional, Standard Systems on Linux only: Installing a Standard System on One Linux Host

If you are installing a standard system on one Linux host, you can install your SAP system on the same host as the SAP HANA database. In this case, you must make sure that you include the RAM requirements for the SAP HANA database instance. For more information, see Requirements for the SAP System Hosts [page 41].

By default, Software Provisioning Manager is able to install the SAP HANA database and the instances of the SAP system in one run under certain circumstances:

- If you only want to install a Standard System [page 24], you do not need to install the SAP HANA database beforehand. However, you must configure the SAP HANA maximum memory settings after the installation has completed.
  Optionally, you can install the SAP HANA database using the SAP HANA installer (hdblcm) tool beforehand. For more information, see the SAP HANA Server Installation and Update Guide. You also need to configure the SAP HANA maximum memory settings.

- If you want to perform a High-Availability System [page 28], you must install the SAP HANA database using the SAP HANA installer (hdblcm) tool beforehand. For more information, see the SAP HANA Server Installation and Update Guide. You also need to configure the SAP HANA maximum memory settings.

Only software installed by certified hardware partners, or any person holding certification, is recommended for use on the SAP HANA system. Do not install any other software on the SAP HANA system. The components of SAP HANA can only be installed by certified hardware partners, or any person holding certification. Furthermore, it must be installed on validated hardware running an approved operating system.

For more information, see the blogs SAP Certified Technology Associate: C_HANATEC_13 – by the SAP HANA Academy and Recent changes in the SAP HANA Technology certification program 2016 in the Related Information section.

⚠️ Caution

If you are installing a standard system on one Linux host, you can install your SAP system on the same host as the SAP HANA database.

In this case, you must use a different SAP system ID (SID) for the SAP HANA database than the one you later specify for the installation of the AS ABAP system.

To install the SAP HANA database beforehand, proceed as follows:

**Prerequisites**

- You use the tool hdblcm or the GUI version hdblcmgui to install SAP HANA. In this documentation we use hdblcm.
- You must run the installer (hdblcm or hdblcmgui) as root user from the following directory where you downloaded and extracted the installation medium or software packages, such as from one of the following:
  - <Media root directory>/DATA_UNITS/HDB_LCM_LINUX_X86_64
  - <Media root directory>/DATA_UNITS/HDB_LCM_LINUX_PPC64LE
  - <Media root directory>/DATA_UNITS/HDB_LCM_LINUX_PPC64
Procedure
1. Change to the directory containing hdblcm and enter the command `hdblcm` to start the installation.
2. Choose `Install new system` and select the additional components required:

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP HANA Studio</td>
<td>Installs the components of the SAP HANA Studio</td>
</tr>
<tr>
<td>SAP HANA Lifecycle Manager</td>
<td>Installs the components of the SAP HANA Studio</td>
</tr>
<tr>
<td>SAP HANA Database Client</td>
<td>Installs the components of the SAP Database Client</td>
</tr>
</tbody>
</table>

3. Specify the required installation parameters.
   In most cases you can accept the default values unless you have specific requirements, such as for the SAP system ID.

Result
You installed an SAP HANA database and now you are ready to install AS ABAP.

Next Steps
If required, you can check that the SAP Host Agent is running although it should normally be running automatically. For more information about the SAP Host Agent, see SAP Note 1031096.

6.3 Setting Connectivity Data for the SAP HANA Database

An SAP ABAP system needs connectivity data to log on to the SAP HANA database. This section describes methods for setting up connectivity data.

For SAP HANA database, you can set up the connectivity data using the following methods:

- Local hdbuserstore container (default method)
  The local hdbuserstore container has always been available with SAP HANA. It is used in all versions of software provisioning manager. It is the default when you are doing an installation of SAP HANA or a migration to SAP HANA. One hdbuserstore is created for each host for which you installing an ABAP instance.
  The hdbuserstore is stored in the home directory of the user in the sub-folder `.hdb/<hostname>`.
  Therefore, even if the `<SID>adm` user has a shared home directory, every host has its own hdbuserstore.
  You can trace the connect method of R3trans by checking the log file `trans.log`.
  The disadvantage of this method is that there is one hdbuserstore container on each SAP application server. This means that, if you want to change the connectivity data, you have to log on to each server of the system and change the data separately on each server.
  To use this method, you need take no further action since it is the default.

- Global hdbuserstore container
  As of SAP HANA Database Revision 93 for clients, you can now store hdbuserstore in a central location.
  The storage location for this method is defined by the value of the environment variable `HDB_USE_IDENT` (that is, hostname is not used in this method). hdbuserstore is stored in the user’s home directory at the following location:
  `/home/<sid>adm/.hdb/<HDB_USE_IDENT>`
  `HDB_USE_IDENT` is the successor to the method that uses a file called `installation.ini` to set a folder name by using a virtual hostname.
Example

Check the value of the environment variable HDB_USE_IDENT:

```bash
plx101:cooadm 14> echo $HDB_USE_IDENT
SYSTEM_GTI
```

Now you can see that hdbuserstore is stored in a directory called SYSTEM_GTI:

```bash
plx101:cooadm 15> hdbuserstore list
DATA FILE : /home/cooadm/.hdb/SYSTEM_GTI/SSFS_HDB.DAT
```

By using this method, a global identifier stored in DEFAULT.PFL supports a single unified hdbuserstore in a shared home directory of user `<sid>adm`.

To use this method, you start the installation with the parameter HDB_USE_IDENT. For more information, see Running the Installer [page 124].

- If you want to use virtual host names, you must start the installer with the SAPINST_USE_HOSTNAME parameter.
  For more information, see Running the Installer [page 124].
- ABAP secure storage in the file system (SSFS)
  ABAP SSFS is a database-independent method of storing data located inside the SAP system. For more information, see SAP Note 1639578.
  To use this method, you start the installation with the parameter HDB_ABAP_SSFS=Yes. For more information, see Running the Installer [page 124].
  Note that only SAP kernel tools can read from ABAP SSFS. This means that SAP HANA client tools such as hdbsql cannot use ABAP SSFS. Therefore, you might want to choose one application server where you still maintain one hdbuserstore container.

6.4 Creating Operating System Users and Groups

During the installation, the installer checks all required accounts (users, groups) and services on the local machine. The installer checks whether the required users and groups already exist. If not, it creates new users and groups as necessary.

The sapinst_instdir directory belongs to a group named sapinst. If this group is not available, it is created automatically as a local group.

If you do not want the installer to create operating system users, groups, and services automatically, you can optionally create them before the installation is started. This might be the case if you use central user management such as Network Information System (NIS).

For distributed installations, unless you are using global accounts or NIS, you must create the target users automatically using the installer or manually on the operating system, before starting the installation:

⚠ Caution

The user ID (UID) and group ID (GID) of SAP users and groups must be identical for all servers belonging to an SAP system.
This does not mean that all users and groups have to be installed on all SAP servers.

The installer checks if the required services are available on the host and creates them if necessary. See the log messages about the service entries and adapt the network-wide (NIS) entries accordingly.

The installer checks the NIS users, groups, and services using NIS commands. However, the installer does not change NIS configurations.

→ Recommendation

For a distributed or a high-availability system, we recommend that you distribute account information (operating system users and groups) over the network, for example by using Network Information Service (NIS).

If you want to use global accounts that are configured on a separate host, you can do this in one of the following ways:

- You start the installer and choose Generic Installation Options > Database > Preparation > Operating System Users and Groups. For more information, see Running the Installer [page 124].
- You create operating system users and groups manually. Check the settings for these operating system users.

User Settings

- Only valid for ‘Platform’: Oracle Solaris
  Oracle Solaris: If your operating system is Oracle Solaris 10 or higher, follow the parameter recommendations for SAP applications in SAP Note 724713.

End of ‘Platform’: Oracle Solaris

- Only valid for ‘Platform’: AIX
  AIX: Make sure that you have set the limits for operating system users as described in SAP Note 323816.

End of ‘Platform’: AIX

- Only valid for ‘Platform’: HP-UX, Linux, Oracle Solaris
  HP-UX, Linux, Oracle Solaris: Make sure that you have set the limits for operating system users root, <sapsid>adm, and your database-specific operating system users.

⚠️ Caution

Caution: the limit mechanism supports hard and soft limits. The soft limit cannot be bigger than the hard limit. The hard limit can be set/increased by the root user like: limit -h <new_value>, for example limit -h datasize unlimited.

○ Using csh shell, the output of command limit needs to be at least as follows:

💡 Example

The following table lists example output taken from SUSE Linux Enterprise Server 11 (x86_64).
Using sh or ksh shell, the output of command `ulimit -a` needs to be at least as follows:

### Example

The following table lists example output taken from SUSE Linux Enterprise Server 11 (x86_64).

<table>
<thead>
<tr>
<th>Output sh</th>
<th>Output ksh</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>cpu time (seconds)</td>
<td>cpu time (seconds)</td>
<td>unlimited</td>
</tr>
<tr>
<td>file size (blocks)</td>
<td>file size (blocks)</td>
<td>unlimited</td>
</tr>
<tr>
<td>data seg size (kbytes)</td>
<td>data size (Kibytes)</td>
<td>unlimited</td>
</tr>
<tr>
<td>stack size (kbytes)</td>
<td>stack size (Kibytes)</td>
<td>8192 KB</td>
</tr>
<tr>
<td>core file size (blocks)</td>
<td>core file size (blocks)</td>
<td>unlimited</td>
</tr>
<tr>
<td>open files</td>
<td>nofile</td>
<td>8192</td>
</tr>
<tr>
<td>max memory size (kbytes)</td>
<td>max memory size (Kibytes)</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

All users **must** have identical environment settings. Any change to the environment – such as variables, or paths – is at your own responsibility.

If you have multiple operating system users with user ID (UID) 0, you must assign the `sapinst` group to all of them.

Do not delete any shell initialization scripts in the home directory of the operating system users. This applies even if you do not intend to use the shells that these scripts are for.

If you install an SAP system with instances distributed over several hosts, make sure that the following requirements are met:

- The user ID (UID) and group ID (GID) of each operating system user must be unique and the same on each instance host that belongs to the same SAP system.
Make sure that the group ID of group `sapinst` is always different from the group ID of any other group (for example, of group `sapsys`) used during the installation. For example, if you want to install an additional application server instance for an existing SAP system, you must make sure that the group ID of group `sapinst` created on the host of the additional application server instance is different from the group ID of any other group on the primary application server instance host of the existing SAP system.

- If you use local operating system user accounts instead of central user management (for example, NIS), users `<sapid>adm` and `sapadm` must have the same password on all hosts.
- If you use local operating system user accounts, make sure that you install your SAP system in Custom mode and specify suitable IDs for user `<sapid>adm` and group `sapsys` on all hosts. The IDs have to be the same on all hosts. If you choose Typical mode, you are not asked to specify the user and group IDs.

- If you create operating system users manually or use already existing operating system users, make sure that the home directory for each of these users is not the root directory (`/`).
- Make sure that the home directory of user `<sapid>adm` is not critical for recursive changes on permissions.
  When operating system users are created by the installer, the permissions on the home directories of these users are changed recursively. This can cause unpredictable errors if you define a critical home directory. For example, the home directory must not be `/` or `/usr/sap`.

- **Only valid for 'Platform': HP-UX**

  HP-UX: To prevent terminal query errors in the `<sapid>adm` environment, comment out the line `eval 'tset -s -Q -m '?hp'` in the `/etc/skel/.login` script. For more information, see SAP Note 1038842.

End of 'Platform': HP-UX

### Operating System Users and Groups

The installer chooses available operating system user IDs and group IDs unless you are installing an additional application server instance. On an additional application server instance you have to enter the same IDs as on the host of the primary application server instance.

If you have multiple operating system users with user ID (UID) 0, you must assign the `sapinst` group to all of them.

> **Recommendation**

For security reasons, we recommend that you remove the operating system users from the group `sapinst` after the installer has completed. For more information, see Ensuring User Security [page 160].

We recommend that you specify this “cleanup” already during the Define Parameters phase on the Cleanup Operating System Users screen. Then, the removal of the operating system users from the group `sapinst` is done automatically. For more information, see Cleanup of Operating System Users in SAP System Parameters [page 54].
### Users and Groups

<table>
<thead>
<tr>
<th>User</th>
<th>Primary Group</th>
<th>Additional Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>root</td>
<td>None</td>
<td>sapinst</td>
<td>Superuser of the UNIX operating system</td>
</tr>
<tr>
<td>&lt;sapid&gt;adm</td>
<td>sapsys</td>
<td>sapinst</td>
<td>SAP system administrator</td>
</tr>
</tbody>
</table>

### Groups and Members

<table>
<thead>
<tr>
<th>Groups</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>sapsys</td>
<td>&lt;sapid&gt;adm</td>
</tr>
<tr>
<td>sapinst</td>
<td>root, &lt;sapid&gt;adm</td>
</tr>
</tbody>
</table>

### SAP Host Agent:

#### User and Groups of the SAP Host Agent

<table>
<thead>
<tr>
<th>User</th>
<th>Primary Group</th>
<th>Additional Group</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>sapadm</td>
<td>sapsys</td>
<td>-</td>
<td>SAP Host Agent administrator</td>
</tr>
</tbody>
</table>

**i Note**

If sapadm does not exist, it is created during the SAP Host Agent installation using /bin/false shell.

Make sure that /bin/false can be used as a login shell.

[Only valid for Platform: AIX]

AIX: Add /bin/false to the list of valid login shells (attribute shells) in /etc/security/login.cfg.

[End of Platform: AIX]

### Groups and Members of the SAP Host Agent User

<table>
<thead>
<tr>
<th>Groups</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>sapsys</td>
<td>sapadm</td>
</tr>
<tr>
<td>sapinst</td>
<td>sapadm</td>
</tr>
</tbody>
</table>
6.5 Required File Systems and Directories

i Note

The installation of any SAP system does not require a special file system setup or separate partitions.

Related Information

SAP Directories [page 87]
SAP HANA Database Directories [page 92]
Setting Up File Systems for a High-Availability System [page 92]

6.5.1 SAP Directories

Depending on the installation option you have chosen, the installer automatically creates the directories listed in the following figures and tables. Before running the installation, you have to set up the required file systems manually. In addition, you have to make sure that the required disk space for the directories to be installed is available on the relevant hard disks.

The installer creates the following types of directories:

- Physically shared directories
- Logically shared directories
- Local directories

**Only valid for ‘Platform’: HP-UX**

**HP-UX only:** For recommendations about block size and mount option configuration, see SAP Note 1077887.

**End of ‘Platform’: HP-UX**

Directories of the SAP System

The figure below assumes that you have set up one file system for the SAP system mount directory `<sapmnt>` and one file system for the `/usr/sap` directory. However, you have to decide for which directories you want to set up separate file systems. If you do not set up any file system on your installation host, the installer creates all directories in the root directory (`/`). A high-availability setup might influence the file system structure.

Contact your HA partner for their recommendation. For more information, see Setting Up File Systems for a High-Availability System [page 92].

The installer prompts you only for the `<sapmnt>` directory during the installation.

The following figures show the directory structure of SAP ABAP system:
All application server instances, including the primary application server instance, are named D<Instance_Number>.

Directory Structure for an SAP ABAP System

Physically Shared Directories (SAP System)

Physically shared directories reside on the global host and are shared by Network File System (NFS). The installer creates the following directories:

- The directory /<sapmnt>/<SAPSID>, which contains SAP kernel and related files, is created on the first installation host. Normally, the first installation host is the host on which the central services instance is to run, but you can also choose another host for /<sapmnt>/<SAPSID>. You need to manually share this directory with Network File System (NFS) and – for a distributed system such as a high-availability system or a system with additional application server instances – mount it from the other installation hosts.

The installer creates the following shared subdirectories in /<sapmnt>/<SAPSID> during the SAP system installation. If you install an SAP system with instances distributed over several hosts, you have to share these directories for all hosts with the same operating system (see Exporting and Mounting Global Directories [page 118]):

- global
- profile
  - Contains the profiles of all instances
- exe
Contains a folder `uc` and a folder `nuc`, each with a platform-specific subfolder:

- `<sapmnt>/<SAPSID>/exe/uc/<platform>` is used in Unicode systems. Executable kernel programs are replicated from this directory to the `exe` directories of each Unicode system instance.
- `<sapmnt>/<SAPSID>/exe/nuc/<platform>` is used in non-Unicode systems (see below). Executable kernel programs are replicated from this directory to the `exe` directories of each non-Unicode system instance (see below).

- Contains a folder `jvm` with the SAP JVM files

- The directory `/usr/sap/trans`, which is the global transport directory.
  
  If you want to use an existing transport directory, you have to mount it before you install the relevant application server instance. Otherwise, the installer creates `/usr/sap/trans` locally.

→ Recommendation

We recommend that you set up your global transport directory as a shared file system.

For more information about the global transport directory, see Exporting and Mounting the Global Transport Directory [page 117].

### Physically Shared SAP Directories

<table>
<thead>
<tr>
<th>Directory</th>
<th>Required Minimum Disk Space</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>/&lt;sapmnt&gt;/</code></td>
<td>Minimum 2.5 GB</td>
</tr>
<tr>
<td><code>&lt;SAPSID&gt;</code></td>
<td></td>
</tr>
<tr>
<td><code>/usr/sap/trans</code></td>
<td>This value heavily depends on the use of your SAP system. For production systems, we recommend to use as much free space as available (at least 2 GB), because the space requirement normally grows dynamically. For the installation, it is sufficient to use 2 GB for each SAP system instance. You can enlarge the file system afterwards.</td>
</tr>
</tbody>
</table>

### Logically Shared Directories (SAP System)

Logically shared directories reside on the local hosts with symbolic links to the global host. The installer creates the directory `/usr/sap/<SAPSID>/SYS` on each host.

This directory contains the following symbolic links to physically shared directories:

- Symbolic link `profile` points to `/<sapmnt>/<SAPSID>/profile`
- Symbolic link `global` points to `/<sapmnt>/<SAPSID>/global`

This directory contains the `exe` subdirectory with symbolic links pointing to the corresponding subdirectories of `/<sapmnt>/<SAPSID>/exe` on the SAP global host:

- Symbolic link `uc` (for Unicode) points to `/<sapmnt>/<SAPSID>/exe/uc`
- Symbolic link `nuc` (for non-Unicode) points to `/<sapmnt>/<SAPSID>/exe/nuc`
- Symbolic link `run` points to another symbolic link `/usr/sap/<SAPSID>/SYS/exe/dbg` in the same directory, and symbolic link `dbg` finally points to `/<sapmnt>/<SAPSID>/exe/uc/<platform>`

Whenever a local instance is started, the `sapcpe` program checks the executables against those in the logically shared directories and, if necessary, replicates them to the local instance.
The installer uses `sapcpe` to replicate the kernel automatically from `/usr/sap/<SAPSID>/SYS/exe/run/DIR_CT_RUN` to `/usr/sap/<SAPSID>/<INSTANCE>/exe/DIR_EXECUTABLE` for each SAP system instance.

**Local Directories (SAP System)**

The installer also creates local directories that reside on the local hosts. The directory `/usr/sap/<SAPSID>` contains files for the operation of a local instance as well as symbolic links to the data for one system. This directory is physically located on each host in the SAP system and contains the following subdirectories:

- **SYS**
  
  *i Note*
  
  The subdirectories of `/usr/sap/<SAPSID>/SYS` have symbolic links to the corresponding subdirectories of `/<sapmnt>/<SAPSID>`, as shown in the figure above.

- Instance-specific directories with the following names:
  - **SAP systems based on SAP NetWeaver 7.5 and higher**: The directory of an application server instance (primary application server instance and additional application server instances) is called `D<Instance_Number>`.
  - The directory of the ABAP central services instance (ASCS) instance is called `ASCS<Instance_Number>`.
  - The directory of an ERS instance is called `ERS<Instance_Number>`.

  If you install a high-availability system, you must install an ERS instance for the ASCS instance.

**Local SAP Directories**

<table>
<thead>
<tr>
<th>Directory</th>
<th>Description</th>
<th>Required Minimum Disk Space</th>
</tr>
</thead>
</table>
| `/usr/sap/<SAPSID>/D<Instance Number>` | Primary application server instance directory | - SAP Business Warehouse server only: minimum 25 GB  
- Other installations: minimum 4 GB |
| `/usr/sap/<SAPSID>/D<Instance Number>` | Additional application server instance directory | - SAP Business Warehouse server only: minimum 25 GB  
- Other installations: minimum 4 GB |
| `/usr/sap/<SAPSID>/ASCS<Instance Number>` | ABAP central services instance (ASCS instance) directory | Minimum 2 GB |
| `/usr/sap/<SAPSID>/ERS<Instance Number>` | ERS instance directory for the ASCS instance (high availability only) | Minimum 2 GB |
Directories of the SAP Host Agent

The SAP Host Agent has only local directories as shown in the following figure:

Local Directories (SAP Host Agent)

The SAP Host Agent directory `/usr/sap/hostctrl` requires 100 MB of disk space. It contains the following subdirectories:

- **exe**
  - Contains the profile `host_profile`
- **work**
  - Working directory of the SAP Host Agent
6.5.2 SAP HANA Database Directories

The directory for the SAP HANA database client is the following:

/usr/sap/<SAPSID>/hdbclient

For the space required, see the table Hardware Requirements in Hardware and Software Requirements Tables [page 41].

**Note**
If you are installing a standard system on Linux, you can install SAP systems on the same host as the SAP HANA database.

The required file systems are created during installation of the SAP HANA database and AS ABAP. However, if required you can set them up before the installation and specify them during the installation procedure.

For more information, see section Recommended File System Layout in the SAP HANA Server Installation and Update Guide at https://help.sap.com/hanaInstallation and Upgrade.

6.5.3 Setting Up File Systems for a High-Availability System

Third-party technology is used to make the SAP directories available to the SAP system. The technologies of choice are NFS, shared disks, and cluster file system. If you have decided to use a high-availability (HA) solution for your SAP system, make sure that you properly address the HA requirements of the SAP file systems in your SAP environment with the HA partner of your choice.

**Prerequisites**

You have already installed the hardware – that is, hosts, disks, and network – and decided how to distribute the database, SAP instances, and – if required – Network File System (NFS) server over the cluster nodes (that is, over the host machines). For more information, see Planning the Switchover Cluster [page 68] and contact your HA partner.

**Context**

From the perspective of an SAP application, there are the following types of SAP Directories [page 87]:

- Physically shared directories: /<sapmnt>/<SAPSID> and /usr/sap/trans
  In an HA setup, <sapmnt> should be a highly available file system, and /usr/sap/trans should be a shared file system.
• Logically shared directories that are bound to a node such as /usr/sap with the following local directories:
  ○ /usr/sap/<SAPSID>
  ○ /usr/sap/<SAPSID>/SYS
  ○ /usr/sap/hostctrl

In an HA Setup, no special actions are required for these local directories.

• Local directories that contain the SAP instances such as /usr/sap/<SAPSID>/ASCS<Instance Number>.

In an HA setup, the directories of the clustered instances (/usr/sap/<SAPSID>/<Instance Type><Instance Number>) should be mounted as cluster-controlled file systems and reside on highly available file systems.

HP-UX only: For recommendations about block size and mount option configuration, see SAP Note 1077887.

End of ‘Platform’: HP-UX

### Procedure

1. Create the file systems or raw partitions for the SAP instances you can switch over in such a way that the content can be made available to all nodes that can run the service.

   At least the ABAP central services (ASCS) instance and the ERS instance must be part of the switchover cluster.

   The SAP directories /<sapmnt>/<SAPSID> and /usr/sap/trans are usually mounted from a Network File System (NFS). Especially for /<sapmnt>/<SAPSID> you should think of using a highly available file system. However, an SAP instance directory /usr/sap/<SAPSID>/<Instance Type><Instance Number> that you want to prepare for HA must always be mounted on the cluster node that is currently running the instance.

   **Caution**

   To start or stop an SAP instance, you have to do one of the following:
   ○ Make the physically shared SAP directories under /<sapmnt>/<SAPSID> available to the server beforehand.
   ○ Consult your HA partner to clarify the best solution for the cluster software.

2. Use the following approach for the file system for the /usr/sap/<SAPSID> directory:

   The /usr/sap/<SAPSID> directory contains at least two subdirectories (see also SAP Directories [page 87]):
   ○ SYS/sapmnt/<SAPSID>
   ○ <Instance Type> <Instance Number> – where the name is defined by the type of services and the application server number:
     ○ D<Instance Number> – which contains the data for the primary application server instance or an additional application server instance
     ○ ASCS<Instance Number> – which contains data for the ABAP central services instance (ASCS instance)
ERS<Instance Number> – which contains the replication table, which is a copy of the lock table.

Only <Instance Type><Instance Number> directories of clustered instances need to be migrated with the SAP instances during the switchover.

Create cluster-controlled file systems for /usr/sap/<SAPSID>/<Instance Type><Instance Number> of clustered instances.

The instance-specific directory name for the ABAP central services instance is normally ASCS<Instance Number>. Migrating only these directories avoids mount conflicts when switching over to a node on which another application server instance is already running. The ASCS<Instance Number> directory can join the /usr/sap/<SAPSID> tree instead of mounting on top of it. The same is true for all other clustered instances.

**i Note**

This approach becomes increasingly important when you want to cluster the central services instances with other local instances running on the cluster hosts outside the control of the switchover software. This applies to the ERS instance and additional ABAP application server instances. The result is a more efficient use of resources. Use this approach for integrated installations of the application server with ABAP stacks.

3. You assign the local (not switching) file systems to permanent mount points.

4. You assign the shared file systems as documented by your HA partner.

**Example**

The graphic below shows a scenario of the file systems and disks in an HA setup with an integrated NFS server. Such a setup is not mandatory. For more information about a setup that meets your needs, consult your HA partner.
6.6 Using Virtual Host Names

You can use one or more virtual TCP/IP host names for SAP servers within an SAP server landscape to hide their physical network identities from each other. This can be useful when quickly moving SAP servers or complete server landscapes to alternative hardware since you do not need to reinstall or reconfigure.

Prerequisites

Make sure that the virtual host name can be correctly resolved in your Domain Name System (DNS) setup.

Context

If you want to install a high-availability (HA) system [page 28], you need the virtual host name when you install the ASCS instance in a cluster.

Procedure

Proceed as described in SAP Note 962955. Assign the required virtual host names to the instance to be installed by specifying them in the <Instance_Name> Host Name field of the <Instance_Name> Instance screen while running the installer.

For more information, see the Virtual Host Name parameter description in SAP System Parameters [page 54].

6.7 Performing Switchover Preparations for High Availability

You have to assign virtual host names to prepare the switchover for high-availability.

Context

To be able to use the required virtual host names [page 96], you have to specify the virtual host in the <Instance_Name> Host Name field of the <Instance_Name> Instance screen.

For more information, see Virtual Host Name in SAP System Parameters [page 54].
Procedure

Assign the virtual IP addresses and host names for the ASCS instance, and (if required) NFS to appropriate failover groups.

>Note
For more information on virtual addresses and virtual host names and how to assign resources to failover groups, ask your HA partner.

6.8 Installing the SAP Front-End Software

Before you start the installation, make sure that the SAP front-end software is installed on at least one computer in your system environment to be able to log on to the SAP system after the installation has finished.

Procedure

1. Check SAP Note 147519 for the recommended SAP front-end release.
2. Install the SAP front-end software required for your SAP system release as described in the documentation `SAP Frontend Installation Guide - <Release>` at: https://wiki.scn.sap.com/wiki/display/ATopics/SAP+GUI+Family

6.9 Configuring Host Names for the SAP HANA Database

You need to perform this procedure if you want to use virtual host names or if your SAP HANA database is located in a separate network.

Context

During the Define Parameters phase, the installer prompts you for the parameters to connect to your SAP HANA database. However, the database host name that you enter is not used for the user store. Instead, the external host name of the database is determined and subsequently used. If the SAP HANA database was installed using a virtual host name and you want this host to be used in the user store connection environment, make sure the host can be resolved from the installation host as well.
Procedure

Make sure that the external host name of the database is correctly maintained.

For more information on how to do this, see SAP Note 1930853 or section Mapping Host Names for Database Client Access in the SAP HANA Administration Guide, available here:


6.10 Checking Time Zones

Before you start the installer, you need to check time zone settings.

Context

Before you start the installer, compare the following time zone settings:

- The time zone of the target host for the ABAP application server
- The time zone of the <sid>adm user of the SAP HANA system
  
  Check the relevant SAP HANA time zone by logging on to the system at the command line with your user <sid>adm and then using command date.

Procedure

If the systems have different time zones, proceed as follows:

- Change the time zone of the ABAP system (recommended solution)
- If the time zone of the ABAP system cannot be changed, change the time zone of the SAP HANA system.

For more information, see https://help.sap.com/viewer/p/SAP_HANA_PLATFORM Installation and Upgrade SAP HANA Server Installation and Update Guide

6.11 Providing the Installation Software

This section provides information about how to provide the required installation archives and software.

Note

The signature of installation archives and installation media is checked automatically by the installer during the Define Parameters phase while the Software Package Browser or Media Browser screens are
processed (see also Running the Installer [page 124]). The installer only accepts archives and media whose signature has been checked. For more information, see SAP Note 2393060.

1. **Download and extract the Software Provisioning Manager 2.0 archive. [page 100]**
   The Software Provisioning Manager 2.0 archive is required on each installation host. Make sure that you always download the latest version.

2. **Download the SAP Kernel [page 101].**
   **SAP BW/4HANA 1.0 SR1 only:** You can either download the SAP Kernel archives separately or download the complete SAP Kernel medium. We recommend downloading the SAP Kernel archives instead of using the complete SAP Kernel medium because the installer verifies each archive separately.
   - Downloading the SAP Kernel Archives (Archive-Based Installation) [page 102]
   - Downloading the Complete SAP Kernel Medium (Only Valid for SAP BW/4HANA 1.0 SR1) [page 104]
   The SAP Kernel archives are required for the installation of the ASCS instance and of each application server instance.
   If you perform the installation using a stack configuration file, you can use the installer to download the SAP Kernel archives from a Maintenance Planner transaction. For more information, see Downloading Software Packages for a Maintenance Planner Transaction [page 105].

3. **Download the SAP HANA database client software [page 107].**
   The RDBMS media and archives are required for the installation of the SAP HANA database on the SAP HANA host. For more information, see Installing the SAP HANA Target Database [page 79].

**Note**
If you are installing a standard system on one Linux host, you can install your SAP system on the same host as the SAP HANA database. For more information, see SAP Note 1953429. In this case, you must make sure that the SAP HANA database RDBMS media are also available on the installation host.

The SAP HANA database client software is required for the installation of each application server instance.

**Next Steps**

Create and transfer the database backup [page 110].

- Downloading and Extracting the Software Provisioning Manager 2.0 Archive [page 100]
- Downloading the SAP Kernel [page 101]
- Downloading Software Packages for a Maintenance Planner Transaction [page 105]
- Downloading the SAP HANA Database Software [page 107]
6.11.1 Downloading and Extracting the Software Provisioning Manager 2.0 Archive

You must always download and extract the Software Provisioning Manager 2.0 archive from the SAP Software Download Center because you must use the latest version.

Context

You require the SAPCAR tool to be able to unpack and verify software component archives (*.SAR files). *.SAR is the format of software lifecycle media and tools that you can download from the SAP Software Download Center. For more information about how to get this tool, see the Procedure section below.

Procedure

1. Download the latest version of the Software Provisioning Manager 2.0 archive SWPM20SP<Support Package Number>_<Version Number>.SAR from:

   https://support.sap.com/sitoolset System Provisioning Download Software Provisioning Manager

2. Make sure that you use the latest version of the SAPCAR tool when manually extracting the Software Provisioning Manager archive.

   i Note

   An older SAPCAR version might extract archive files in a wrong way and this could prevent the installer from working consistently.

   Proceed as follows to get the latest version of SAPCAR:

   a. Go to https://launchpad.support.sap.com/#/softwarecenter SUPPORT PACKAGES & PATCHES
      By Category SAP TECHNOLOGY COMPONENTS SAPCAR
   b. Select the archive file for your operating system and download it to an empty directory.
   c. Rename the executable to sapcar.exe.

   For more information about SAPCAR, see SAP Note 212876.

3. Using the latest version of SAPCAR, you can verify the signature of the downloaded SWPM20SP<Support Package Number>_<Version Number>.SAR archive as follows:

   a. Get the latest version of the SAPCRYPTOLIB archive to your installation host as follows:

      1. Go to https://launchpad.support.sap.com/#/softwarecenter SUPPORT PACKAGES & PATCHES and search for "sapcryptolib".
      2. Select the archive file for your operating system and download it to the same directory where you have put the SAPCAR executable.
3. Use the following command to extract the SAPCRYPTOLIB archive to the same directory where you have put the SAPCAR executable:

```
sapcar -xvf sapcryptolibp_84.sar -R <Target Directory>
```

4. Download the Certificate Revocation List from https://tcs.mysap.com/crl/crlbag.p7s and move it into the same directory.

b. Verify the signature of the downloaded SWPM20SP<Support Package Number>_<Version Number>.SAR archive by executing the following command:

```
<Note>
Check SAP Notes 2178665 and 2568783 whether additional information is available.
</Note>
```

```
/‹Path to SAPCAR›/sapcar -tvVf ‹Path to Download Directory›/SWPM20SP<Support Package Number>_<Version Number>.SAR -crl ‹File Name of Revocation List›
```

4. Unpack the Software Provisioning Manager 2.0 archive to a local directory using the following command:

```
/‹Path to SAPCAR›/sapcar -xvf ‹Path to Download Directory›/SWPM20SP<Support Package Number>_<Version Number>.SAR ‹Path to Unpack Directory›
```

<Note>
Make sure that all users have read permissions for the directory where you want to unpack the installer.
</Note>

<Caution>
Make sure that you unpack the Software Provisioning Manager archive to a dedicated folder. Do not unpack it to the same folder as other installation media or archives.
</Caution>

### 6.11.2 Downloading the SAP Kernel

This section describes how to download the SAP Kernel.

You can either download the separate *.SAR archives of the SAP Kernel or the complete SAP Kernel medium.

- Downloading the SAP Kernel Archives (Archive-Based Installation) [page 102]
- Downloading the Complete SAP Kernel Medium (Only Valid for SAP BW/4HANA 1.0 SR1) [page 104]

#### Related Information

- Downloading the SAP Kernel Archives (Archive-Based Installation) [page 102]
- Downloading the Complete SAP Kernel Medium (Only Valid for SAP BW/4HANA 1.0 SR1) [page 104]
6.11.2.1 Downloading the SAP Kernel Archives (Archive-Based Installation)

This section describes how to download the SAP kernel *.SAR archives required for an archive-based installation.

Context

The signature of installation archives is checked automatically by the installer [page 124] during the Define Parameters phase while processing the Software Package Browser screens. The installer only accepts archives whose signature has been checked. After scanning the archives and verifying the signature, an info file is written where you can find detailed information about matching and non-matching archive files. You can access this info file by choosing the info file link in the Archive Scanning Result section of the Software Package Browser screen. The info file contains only the results of the latest archive scan. For more information, see SAP Note 2393060.

Procedure

1. Go to https://launchpad.support.sap.com/#/softwarecenter SUPPORT PACKAGES & PATCHES By Category
2. Choose the required software component and release:
   - If you want to install SAP S/4HANA <Release> Server, choose SAP APPLICATION COMPONENTS SAP S/4HANA SAP S/4HANA <Release> SAP S/4HANA SERVER
   - If you want to install AS ABAP for SAP S/4HANA Frontend, choose SAP NetWeaver and complementary products AS ABAP FOR S/4HANA FRONTEND AS ABAP <Release> FOR S/4 HANA <Release>
   - If you want to install an SAP BW/4HANA server, choose SAP NetWeaver and complementary products SAP BW/4HANA SAP BW/4HANA <Release> BW/4HANA SERVER
3. Choose the required package:

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you perform an additional application server installation, kernel archives - such as SAPEXE&lt;Version&gt;.SAR, SAPEXEDB&lt;Version&gt;.SAR, IGSEXE&lt;Version&gt;.SAR, igshelper&lt;version&gt;.sar - are only prompted if they cannot be retrieved from the primary application server instance or the ASCS instance of the existing SAP system.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Caution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make sure that you always use the highest available patch level unless special patch levels are specified for the relevant package in SAP Note 2568783.</td>
</tr>
</tbody>
</table>
Make sure that you always choose SAPEXE<Version>.SAR, SAPEXEDB<Version>.SAR of the same SAP kernel release and extension.

**Example**

- If SAPEXE<Version>.SAR is of version 7.53 64-BIT UNICODE, then SAPEXEDB<Version>.SAR must also be of version 7.53 64-BIT UNICODE.
- If SAPEXE<Version>.SAR is of version 7.49 64-BIT UNICODE, then SAPEXEDB<Version>.SAR must also be of version 7.49 64-BIT UNICODE.

If you provide the archives in one download folder, and there is more than one version of the same archive available - for example SAPEXE<Version>.SAR - and these versions match the product-specific requirements, the installer selects one of these archive versions. If you want a specific archive version to be used, make sure that this is the only version available in the download folder. When running system provisioning in GUI mode, you can also check in the GUI which archive is being used. So even if there is more than one version of the same archive available in the download folder, you can select the exact archive version you want to use and enter the exact path to the required archive file.

SAPEXE<Version>.SAR

- SAP KERNEL <Version><UC> <Operating System> #DATABASE INDEPENDENT

SAPEXEDB<Version>.SAR

Choose the version corresponding to the SAPEXE<Version>.SAR from SAP KERNEL <Version> <UC> <Operating System> <DATABASE>

- SAP IGS <Version> <Operating System>

igsexe<version>.sar

- SAP IGS HELPER # OS independent

igshelper<version>.sar

- SAPHOSTAGENT<Version>.SAR

SAP HOST AGENT 7.21 <Operating System>

**i Note**

The SAPHOSTAGENT<Version>.SAR archive is only prompted if there is either no SAP Host Agent available on the installation host or you specified during the Define Parameters phase that you want to upgrade an existing version of the SAP Host Agent already available on the installation host. In the latter case, you must specify a higher version of the SAPHOSTAGENT<Version>.SAR. Otherwise, the existing SAP Host Agent is not upgraded.
6.11.2.2 Downloading the Complete SAP Kernel Medium
(Only Valid for SAP BW/4HANA 1.0 SR1)

This section describes how to download the complete kernel medium required for the installation.

**Note**
A complete SAP kernel medium is only available for SAP systems based on SAP BW/4HANA 1.0 SR1. For SAP systems based on ABAP Platform 1809 or higher, you can only download the SAP kernel archives.[page 102]

**Context**

The signature of installation media is checked **automatically** by the installer during the Define Parameters phase while the Media Browser screens are processed (see also Running the Installer [page 124]). The installer only accepts media whose signature has been checked. For more information, see SAP Note 2393060.

**Procedure**

1. Create a download directory on the host where you want to run the installer.
2. You can download the complete kernel medium for your operating system as a *zip file from the following path: [https://launchpad.support.sap.com/#/softwarecenter](https://launchpad.support.sap.com/#/softwarecenter) [INSTALLATION & UPGRADE] [By Category] [SAP NetWeaver and complementary products] [SAP BW/4HANA] [SAP BW/4HANA 1.0] [INSTALLATION]

**Note**
All download objects that are part of an installation medium have the same material number and an individual sequence number:

\[<Material_Number>_<Sequence_Number>\]

**Example**

51031387_1
51031387_2
...

3. Download the objects to the download directory.
4. To correctly re-combine the media that are split into small parts, unpack all parts into the same directory.

In the unpacking directory, the system creates a subdirectory with a short text describing the medium and copies the data into it. The data is now all in the correct directory, the same as on the medium that was physically produced. For more information, see SAP Note 1258173.
6.11.3 Downloading Software Packages for a Maintenance Planner Transaction

Software Provisioning Manager (the installer) is now enabled to download all software packages that have been defined in a Maintenance Planner Transaction.

Note
This feature is only available if you perform an installation using a stack configuration file.

Prerequisites

Plan your new SAP system including the required Support Package level (applicable for SAP S/4 HANA, SAP NetWeaver, SAP Business Suite, and SAP Financials) as available in the Maintenance Planner and run `sapinst SAPINST_STACK_XML=<stack configuration file>` in order to benefit from an automated installation process.

Procedure

1. Specify a download directory for the artifacts (SAP archives) to be downloaded.
2. Start the installer as described in Running the Installer.[page 124]
3. On the Welcome screen, choose ➤ Generic Options ➤ Download Software Packages for Maintenance Planner Transaction
4. Follow the instructions on the installer screens.

The installer prompts you for the following input parameters:

- Maintenance Planner Transaction ID
  You can find the Maintenance Planner Transaction ID by one of the following ways:
  - In the MP_Plan_<Transaction ID>_<Generation Date>_.pdf file which you can download during the Completed step in the Maintenance Planner by choosing the Download PDF button.
  - From the Transaction ID column in the list of transactions displayed in the Transactions panel in the maintenance planner.
○ From the parameter `mopz-transaction-id` in the stack configuration file
  `MP_Stack_<Transaction ID>_<Generation Date>.xml` which you can download during the
  `Download Files` step in the Maintenance Planner by choosing the `Download Stack XML` button.

**Note**
If you started the installer using a stack configuration file, the Maintenance Planner Transaction ID is only displayed.

○ Your S-UserID and password
You call `Software Provisioning Manager` with command line parameter
`SAPINST_STACK_XML=<Absolute_Path_To_Stack_XML_File>` to get the `Maintenance Planner Transaction ID` extracted from the stack configuration file.
You must perform this option directly after creating the Maintenance Planner Transaction, because the contained download links usually expire soon.
Ensure the following for your S-User:
1. You have download permissions for all artifacts on `https://launchpad.support.sap.com/#/softwarecenter` to be able to download them.

2. Consider the SAP Support Portal and the SAP ONE Support Launchpad password policies. Your **password must be the same** for both of them. If the passwords are not the same, you will lock the S-User in the SAP Support Portal. The **password must meet all of the following requirements**:
   ○ Must be exactly eight characters long
   ○ Contains at least one upper-case letter (A-Z)
   ○ Contains at least one lower-case letter (a-z)
   ○ Contains at least one decimal digit (0-9)
   ○ Contains at least one of the following special characters: ! @ $ % / ( [ ] ) - * = ? ' ~ # _ , ; : <>
   ○ Must not start with ? or!
   ○ Must not contain any blanks
   ○ Must not begin with three identical characters
   ○ Must be different from the last five passwords you have already used
   ○ Only one password change is allowed per day

○ Location of download folder for the installation software packages to be downloaded
○ If you have a proxy configured in your network, provide the proxy host and port.

5. You get a list of all downloadable artifacts (SAP archives) as specified in the stack configuration file along with their file size.
   You can still deselect downloadable artifacts (SAP archives) that you do not need to be downloaded.

6. Choose **Next** to start the download.
   If you get a download error, this is the result of an unsuccessful network connection. Check your network connection and proxy configuration. If the download of some artifacts finishes without any error, but still with a status other than **OK**, you must do one of the following:
   ○ Create an up-to-date Maintenance Plan and perform again the download of the files which were not downloaded successfully. In case of an error, the installer skips the download of the artifact (SAR archive) in question and continue with the next one in the list.
Download the still missing files directly from the SAP Software Center at https://launchpad.support.sap.com/#/softwarecenter.

**Results**

You have downloaded the artifacts (SAP archives) required for your SAP system installation with Software Provisioning Manager (the installer) - corresponding to the archives listed in section Downloading the SAP Kernel [page 101] - and for applying the required kernel and support packages using Software Update Manager (SUM) after the installation has completed.

### 6.11.4 Downloading the SAP HANA Database Software

This section describes how to download the SAP HANA 2.0 database client and - if you want to install your SAP system on the same host as the SAP HANA database - the SAP HANA database server software required for the installation.

**Context**

For SAP systems based on ABAP Platform 1809 or higher, the SAP HANA 2.0 database RDBMS and client software is available as installation archives.

For SAP systems based on SAP BW/4HANA 1.0 SR1, the SAP HANA 2.0 database RDBMS and client software is available as physical installation media.

**iNote**

The SAP HANA database server software is only required if you are installing a standard system on one Linux host, you can install your SAP system on the same host as the SAP HANA database. For more information, see SAP Note 1953429.

The signature of installation archives is checked automatically by the installer [page 124] during the Define Parameters phase while processing the Software Package Browser screens. The installer only accepts archives whose signature has been checked. After scanning the archives and verifying the signature, an info file is written where you can find detailed information about matching and non-matching archive files. You can access this info file by choosing the info file link in the Archive Scanning Result section of the Software Package Browser screen. The info file contains only the results of the latest archive scan. For more information, see SAP Note 2393060.

The signature of installation media is checked automatically by the installer during the Define Parameters phase while the Media Browser screens are processed (see also Running the Installer [page 124]). The installer only accepts media whose signature has been checked. For more information, see SAP Note 2393060.
Procedure

1. Create a download directory on the host where you want to run the installer.
2. To download SAP HANA database client software, choose the download path for your product:
   - If you want to install an SAP system based on ABAP Platform 1809 or higher, go to: https://launchpad.support.sap.com/#/softwarecenter Installations & Upgrades By Category SAP APPLICATION COMPONENTS SAP S/4HANA <Release> INSTALLATION
     Make the database client archive available on the installation host. Do not unpack it but just provide it when you are prompted during the installation process.
   - If you want to install SAP BW/4HANA 1.0 SR1, go to: https://launchpad.support.sap.com/#/softwarecenter Installations & Upgrades By Category SAP NETWEAVER AND COMPLEMENTARY PRODUCTS SAP BW/4HANA SAP BW/4HANA 1.0 INSTALLATION
     Unpack the ZIP archive and make it available on the installation host.

   ![Image]

   **Note**
   All download objects that are part of an installation medium have the same material number and an individual sequence number:

   `<Material_Number>_<Sequence_Number>`

   **Example**

   51031387_1
   51031387_2
   ...

   1. Download the objects to the download directory.
   2. To correctly re-combine the media that are split into small parts, unpack all parts into the same directory.
      In the unpacking directory, the system creates a subdirectory with a short text describing the medium and copies the data into it. The data is now all in the correct directory, the same as on the medium that was physically produced. For more information, see SAP Note 1258173.

   ![Image]

   **Caution**
   Make sure that you unpack each installation media to a separate folder. Do not unpack installation media to the same folder where you unpack the Software Provisioning Manager archive.

   Do not unpack installation media to the same folder where you unpack the SAP kernel archives for archive-based installation.

   3. To download the SAP HANA 2.0 database RDBMS media, go to https://launchpad.support.sap.com/#/softwarecenter Installations & Upgrades By Category SAP IN-MEMORY (SAP HANA) SAP HANA PLATFORM EDITION 2.0 INSTALLATION.
This step is only required if you are installing a standard system on one Linux host, you can install your SAP system on the same host as the SAP HANA database. For more information, see SAP Note 1953429. Only in this case, you must make sure that the SAP HANA database RDBMS media are also available on the installation host.

- If you want to install an SAP system based on ABAP Platform 1809 or higher, download the database RDBMS archives and make them available on the installation host. Do not unpack it but just provide it when you are prompted during the installation process. Make the database client archive available on the installation host. Do not unpack it but just provide it when you are prompted during the installation process.
- If you want to install SAP BW/4HANA 1.0 SR1, download the database RDBMS media and make them available on the installation host.

All download objects that are part of an installation medium have the same material number and an individual sequence number:

<Material_Number>_<Sequence_Number>

Example

51031387_1
51031387_2
... 

1. Download the objects to the download directory.
2. To correctly re-combine the media that are split into small parts, unpack all parts into the same directory.

   In the unpacking directory, the system creates a subdirectory with a short text describing the medium and copies the data into this subdirectory. The data is now all in the correct directory, the same as on the medium that was physically produced. For more information, see SAP Note 1258173.

Caution

Make sure that you unpack each installation media to a separate folder. Do not unpack installation media to the same folder where you unpack the Software Provisioning Manager archive.

Do not unpack installation media to the same folder where you unpack the SAP kernel archives for archive-based installation.
7 System Copy Procedure

Copying a Complete SAP System

1. Create that database backup on the source SAP HANA database host and transfer it to the target SAP HANA database host as described in Creating and Transferring the Database Backup [page 110].
2. Install the target system as described in Installing the Target System [page 112].
3. Next Steps:
   Follow-Up Activities [page 141]

Copying Single Instances Only

If you only want to copy single instances, choose the appropriate procedure from the following:

- Copying the Primary Application Server Instance Only [page 138]
- Copying the Database Only – Refresh Database Content [page 139]

7.1 Creating and Transferring the Database Backup

This section describes how to create the database backup and how to transfer it to the target system.

Prerequisites

You have specified a directory with sufficient disk space (20 GB minimum) as the backup destination. For improved data safety, we recommend that you specify an external backup destination.

i Note

Customer-specific changes to the SAP HANA database configuration are not saved as part of the data backup.

For more information, see the SAP HANA Administration Guide at http://help.sap.com/hana_platform System Administration
Process Flow

1. Create the database backup [page 111].
   If your source database is a SAP HANA multitenant database container, create a backup of the tenant database. [page 111].

2. Transfer the backup to the target database system. [page 112]

7.1.1 Creating the Database Backup

This section describes how to create a database backup using the SAP HANA Database Studio.

Procedure

For more detailed information about the following steps, see the SAP HANA Administration Guide at http://help.sap.com/hana_platform System Administration.

1. In the SAP HANA Studio, right-click the database system that is to be copied and choose Backup....
   If you use SAP HANA multitenant database containers, right-click on the SYSTEMDB database of the system to be copied, and choose Backup Tenant Database....

2. Select Complete Data Backup as the Backup Type and select File or Backint as the Destination Type.
   If you select File as the Destination Type, proceed as follows:
   Under Backup Destination, specify the directory in which you want to store the backup files.
   For both backup types, proceed as follows: Under Backup Prefix, specify a prefix for the backup file.

3. Ensure that the backup directory contains sufficient free space for the backup and that no backup that has the same prefix already exists there.

4. Choose Next.

5. Check your entries and choose Finish to start the backup or choose Back to correct your entries.

6. Wait until the backup has been created and then close the dialog box.

7.1.2 Creating the Backup for a Tenant Database

If your source database is a SAP HANA multitenant database container, create a backup of the tenant database.

- If your database is SAP HANA 2.0 SP02 and higher in a multitenant environment (MDC), you can use the installer:
  1. Start the installer as described in Running the Installer [page 124].
  2. On the Welcome screen, choose Generic Options > ABAP Database Backup for SAP HANA...
     In addition to creating a backup of SAP HANA tenant database, source system and database backup information is created as well.
To create the backup with SAP HANA database-specific means, proceed as described in the SAP HANA Tenant Databases Operations Guide at http://help.sap.com/hana_platform Administration.

7.1.3 Transferring the Backup to the Target Database System.

Procedure

Copy all files of the backup to the directory that can be read from the target database system. The backup files are located in the directory of the source database system that is specified in step 1 and begin with the prefix that is specified in Creating the Database Backup [page 111].

7.2 Installing the Target System

This installation checklist guides you through the required installation steps for the target system:

Installation Checklist [page 112]

7.2.1 Installation Checklist

This section includes the installation steps for the following:

- Standard system
- Distributed system
- High-availability system
- Additional application server instance

Detailed information about the steps are available in the linked sections.

Note

The SAP HANA database is normally pre-installed by SAP partners before you start the installation. For more information about how to install the SAP HANA database, see the SAP HANA Server Installation and Update Guide at https://help.sap.com/hana_platform Installation and Upgrade. The contents of the database instance are remotely installed by Software Provisioning Manager (the “installer”) from the primary application server host.

However, on Linux you can install SAP systems on the same host as the SAP HANA database - that is as a standard system [page 24] - without applying additional environment settings.
On the *Database for SAP System* screen, enter the *Database Host* and the *Instance Number* for your SAP HANA database host. If the instance does not exist, a new SAP HANA database instance will be installed on the same host as the SAP system.

**Standard System**

1. You check the prerequisites [page 121] and run the installer [page 124] to install the SAP system.

   **i Note**
   
   In a standard system, all mandatory instances except the database instance are installed on one host.

2. You continue with Post-Installation [page 141].

**Distributed System**

1. If you want to share the transport directory *trans* from another system, you have to mount [page 117] it from this system. Otherwise, we recommend that you share the *trans* directory that is created during the installation of the primary application server instance.

2. On the *ASCS instance host*, you do the following:
   
   1. You check the prerequisites [page 121] and run the installer [page 124] to install the ABAP central services instance (ASCS instance).

      **i Note**
      
      If you want to install an ASCS instance with integrated SAP Web Dispatcher [page 34] or with integrated SAP Gateway [page 36] or both, you must choose the *Custom* parameter mode.
      
      When processing the screens for the ASCS instance installation, you are prompted to mark the corresponding checkbox on the screen *Additional Components to be Included in the ASCS Instance*.
      
      If you mark the checkbox for SAP Web Dispatcher, you are prompted for the additional parameters required for the SAP Web Dispatcher installation on the subsequent screens.

   2. You export global directories [page 118] in `<sapmnt>/SAPSID>` to the database and primary application server instance host.

3. On the *primary application server instance host*, you do the following:
   
   1. You mount the global directories [page 118] in `<sapmnt>/SAPSID>` that you exported from the SAP global host.
   2. You check the prerequisites [page 121] and run the installer [page 124] to install the contents of the database instance and then the primary application server instance.
   3. If you want to use the shared transport directory *trans* from another system, you also mount [page 117] this directory.

4. You continue with Post-Installation [page 141].

**Graphical Overview**
The following figure shows how you install the various instances in a distributed system:

**High-Availability System**

You make sure that you have already prepared the switchover cluster both for the ASCS and the ERS failover groups. You ought to have already made sure that it meets the hardware and software requirements and that it has all the necessary file systems, mount points, and (if required) Network File System (NFS).

This is described in *Performing Switchover Preparations for High Availability* [page 96] and *Setting Up File Systems for a High Availability System* [page 92].

1. Export the trans directory to the switchover cluster, database, primary application server, and additional application server instance hosts.
   - If you want to share the transport directory `trans` from another system, you have to mount [page 117] it from this system. Otherwise, we recommend that you share the `trans` directory that is created during the installation of the primary application server instance (see below).

2. You check the prerequisites [page 121] and run the installer [page 124] to install the ASCS instance on Node 1 of the switchover cluster, using Virtual Host (VH) for ASCS instance (“VH ASCS”).
   - For more information about virtual hosts, see *Using Virtual Host Names* [page 96].

**Note**

If you want to install an ASCS instance with integrated SAP Web Dispatcher [page 34] or with integrated SAP Gateway [page 36] or both, you must choose the Custom parameter mode.

When processing the screens for the ASCS instance installation, you are prompted to mark the corresponding checkbox on the screen *Additional Components to be Included in the ASCS Instance*.

If you mark the checkbox for SAP Web Dispatcher, you are prompted for the additional parameters required for the SAP Web Dispatcher installation on the subsequent screens.
3. You check the prerequisites [page 121] and run the installer [page 124] to install the ERS instance on Node 2 of the switchover cluster, using Virtual Host (VH) for ERS instance ("VH ERS").
   For more information about virtual hosts, see Using Virtual Host Names [page 96].

4. **Optional, only valid for SAP systems based on ABAP Platform 1809 or higher:** Copy users, groups, and filesystems from Node 1 to Node … , Node N:
   You prepare Node … , Node N, making sure that they meet the hardware and software requirements [page 39] and have all the necessary file systems [page 92], mount points, and (if required) Network File System (NFS).
   You set up the user environment on Node … , Node N:
   - You use the same user and group IDs as on the primary node.
   - You create the home directories of users and copy all files from the home directory of the primary node.
   - You copy the files from the following directories:
     - `/etc/services` (SAP service port definitions)
     - `/etc/rc.d/sapinit` (generic start script)
     - `/usr/sap/sapservices` (for `sapcontrol -nr NN -function ListInstances`)
   For more information about the required operating system users and groups, see Creating Operating System Users [page 82].

5. You export global directories [page 118] in `<sapmnt>/<SAPSID>` to the database host, to the primary application server instance host, and to the additional application server instance hosts.

6. Prepare mount points, file systems on the primary application server instance host.
   For more information, see Exporting and Mounting Global Directories [page 118].

7. Mount global directories on the primary application server instance host. For more information, see Exporting and Mounting Global Directories [page 118].

8. You check the prerequisites [page 121] and run the installer [page 124] to install the contents of the database instance.

9. You check the prerequisites [page 121] and run the installer [page 124] to install the primary application server instance.

10. You mount global directories on the additional application server instance hosts. For more information, see Exporting and Mounting Global Directories [page 118].

11. You check the prerequisites [page 121] and run the installer [page 124] to install additional application server to create redundancy.
    The AS instances are not a SPOF. Therefore, do not include these instances in the cluster.

12. You continue with Post-Installation [page 141].

**Graphical Overview**

The following figure provides an overview of how you install the various instances in a high-availability installation:

The ASCS and ERS instances behave similar regarding to installation and failover groups. The ASCS instance has an own failover group and the ERS instance has another failover group. If shared discs are used for installation of ASCS, the installation for ERS should also use a shared disk.
Additional Application Server Instance

Installation Steps for Additional Application Server Instances for a Standard System

1. If you want to install additional application server instances on a host different from the SAP system host, you export global directories in `<sapmnt>/<SAPSID>` to the hosts on which you want to install additional application server instances.

2. On every additional application server instance host, you do the following:

   1. If you want to install additional application server instances on a host different from the SAP system host, you mount the global directories [page 118] in `<sapmnt>/<SAPSID>` that you exported from the SAP system host.

   2. You check the prerequisites [page 121] and run the installer [page 124] to install the additional application server instance.

3. You continue with Post-Installation [page 141].

Installation Steps for an Application Server Instance for a Distributed System

1. If you want to share the transport directory `trans` from another system, you have to mount [page 117] it from this system. Otherwise, we recommend that you share the `trans` directory that is created during the installation of the primary application server instance.

2. On the SAP global host, you export global directories in `<sapmnt>/<SAPSID>` to the hosts on which you want to install additional application server instances.

3. On every additional application server instance host, you do the following:

   1. You mount the global directories [page 118] in `<sapmnt>/<SAPSID>` that you exported from the SAP global host.

   2. You check the prerequisites [page 121] and run the installer [page 124] to install the additional application server instance.
If you want to use the shared transport directory trans from another system, also mount [page 117] this directory.

You continue with Post-Installation [page 141].

Installation Steps for an Additional Application Server Instance for a High-Availability System

1. If you want to share the transport directory trans from another system, you have to mount [page 117] it from this system. Otherwise, we recommend that you share the trans directory that is created during the installation of the primary application server instance.

2. On the primary node, host A, of the switchover cluster infrastructure, you export global directories in \<sapmnt>\/<SAPSID> to the hosts on which you want to install additional application server instances.

3. On each additional application server instance host, do the following:
   1. You mount the global directories [page 118] in \<sapmnt>\/<SAPSID> that you exported from the SAP global host.
   2. You check the prerequisites [page 121] and run the installer [page 124] to install the additional application server instance.
   3. If you want to use the shared transport directory trans from another system, you also mount [page 117] this directory.

4. You continue with Post-Installation [page 141].

7.2.2 Exporting and Mounting the Transport Directory

Every SAP system must be assigned to a transport directory. All application server instances of an SAP system must point to the same transport directory.

Context

Multiple SAP system can use the same transport directory. However, it is not required to have one global transport directory in your SAP system landscape. Depending on your security requirements, you must decide how you want to set up the transport directories in your landscape. Systems with lower security requirements can share a transport directory (DEV, QA, for example). For systems with higher security requirements (PROD, for example), you might want to have a separate transport directory.

The transport directory is used by the Change and Transport System (CTS). The CTS helps you to organize development projects, and then transport the changes between the SAP systems in your system landscape.

For more information, see the SAP Online Documentation [page 13] at:

Application Help ➤ Function-Oriented View: English ➤ Application Server ➤ Application Server ABAP ➤ Administration of Application Server ABAP ➤ Change and Transport System ➤ Change and Transport System - Overview ➤ Basics of the Change and Transport System ➤ Transport Management System - Concept

Consider the following:

- If the transport directory already exists, make sure that it is exported on the transport directory host and mount it on the SAP instance installation host.
If the transport directory does not exist, proceed as follows:

- Create the transport directory (either on the host where the primary application server instance is running or on a file server).
- Export it on the transport directory host.
- If you did not create the transport directory on your SAP instance installation host, mount it there.

### Procedure

1. **Exporting the Transport Directory**
   
   a. Log on as user root to the host where the transport directory `/usr/sap/trans` resides.
   
   b. Make sure that `/usr/sap/trans` belongs to the group sapsys and to the user root.
   
   c. If not already done, export the directory using Network File System (NFS).

2. **Mounting the Transport Directory**

   **Note**

   If the transport directory resides on your local SAP instance installation host, you do not need to mount it.

   a. Create the mount point `/usr/sap/trans`.
   
   b. Mount `/usr/sap/trans` using Network File System (NFS) from the exporting host.

### Related Information

- Exporting and Mounting Directories via NFS for Linux [page 180]
- Exporting and Mounting Directories via NFS for AIX [page 178]
- Exporting and Mounting Directories via NFS for Oracle Solaris [page 182]
- Exporting and Mounting Directories via NFS for HP-UX [page 179]

### 7.2.3 Exporting and Mounting Global Directories

If you install an additional application server instance on a host other than the SAP global host, mount global directories from the SAP global host.

### Prerequisites

If you want to install the executables locally instead of sharing them, do not mount the `exe` directory with Network File System (NFS). Instead, create `<sapmnt>/<SAPSID>/exe` as a local directory (not a link) with a minimum of 1.5 GB free space.
Context

There is no need to create the directories before the installation when you install a primary application server instance. The global directories must be exported only if you install additional application server instances.

Choose one of the following ways to proceed, depending on whether you are performing a homogeneous or heterogeneous installation:

Procedure

- **Exporting and Mounting Global Directories for a Homogeneous Installation**
  a. Log on to the SAP global host as user root and export the following directories with read/write access for the root user to the host where you want to install the new instance:
     
     `<sapmnt>/<SAPSID>/exe`
     `<sapmnt>/<SAPSID>/profile`
     `<sapmnt>/<SAPSID>/global`
  
  b. Log on to the host of the new instance that you want to install as user root.
  c. Create the following mount points and mount them from the SAP global host:
     
     `<sapmnt>/<SAPSID>/exe`
     `<sapmnt>/<SAPSID>/profile`
     `<sapmnt>/<SAPSID>/global`

  △ Caution

  Make sure that the mount points under `/<sapmnt>/<SAPSID>/` are permanent. Otherwise, automatic start of the instance services does not work when you reboot the system.

- **Exporting and Mounting Global Directories for a Heterogeneous Installation**

  With a heterogeneous installation, the instances of an SAP system are installed on hosts with different UNIX operating systems. If you need information about the installation of application servers on Windows in a UNIX environment, see Heterogeneous SAP System Installations [page 183].

  □ Note

  Mounting the directories between different system types, for example mounting a Windows file system on a Linux host, requires a 3rd party product such as Samba. The installation and configuration of Samba is not covered by in this guide.

  Proceed as follows for a heterogeneous installation with different UNIX operating systems:
  a. Log on to the SAP global host as user root and export the following directories with root access to the host on which you want to install the new instance:
     
     `<sapmnt>/<SAPSID>/profile`
     `<sapmnt>/<SAPSID>/global`
b. Log on to the host of the new instance as user **root**.

c. Create the following mount points and mount them from the SAP global host:

\[
<sapmnt>/<SAPSID>/profile
\]
\[
<sapmnt>/<SAPSID>/global
\]

### Caution

Make sure that these mount points are permanent. Otherwise automatic start of the instance services does not work when you reboot the system.

### Caution

Do not mount \( <\text{sapmnt}>/<\text{SAPSID}>/exe \) and do not create it locally. It is created automatically during the installation.

### Related Information

- Exporting and Mounting Directories via NFS for Linux [page 180]
- Exporting and Mounting Directories via NFS for AIX [page 178]
- Exporting and Mounting Directories via NFS for Oracle Solaris [page 182]
- Exporting and Mounting Directories via NFS for HP-UX [page 179]

### 7.2.4 Specifying the Initial Data Source of the User Management Engine

During the installation of your SAP system, you have to specify the initial data source of the User Management Engine (UME).

### Prerequisites

You have planned how you want to configure user and access management for your SAP system to be installed as described in Planning User and Access Management [page 51].
Procedure

Using Central User Management

1. You install your SAP system as described in this installation guide.
2. Add the system to Central User Administration (CUA). For more information, see Configuring User Management [page 160].

Using an LDAP directory as Source for User Data

1. You install your SAP system as described in this installation guide.
2. Configure the user management of the newly installed SAP system to use an LDAP directory. For more information, see Configuring User Management [page 160].

7.2.5 Prerequisites for Running the Installer

Make sure you fulfil the following prerequisites before running the installer.

- For the SL Common GUI, make sure that the following web browser requirements are met:
  - You have one of the following supported browsers on the device where you want to run the SL Common GUI:
    - Google Chrome (recommended)
    - Mozilla Firefox
    - Microsoft Edge
    - Microsoft Internet Explorer 11 or higher.
    Always use the latest version of these web browsers.
  - If you copy the SL Common GUI URL manually in the browser window, make sure that you open a new Web browser window in private browsing mode (Internet Explorer), incognito mode (Chrome) or private browsing mode (Firefox). This is to prevent Web browser plugins and settings from interfering with the SL Common GUI.

⚠️ Caution

The installer uses a self-signed certificate, which is used temporarily only while the installer is running. This certificate is not trusted by the browser unless it is imported manually by the user running the installer. This behavior is intentionally designed in this way because - unlike ordinary public web servers - the installer has different usage patterns. You must configure your browser do trust the self-issued certificate of the installer after carefully performing the “thumbprint” verification described in Running the Installer [page 124]. For more information about adding trusted certificates, see the documentation of your browser.

For more information about the SL Common GUI, see Useful Information about the Installer [page 130].

- If you want to enable Internet Protocol Version 6 (IPv6), make sure that you set `SAP_IPv6_ACTIVE=1` in the environment of the user with root authorization which you use to start the installer. While running the installer, this setting is then also added to the environment of the `<sapsid>adm` user.
Note

By applying this setting the SAP system administrator is responsible for configuring the IP version on each host of the system landscape, before installing any additional instance to it.

- We recommend that you use the csh shell for the installation. If you want to use another shell, make sure that you have read SAP Note 202227. The installer uses csh scripts during the installation to obtain the environment for user <sapsid>adm. This is also true if user <sapsid>adm already exists from an earlier SAP system installation, and the shell of this user is not csh. Before you start the installer, execute the following command as user <sapsid>adm to make sure that the csh scripts are up-to-date:

  /bin/csh -c "source /home/<sapsid>/adm/.cshrc;env"

- Make sure that your operating system does not delete the contents of the temporary directory /tmp or the contents of the directories to which the variables TEMP, TMP, or TMPDIR point, for example by using a crontab entry. Make sure that the temporary directory has the permissions 755.

- Make sure that you have at least 300 MB of free space in the installation directory for each installation option. In addition, you need 300 MB free space for the installer executables. If you cannot provide 300 MB free space in the temporary directory, you can set one of the environment variables TEMP, TMP, or TMPDIR to another directory with 300 MB free space for the installer executables. You can set values for the TEMP, TMP, or TMPDIR environment variable to an alternative installation directory as described in section Useful Information About the Installer [page 130].

- Make sure that umask is set to 022 for the user with root permissions that you want to use for running the installer. As the user with root permissions that you want to use for running the installer, enter the following command: umask 022

- Only valid for 'Platform': AIX

  AIX: Make sure that you have set the limits for operating system users as described in SAP Note 323816.

- Only valid for 'Platform': HP-UX, Linux, Oracle Solaris

  HP-UX, Linux, Oracle-Solaris: Make sure that you have set the limits for operating system users root, <sapsid>adm, and your database-specific operating system users (see also sections Creating Operating System Users and Groups and Running the Installer in the installation guide).

Caution

Caution: the limit mechanism supports hard- and soft-limits. The soft-limit cannot be bigger than the hard-limit. The hard-limit can be set/increased by the root user like: limit -h <limit> <new_value>, for example limit -h datasize unlimited.

- Using csh shell, the output of command limit needs to be at least as follows:

Example

The following table lists example output taken from SUSE Linux Enterprise Server 11 (x86_64).
Using `sh` or `ksh` shell, the output of command `ulimit -a` needs to be at least as follows:

### Example

The following table lists example output taken from SUSE Linux Enterprise Server 11 (x86_64).

<table>
<thead>
<tr>
<th>Properties</th>
<th>Output sh</th>
<th>Output ksh</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>cpu time (seconds)</td>
<td>cpu time (seconds)</td>
<td>unlimited</td>
<td></td>
</tr>
<tr>
<td>file size (blocks)</td>
<td>file size (blocks)</td>
<td>unlimited</td>
<td></td>
</tr>
<tr>
<td>data seg size (kbytes)</td>
<td>data size (Kibytes)</td>
<td>unlimited</td>
<td></td>
</tr>
<tr>
<td>stack size (kbytes)</td>
<td>stack size (Kibytes)</td>
<td>8192 KB</td>
<td></td>
</tr>
<tr>
<td>core file size (blocks)</td>
<td>core file size (blocks)</td>
<td>unlimited</td>
<td></td>
</tr>
<tr>
<td>open files</td>
<td>nofile</td>
<td>8192</td>
<td></td>
</tr>
<tr>
<td>max memory size (kbytes)</td>
<td>max memory size (Kibytes)</td>
<td>unlimited</td>
<td></td>
</tr>
</tbody>
</table>

End of ‘Platform’: HP-UX, Linux, Oracle Solaris

- Make sure that you have defined the most important SAP system parameters as described in Basic Installation Parameters [page 52] before you start the installation.
- Check that your installation host meets the requirements for the installation options that you want to install. For more information, see Running the Prerequisite Checker [page 40].
- Make sure that the database is up and running before starting the installation.
- If you want to install an additional application server instance in an existing SAP system, make sure that:
  - There is exactly one entry in the `/usr.sap/sapservices` file for each SAP instance installed on this host. Be sure to check that the entry refers to the correct profile.
○ There are no profile backup files with an underscore "_" in their profile name. If so, replace the "_" with a ".".

⚠️ Example


● Make sure that the following ports are not used by other processes:
  ○ Port 4237 is used by default as HTTPS port for communication between the installer and the SL Common GUI.
  
  If this port cannot be used, you can assign a free port number by executing `sapinst` with the following command line parameter:

  ```
  SAPINST_HTTPS_PORT=<Free Port Number>
  ```

  ○ Port 4239 is used by default for displaying the feedback evaluation form at the end of the installer processing.
  
  The filled-out evaluation form is then sent to SAP using HTTPS.
  
  If this port cannot be used, you can assign a free port number by executing `sapinst` with the following command line parameter:

  ```
  SAPINST_HTTP_PORT=<Free Port Number>
  ```

  ● If you want to perform the installation in unattended mode, see SAP Note 2230669 which describes an improved procedure using `inifile.params`.

7.2.6 Running the Installer

This section describes how to run the installer.

Prerequisites

For more information, see Prerequisites for Running the Installer [page 121].

Context

The installer has a web browser-based GUI named “SL Common GUI of the Software Provisioning Manager” - “SL Common GUI” for short.

This procedure describes an installation where you run the installer and use the SL Common GUI, that is you can control the processing of the installer from a browser running on any device.

For more information about the SL Common GUI, see Useful Information About the Installer [page 130].
Procedure

1. Log on to the installation host as a user with root permissions.

   Caution
   Make sure that the user with root permissions that you want to use for running the installer has not set any environment variables for a different SAP system or database.

   If your security policy requires that the person running the installer is not allowed to know the credentials of a user with root permissions on the installation host, you can specify another operating system user for authentication purposes. You do this using the SAPINST_REMOTE_ACCESS_USER parameter when starting the sapinst executable from the command line. You must confirm that the user is a trusted one. For more information, see SAP Note 1745524.

2. Make the installation software available.

   executables from the command line. You must confirm that the user is a trusted one. For more information, see SAP Note 1745524.

   For more information, see Providing the Installation Software [page 98].

i Note

SAP BW/4HANA 1.0 SR1 only: Even if you use the complete SAP kernel media, the installer might prompt you during the provisioning process for additional archives (*.SAR files) due to special Patch Level (PL) requirements depending on categories such as the product, operating system, and database platform.

For example: The installer might require a certain PL of <X> of the SAPEXEDB.SAR (for DBTYPE <Y>), but this PL of the SAPEXEDB.SAR is not contained in the SAP kernel media. In this case you must download the required PL from https://launchpad.support.sap.com/#/softwarecenter following the instructions given in Downloading the SAP Kernel Archives (Archive-Based Installation) [page 102].

→ Recommendation

Make the installation software available locally. For example, if you use Network File System (NFS), reading from software mounted with NFS might fail.

Only valid for ‘Platform’: Oracle Solaris

i Note

Oracle Solaris: If you mount installation media, make sure that you do this with option nomapcase.

End of ‘Platform’: Oracle Solaris

3. Start the installer from the directory to which you unpacked the Software Provisioning Manager archive by entering the following command:

<Path_To_Unpack_Directory>/sapinst
If you are using a stack configuration file (see Installation Using a Stack Configuration File (Optional) [page 37]), you must call the sapinst executable with command line parameter:

```
SAPINST_STACK_XML=<Absolute_Path_To_Stack_XML_File>

/<Path_To_Unpack Directory>/sapinst
```

**Note**

If you want to set the connectivity data for your SAP HANA database, you can add parameters when calling sapinst as follows:

- **Global hdbuserstore container**
  
  ```
  /<Path_To_Unpack Directory>/sapinst HDB_USE_IDENT=SYSTEM_<SID>
  ```
  
  You need not set HDB_USER_IDENT to the suggested value SYSTEM_<SID>. If you prefer, you can use the characters A-z, 0-9, or _.

- If you want to assign virtual host names, you must start the installer with the SAPINST_USE_HOSTNAME command line parameter:
  
  ```
  /<Path_To_Unpack Directory>/sapinst
  SAPINST_USE_HOSTNAME=<Virtual_Host_Name>
  ```

- **ABAP secure storage in the file system (SSFS):**
  
  ```
  /<Path_To_Unpack Directory>/sapinst
  HDB_ABAP_SSFS=YES
  ```

For more information, see Setting Connectivity Data for the SAP HANA Database [page 81].

4. The installer is starting up.

The installer now starts and waits for the connection with the SL Common GUI.

You can find the URL you require to access the SL Common GUI at the bottom of the shell from which you are running the installer.

```
...                        
Open your browser and paste the following URL address to access the GUI
https://[<hostname>]:4237/sapinst/docs/index.html
Logon users: [<users>]  
...                        
```

**Note**

If the host specified by `<hostname>` cannot be reached due to a special network configuration, proceed as follows:

1. Terminate the installer as described in Useful Information about the Installer [page 130].
2. Restart the installer from the command line with the `SAPINST_GUI_HOSTNAME=<hostname>` property.

You can use a fully-qualified host name.

If you have a supported web browser (see Prerequisites for Running the Installer [page 121]) installed on the host where you run the installer, you can open this URL directly in the shell. Otherwise, open the URL in a supported web browser that runs on another device.
Caution

After opening the browser URL, make sure that the URL in the browser starts with “https://” to avoid security risks such as SSL stripping.

Before you reach the Welcome screen, your browser warns you that the certificate of the sapinst process on this computer could not be verified.

Proceed as follows to avoid security risks such as a man-in-the-middle attack:

1. Click on the certificate area on the left hand side in the address bar of your browser, and view the certificate.
2. Open the certificate fingerprint or thumbprint, and compare all hexadecimal numbers to the ones displayed in the console output of the installer.
3. Go to the sapinst_exe.xxxxx.xxxx directory in the temporary directory to which the installer has extracted itself:
   `<User_Home>/sapinst`.
4. In the sapinst_exe.xxxxx.xxxx directory, execute the sapgenpse tool with the command line option `get_my_name -p`.
   As a result, you get the server fingerprint or thumbprint from the server certificate.
5. Accept the warning to inform your browser that it can trust this site, even if the certificate could not be verified.

The SL Common GUI opens in the browser by displaying the Welcome screen.

5. On the Welcome screen, choose the required option:
   - To perform the target system installation for a complete SAP system using an SAP HANA database backup, choose **<Product> <Product Version> <Database> System Copy Target System**.
   - If the target system already exists and you only want to replace the content of the database, choose **Generic Options Refresh Database Content**.
     For more information, see *Copying the Database Only – Refresh Database Content* [page 139].
   - To create a backup of an SAP HANA 2.0 SP02 or higher tenant database, choose **Generic Options ABAP Database Backup for SAP HANA**.
     For more information, see *Creating the Backup for a Tenant Database* [page 111].

6. Choose Next.

Note

If there are errors during the self-extraction process of the installer, you can find the log file `dev_selfex.out` in the temporary directory.

7. Follow the instructions on the installer screens and enter the required parameters.
   - In the **SAP System Database** screen, choose **Homogeneous System Copy (SAP HANA-specific Backup/Recovery)**.
   - In the **Database Schema** screens, enter the schema names and the passwords that match the data in the backup. For example, if you install a DEV system and use a backup of the PRD system for the
installation, you must specify SAPPRD as the schema in the screens instead of SAPDEV. The same applies to the DBA Cockpit schema.

○ In the **Database Recovery** screens, first enter the password of the `<sapid>adm` user of the target database and the related SAPControl URL. The system prefills the SAPControl URL. It usually does not have to be changed. In addition, select **File or Backint** as the **Destination Type** in accordance with the backup type created in step 1.

○ In the next screen, enter the directory and the name (prefix) of the backup. As the directory, enter the directory to which you copied the backup files in step 2. As a prefix enter the prefix of the backup that you chose in step 1. In the case of a Backint backup, enter the database SID `<DBSID>` of the source system. In the case of a file backup, you can also specify whether you want the system to check whether the backup exists. If this check is deactivated and the backup does not exist, the installation will terminate with an error at a later time.

○ In the SAP HANA License screen, you can then choose whether or not you want to install a new SAP HANA license in the target database system. A new license is required because the backup that is to be implemented in the target database system derives from another source database, that is the hardware or the `<DBSID>` has changed.

If you are installing a **standard system on Linux**, and want to install your SAP system on the **same host** as the SAP HANA database, note the following:

On the **Database for SAP System** screen, enter the **Database Host** and the **Instance Number** for your SAP HANA database host. If the instance does not exist, a **new SAP HANA database instance will be installed on the same host as the SAP system**.

The parameter **Database ID (DBSID)** is the name of the database tenant and the **Password** is for its SYSTEM user. If an SAP HANA database is found but the DBSID does not exist, a **new database tenant will be created**.

⚠️ **Caution**

If no active SAP HANA instance is found, a new one will be created. The system id and tenant database will have the name given in the database. The DBSID used for this case must not match the SAPSID used for the SAP system installed or to be installed on the current host.

⚠️ **Caution**

You must use a **different** SAP system ID (SID) for the AS ABAP system than that already specified for the installation of the SAP HANA database.

8. To start the installation, choose **Next**.

The installer starts the installation and displays the progress of the installation. When the installation has finished, the installer shows the message: **Execution of <Option_Name> has completed**.

Only valid for ‘Platform’: HP-UX

⚠️ **Caution**

**HP-UX only:** If you decided to use 02 as the instance number, the instance fails to start during the installation process. For more information about the cause, see [SAP System Parameters](page 54). You must manually change the port number for report `RSLGCOLL` to continue with the installation. Proceed as follows:

1. Go to directory `/<sapmnt>/<SAPSID>/profile.`
2. Edit DEFAULT.PFL.
3. Set the parameter rslg/collect_daemon/listen_port to a free port number.

End of 'Platform': HP-UX

9. If required, delete directories with the name sapinst_exe.xxxxxx.xxxx after the installer has finished. Sometimes these directories remain in the temporary directory.

→ Recommendation

Keep all installation directories until you are sure that the system, including all instances, is completely and correctly installed. Once the system is completely and correctly installed, make a copy of the installation directories with all their contents and save it to a physically separate medium, such as an optical medium or a USB drive separate from your installation hosts. This might be useful for analyzing issues occurring later when you use the system. For security reasons, do not keep installation directories on installation hosts, but make sure that you delete them after saving them separately.

10. If you copied the installer software to your hard disk, you can delete these files when the installation has successfully completed.
11. For security reasons, we recommend that you remove the operating system users from the group sapinst after you have completed the installation.

i Note

This step is only required, if you did not specify during the Define Parameters phase that the operating system users are to be removed from the group sapinst after the execution of the installer has completed.

12. For security reasons, we recommend that you delete the .sapinst directory within the home directory of the user with which you ran the installer:

<User_Home>/sapinst/

13. The installer log files contain IP addresses and User IDs such as the ID of your S-User. For security, data protection, and privacy-related reasons we strongly recommend that you delete these log files once you do not need them any longer.

You find the installer log files in the sapinst_instdir directory. For more information, see Useful Information about the Installer [page 130].

### 7.2.7 Additional Information about the Installer

The following sections provide additional information about the installer.

- Useful Information about the Installer [page 130]
- Interrupted Processing of the Installer [page 131]
- Entries in the Services File Created by the Installer [page 135]
- Troubleshooting with the Installer [page 136]
- Using the Step State Editor (SAP Support Experts Only) [page 137]
7.2.7.1 Useful Information about the Installer

This section contains some useful technical background information about the installer and the installer GUI.

- Software Provisioning Manager (the “installer” for short) has the web browser-based “SL Common GUI of the Software Provisioning Manager” - “SL Common GUI” for short. The SL Common GUI uses the SAP UI Development Toolkit for HTML5 - also known as SAPUI5 - a client-side HTML5 rendering library based on JavaScript. The benefits of this new user interface technology for the user are:
  ○ Zero footprint, since only a web browser is required on the client
  ○ New controls and functionality, for example, view logs in web browser.

As of version 2.0 SP01 Patch Level (PL) 5, Software Provisioning Manager comes with a new look and feel of the SL Common GUI. For more information, see https://blogs.sap.com/2018/11/10/new-look-for-software-provisioning-manager/.

The SL Common GUI connects the web browser on a client with the sapinst executable - which is part of Software Provisioning Manager - running on the installation host using the standard protocol HTTPS. For the SL Common GUI the installer provides a pre-generated URL at the bottom of the shell from which you are running the installer. If you have a supported web browser installed on the host where you run the installer, you can start the SL Common GUI directly from this URL. Otherwise, open a web browser supported by the SL Common GUI on any device and run the URL from there.

For more information about supported web browsers see Prerequisites for Running the Installer [page 121]. If you need to run the SL Common GUI in accessibility mode, apply the standard accessibility functions of your web browser.

- As soon as you have started the sapinst executable, the installer creates a .sapinst directory underneath the /home/<User> directory where it keeps its log files. <User> is the user with which you have started the installer.

After you have reached the Welcome screen and selected the relevant installer option for the SAP system or instance to be installed, the installer creates a directory sapinst_instdir where it keeps its log files, and which is located directly below the temporary directory. The installer finds the temporary directory by checking the value of the TEMP, TMP, or TMPDIR environment variable. If no value is set for these variables, the installer uses /tmp by default.

All log files which have been stored so far in the .sapinst folder are moved to the sapinst_instdir directory as soon as the latter has been created.

If you want the sapinst_instdir directory to be created in another directory than /tmp, set the environment variable TEMP, TMP, or TMPDIR to this directory before you start the installer.

<table>
<thead>
<tr>
<th>Shell Used</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bourne shell (sh)</td>
<td>TEMP=&lt;Directory&gt;</td>
</tr>
<tr>
<td></td>
<td>export TEMP</td>
</tr>
<tr>
<td>C shell (csh)</td>
<td>setenv TEMP &lt;Directory&gt;</td>
</tr>
<tr>
<td>Korn shell (ksh)</td>
<td>export TEMP=&lt;Directory&gt;</td>
</tr>
</tbody>
</table>
The installer extracts itself to the temporary directory. These executables are deleted again after the installer has stopped running. Directories called sapinst_exe.xxxxxx.xxxx sometimes remain in the temporary directory after the installer has finished. You can safely delete them. The temporary directory also contains the log file dev_selfex.out from the self-extraction process of the installer, which might be useful if an error occurs.

Caution

If the installer cannot find a temporary directory, the installation terminates with the error FCO-00058.

To see a list of all available installer properties, start the installer as described above with the option -p:
./sapinst -p

If you want to perform the installation in unattended mode, see SAP Note 2230669 which describes an improved procedure using inifile.params.

If required, stop the installer by choosing the Cancel button.

Note

If you need to terminate the installer, press Ctrl + C.

7.2.7.2 Interrupted Processing of the Installer

Here you find information about how to restart the installer if its processing has been interrupted.

Context

The processing of the installer might be interrupted for one of the following reasons:

- An error occurred during the Define Parameters or Execute phase:
  The installer does not abort the installation in error situations. If an error occurs, the installation pauses and a dialog box appears. The dialog box contains a short description of the choices listed in the table below as well as a path to a log file that contains detailed information about the error.
- You interrupted the processing of the installer by choosing Cancel in the SL Common GUI.
Caution

If you stop an option in the Execute phase, any system or component installed by this option is incomplete and not ready to be used. Any system or component uninstalled by this option is not completely uninstalled.

The following table describes the options in the dialog box:

<table>
<thead>
<tr>
<th>Option</th>
<th>Definition</th>
</tr>
</thead>
</table>
| Retry    | The installer retries the installation from the point of failure without repeating any of the previous steps.  
This is possible because the installer records the installation progress in the keydb.xml file.  
We recommend that you view the entries in the log files, try to solve the problem, and then choose Retry.  
If the same or a different error occurs, the installer displays the same dialog box again. |
| Stop     | The installer stops the installation, closing the dialog box, the installer GUI, and the GUI server.  
The installer records the installation progress in the keydb.xml file. Therefore, you can continue the installation from the point of failure without repeating any of the previous steps. See the procedure below. |
| Continue | The installer continues the installation from the current point.                                                                         |
| View Log | Access installation log files.                                                                                                         |

i Note

You can also terminate the installer by choosing Ctrl + C but we do not recommend this because it kills the process immediately.

The following procedure describes the steps to restart an installation, which you stopped by choosing Stop, or to continue an interrupted installation after an error situation.

Procedure

1. Log on to the installation host as a user with the required permissions as described in Running the Installer [page 124].
2. Make sure that the installation software is still available.
   For more information, see Providing the Installation Software [page 98].
→ **Recommendation**

Make the installation software available **locally**. For example, if you use remote file shares on other Windows hosts, CIFS shares on third-party SMB-servers, or Network File System (NFS), reading from software mounted with NFS might fail.

**Only valid for 'Platform': Oracle Solaris**

**Note**

**Oracle Solaris:** If you mount installation media, make sure that you do this with option `nomapcase`.

End of 'Platform': Oracle Solaris

3. Make sure that the installation software are still available.

For more information, see Providing the Installation Software [page 98].

→ **Recommendation**

Make the installation software available **locally**. For example, if you use remote file shares on other Windows hosts, CIFS shares on third-party SMB-servers, or Network File System (NFS), reading from software mounted with NFS might fail.

**Only valid for 'Platform': Oracle Solaris**

**Note**

**Oracle Solaris:** If you mount installation media, make sure that you do this with option `nomapcase`.

End of 'Platform': Oracle Solaris

4. Restart the installer from the directory to which you unpacked the Software Provisioning Manager archive by executing the following command:

```
<Path_To_Unpack_Directory>/sapinst
```

5. The installer is restarting.

The installer now starts and waits for the connection with the SL Common GUI.

You can find the URL you require to access the SL Common GUI at the bottom of the shell from which you are running the installer.

```
...                          *****************************************
Open your browser and paste the following URL address to access the GUI
https://[<hostname>]:4237/sapinst/docs/index.html
Logon users: [<users>]
                          *****************************************
...                        
```

**Note**

If the host specified by `<hostname>` cannot be reached due to a special network configuration, proceed as follows:

1. Terminate the installer as described in Useful Information about the Installer [page 130].
2. Restart the installer from the command line with the `SAPINST_GUI_HOSTNAME=<hostname>` property.
You can use a fully-qualified host name.

If you have a supported web browser (see Prerequisites for Running the Installer [page 121]) installed on the host where you run the installer, you can open this URL directly in the shell. Otherwise, open the URL in a supported web browser that runs on another device.

⚠️ Caution

After opening the browser URL, make sure that the URL in the browser starts with "https://" to avoid security risks such as SSL stripping.

Before you reach the Welcome screen, your browser warns you that the certificate of the sapinst process on this computer could not be verified.

Proceed as follows to avoid security risks such as a man-in-the-middle attack:

1. Click on the certificate area on the left hand side in the address bar of your browser, and view the certificate.
2. Open the certificate fingerprint or thumbprint, and compare all hexadecimal numbers to the ones displayed in the console output of the installer.

Proceed as follows to get the certificate fingerprint or thumbprint from the server certificate printed in the installer console:

1. Go to the sapinst_exe.xxxxxx.xxxx directory in the temporary directory to which the installer has extracted itself:
   <User_Home>/sapinst/
2. In the sapinst_exe.xxxxxx.xxxx directory, execute the sapgenpse tool with the command line option get_my_name -p.

As a result, you get the server fingerprint or thumbprint from the server certificate.
3. Accept the warning to inform your browser that it can trust this site, even if the certificate could not be verified.

The SL Common GUI opens in the browser by displaying the Welcome screen.

6. From the tree structure on the Welcome screen, select the installation option that you want to continue and choose Next.

The What do you want to do? screen appears.

7. On the What do you want to do? screen, decide between the following alternatives and continue with Next:
**Alternative**

<table>
<thead>
<tr>
<th>Perform a new run</th>
</tr>
</thead>
<tbody>
<tr>
<td>The installer does not continue the interrupted installation option. Instead, it moves the content of the old installer directory and all installer-specific files to a backup directory. Afterwards, you can no longer continue the old option.</td>
</tr>
</tbody>
</table>

The following naming convention is used for the backup directory:

log_<Day>_<Month>_<Year>_<Hours>_<Minutes>_<Seconds>

**Example**

log_01_Oct_2016_13_47_56

**i Note**

All actions taken by the installation before you stopped it (such as creating directories or users) are not revoked.

**Caution**

The installer moves all the files and folders to a new log directory, even if these files and folders are owned by other users. If there are any processes currently running on these files and folders, they might no longer function properly.

<table>
<thead>
<tr>
<th>Continue with the existing one</th>
</tr>
</thead>
<tbody>
<tr>
<td>The installer continues the interrupted installation from the point of failure.</td>
</tr>
</tbody>
</table>

### 7.2.7.3 Entries in the Services File Created by the Installer

After the installation has finished successfully, the installer has created the following entries in `/etc/services`:

```
sapdp<Instance_Number> = 32<Instance_Number>/tcp
sapdp<Instance_Number>s = 47<Instance_Number>/tcp
sapgw<Instance_Number> = 33<Instance_Number>/tcp
sapgw<Instance_Number>s = 48<Instance_Number>/tcp
sapms<SAPSID> = 36<Instance_Number>/tcp (unless you specified another value during the installation)
```

**i Note**

- There is a port created for every possible instance number, regardless of which instance number you specified during the installation. For example, for `sapgw<Instance_Number> = 33<Instance_Number>/tcp` the following range of entries is created:
  
  sapgw00 = 3300/tcp
  sapgw01 = 3301/tcp
  sapgw02 = 3302/tcp
If there is more than one entry for the same port number, this is *not* an error.

### 7.2.7.4 Troubleshooting with the Installer

This section tells you how to proceed when errors occur while the installer is running.

#### Context

If an error occurs, the installer:

- Stops processing
- Displays a dialog informing you about the error

#### Procedure

1. Check SAP Note [2393060](#) for known installer issues.
2. If an error occurs during the Define Parameters or the Execute Service phase, do one of the following:
   - Try to solve the problem:
     - To check the installer log files (sapinst.log and sapinst_dev.log) for errors, choose the LOG FILES tab.
     - The LOG FILES tab is only available if you have selected on the Welcome screen the relevant installer option for the SAP product to be installed.
     - If you need to access the log files before you have done this selection, you can find them in the .sapinst directory underneath the /home/<User> directory, where <User> is the user that you used to start the installer.
     - For more information, see Useful Information about the Installer [page 130].
     - To check the log and trace files of the installer GUI for errors, go to the directory <User_Home>/sapinst/
     - Then continue by choosing Retry.
     - If required, abort the installer by choosing Cancel in the tool menu and restart the installer. For more information, see Interrupted Processing of the Installer [page 131].
   - If required, abort the installer by choosing Cancel in the tool menu and restart the installer. For more information, see Interrupted Processing of the Installer [page 131].
3. If you cannot resolve the problem, report an incident using the appropriate subcomponent of BC-INS*.
   - For more information about using subcomponents of BC-INS*, see SAP Note [1669327](#).
7.2.7.5 Using the Step State Editor (SAP Support Experts Only)

This section describes how to use the Step State Editor available in the installer.

**i Note**

Only use the Step State Editor if the SAP Support requests you to do so, for example to resolve a customer incident.

**Prerequisites**

- SAP Support requests you to use the Step State Editor.
- Make sure that the host where you run the installer meets the requirements listed in Prerequisites for Running the Installer [page 121].

**Procedure**

1. Start the installer from the command line as described in Running the Installer [page 124] with the additional command line parameter `SAPINST_SET_STEPSTATE=true`.
2. Follow the instructions on the installer screens and fill in the parameters prompted during the Define Parameters phase until you reach the Parameter Summary screen.
3. Choose Next.

   The Step State Editor opens as an additional dialog. Within this dialog you see a list of all steps to be executed by the installer during the Execute Service phase. By default all steps are in an initial state. Underneath each step, you see the assigned installer component. For each step you have a Skip and a Break option.
   
   - Mark the checkbox in front of the Break option of the steps where you want the installer to pause.
   - Mark the checkbox in front of the Skip option of the steps which you want the installer to skip.
4. After you have marked all required steps with either the Break or the Skip option, choose OK on the Step State Editor dialog.

   The installer starts processing the Execute Service phase and pauses one after another when reaching each step whose Break option you have marked. You can now choose one of the following:
   
   - Choose OK to continue with this step.
   - Choose Step State Editor to return to the Step State Editor and make changes, for example you can repeat the step by marking the checkbox in front of the Repeat option.
   - Choose Cancel to abort the installer.
5. Continue until you have run through all the steps of the Execute Service phase of the installer.
7.3 Copying Single Instances Only

If you want to copy single instances of your SAP system only, you can use one of the following procedures, depending on your use case.

⚠️ Caution

You **cannot** copy single product instances, usage types, or components!

Related Information

Copying the Primary Application Server Instance Only [page 138]
Copying the Database Only – Refresh Database Content [page 139]

7.3.1 Copying the Primary Application Server Instance Only

With this procedure, you can move a primary application server instance to a different host within your system.

Prerequisites

The ABAP central services instance (ASCS instance) is installed.

Procedure

1. Shut down all application servers.
2. Uninstall the old primary application server instance as described in Deleting an SAP System or Single Instances [page 216].
3. On your **target** host, start the installer as described in Running the Installer [page 124].
4. On the Welcome screen, navigate to the following folder according to the requirements of your target system:
   
   `<Product> <Database> System Copy Target System Distributed System or High-Availability System Based on <Technical Stack> Primary Application Server Instance`

5. After the installation has finished, restart all additional application server including the instance services.
7.3.2 Copying the Database Only – Refresh Database Content

Using the Refresh Database Content option in the installer you can refresh the content of an existing database using a database backup. You do not have to copy the primary application server instance and to reinstall additional applications servers.

i Note
System copy option Refresh Database Content is currently not released for SAP SCM.

Prerequisites

The source system and the target system already exist.

Context

You must choose the same schema name for the target system as the schema name of the export or database backup. However, you can choose a different instance number.

We recommend that you use option Refresh Database Content if you need to equalize the database content of two or more already existing and configured systems, for example in automatized system landscapes with “template” systems which have to correspond to precisely defined standards, such as predefined host names, network settings, users, security policies.

Procedure


   Make sure that the database backup is accessible from the database host.

2. On the SAP system host, stop all SAP application server instances, but leave the ASCS instance running.

3. On the application server instance host, run the installer and choose ➔ Generic Options ➔ SAP HANA Database ➔ Refresh Database Content ➔.

   Follow the instructions on the installer screens. You are prompted for the following:
   ○ The <DBSID> of the target system.
   ○ The profile directory of your SAP system.
   ○ The location of the database backup.
   ○ The database administrator password for the backup.
Related Information

Running the Installer [page 124]
8 Follow-Up Activities

This post-installation checklist guides you through the required post-installation steps for the target system:

Related Information

Performing Follow-Up Activities in the Source System [page 141]
Performing Follow-Up Activities in the Target System [page 141]

8.1 Performing Follow-Up Activities in the Source System

This section describes the follow-up steps that you have to perform in the source system after the target system installation has completed.

Procedure

1. Reschedule released jobs.
   
   If you stopped scheduling of released jobs and of jobs that must run periodically before you started the system copy procedure, release them again by running report BTCTRNS2. For more information, see General Technical Preparations for the System Copy [page 76].

2. Using CCMS, adapt your operation mode timetable to the original status (transaction SM37).

8.2 Performing Follow-Up Activities in the Target System

Post-Installation Checklist [page 141]

8.2.1 Post-Installation Checklist

This section includes the post-installation steps that you have to perform for the following:

- Standard, distributed, or high-availability system
Additional application server instance

More detailed information about the steps are available in the linked sections.

**Note**

We highly recommend that you apply the latest Support Package as described in [Applying the Latest Kernel](page 157). The minimum requirement for running SAP BW on the SAP HANA database is SP4.

### Standard, Distributed, or High-Availability System

**Note**

In a standard system, all mandatory instances except the database instance are installed on one host. Therefore, if you are installing a standard system, you can ignore references to other hosts.

The SAP HANA database is normally pre-installed by SAP partners before you start the installation. During the SAP system installation, the database instance was remotely installed by Software Provisioning Manager (the “installer”) from the primary application server host.

However, in a standard system on Linux, you can install SAP systems on the same host as the SAP HANA database - that is as a standard system - without applying additional environment settings. For more information, see [SAP Note 1953429](page 157).

1. You check and if necessary modify the settings for the operating system users for your SAP system if they were created by the installer. For more information, see [Creating Operating System Users and Groups](page 82).
2. You check whether you can log on to the Application Server ABAP [page 143].
3. You perform follow-up activities for the ABAP system [page 144].
4. If you have not enabled SAP EarlyWatch Alert in your SAP Solution Manager, you enable SAP EarlyWatch Alert for ABAP Systems on SAP HANA [page 150].
5. If you have installed a high-availability system, you set up the licenses for high availability [page 152].
6. You configure the remote connection to SAP support [page 153].
7. You perform the consistency check [page 153].
8. You configure the Transport Management System [page 154].
9. For production systems it is highly recommended that you connect the system to SAP Solution Manager [page 155].
10. Run installer option Check and Adjust ABAP System to apply necessary configuration steps.
11. You apply the latest kernel and Support Packages [page 157].
12. If required, you install additional languages and perform language transport [page 158].
13. You perform IP Multicast Configuration [page 159].
14. You configure the user management [page 160].
15. You ensure user security [page 160].
16. You perform the client copy [page 162].
17. You install or upgrade SAP HANA studio [page 163].
18. You perform Follow-Up Activities for the SAP HANA Database [page 163].
19. If required, you change the keys for the secure storage [page 166].
20. You perform a full installation backup [page 167].
21. If you chose to install an integrated SAP Web Dispatcher within the ASCS instance, you log on to the SAP Web Dispatcher Management Console [page 169].
22. If you chose to install an integrated SAP Web Dispatcher within the ASCS instance, you configure the SAP Web Dispatcher [page 170].
23. If you chose to install an integrated Gateway within the ASCS instance, you configure the SAP Gateway [page 170].

Additional Application Server Instance

1. You check and if necessary modify the settings for the operating system users for your SAP system if they were created by the installer.
   For more information, see Creating Operating System Users and Groups [page 82].
2. You check whether you can log on to the Application Server ABAP [page 143].
3. You ensure user security [page 160].
4. You perform a full installation backup [page 167].

8.2.2 Logging On to the Application Server ABAP

You need to check that you can log on to the Application Server ABAP with the standard users, given in the table below.

Prerequisites

- The SAP system is up and running.
- You have installed the SAP front-end software.

Context

---

i Note

Client 066 is no longer available in newly installed SAP systems based on SAP NetWeaver 7.5 or higher. For more information, see SAP Note 1749142.

---

i Note

Client 001 is no longer available in newly installed SAP systems based on SAP S/4HANA and SAP BW/4HANA.
You access the application server ABAP using *SAP Logon*.

**Procedure**

1. Start *SAP Logon* on the host where you have installed the SAP front-end software as follows:
   - SAP GUI for Windows:
     - On the host where you have installed the front end, choose:
       - Start Programs SAP Front End<Release> SAPlogon
   - SAP GUI for Java:
     - Enter the following command from the GUI installation directory:
       - `guilogon`

2. Create a logon entry for the newly installed system in the *SAP Logon*.
   For more information about creating new logon entries, press `F1`.

3. When you have created the entry, log on as user *SAP* or *DDIC*.

### 8.2.3 Performing Follow-Up Activities for ABAP

**Related Information**

- Activities at Operating System Level [page 145]
- Activities at Database Level [page 145]
- Activities at SAP System Level [page 146]
- Checking the Target System [page 150]
8.2.3.1 Activities at Operating System Level

This section includes the adaptations that you have to make at operating system level in your target system.

Procedure

1. Adapt the configuration files at operating system level to meet network and SAP requirements.
2. Adapt additional SAP software components (for example, RFC, CPIC, SAP ArchiveLink) if required.
3. Adapt additional non-SAP software components (for example, archiving systems, monitoring tools, job schedulers) if required.
4. Adapt backup programs (for example, BRBACKUP, BRARCHIVE, BACKINT) if required.
5. Adapt non-SAP directories, file systems, NFS mounts, and so on, if required.
6. Check the SAP parameters of the default and instance profiles.
7. Check your UNIX shell files for special entries.
8. Check crontab or AT jobs.
9. Check operating system files (for example, .netrc, .rhosts).
10. Check operating system printers.
11. If the spool requests are stored at file system level, you must copy the subdirectories with the spool files to the new global directory. For more information, see SAP Note 20176.

8.2.3.2 Activities at Database Level

This section includes the adaptations that you have to make at database level in your target system.

Procedure

1. Before starting the SAP system, make sure that the logging mechanism of the database is active.
2. Check the parameters in the database profiles.
3. Delete all entries from the following tables: ALCONSEG, ALSYSTEMS, DBSNP, MONI, OSMON, PAHI, SDBAD, SDBAP, SDBAR.
4. Delete entries in the table DDLOG for buffer synchronization.
8.2.3.3 Activities at SAP System Level

This section includes the adaptations that you have to make at SAP system level in your target system.

### Note

You can use ABAP post-copy automation (PCA) to automatically perform follow-up activities at system level. ABAP post-copy automation (PCA) provides task lists with a predefined sequence of configuration tasks to configure extensive technical scenarios automatically. For more information, see SAP Note [1614266](#).

To be able to use PCA, you must install the license for SAP Landscape Virtualization Management Enterprise Edition. For more information, see SAP Note [1912110](#).

### Procedure

1. If you performed a Unicode conversion using as target system ID the same `<SAPSID>` as the source system ID and the (local or NIS-mounted) operating system users of the target system still have the environment of the operating system users of the source system, you need to update the user environment for the operating system users of the target system as follows:

   Update the `PATH` variable so that it points to the platform-specific directory for Unicode.

   **Example**

   ```
   Update the `PATH` value `/usr/sap/<SAPSID>/SYS/exe/nuc/linuxx86_64` to `/usr/sap/<SAPSID>/SYS/exe/uc/linuxx86_64`
   ```

2. Run an installation check (transaction `SM28`).
3. Delete all entries from the tables `TPFET` and `TPFHT` (transaction `SE14`).
   These tables contain information about changes made to the profile of your source system.
4. Import the system profiles into the database (transaction `RZ10`).
5. If you changed the SAP system ID during the system copy, delete all entries from table `TLOCK`, which holds the repair requests from your source system.
6. Maintain the operation modes.
   a. Create new operation modes and instance definitions (transaction `R204`).
   b. Maintain the time table using the new operation modes (transaction `SM63`).
   c. Delete the old operation modes and old instance definitions.
7. Adapt other CCMS settings (for example, alert thresholds, reorganization parameters of CCMS table `MONI`) if required.
8. Check the logon groups and the assignment of the application servers to the logon groups (transaction `SMLG`).
   If required, create new logon groups and assign the new application servers to these logon groups.
9. Define or remove the SAP system users and revise the authorizations of the system users: [Tools](#) > *Administration* > *User maintenance* > *Users* (transaction `SU01`).
10. Synchronize the buffers as described in SAP Note 36283 and adapt the client information for the logical system.

11. Configure the spool server.
   a. Adapt the definition of the printers to meet the new system requirements (transaction SPAD):
      ◦ Device types and character set definitions
      ◦ Spool server
      ◦ Output management systems (OMS)
   b. Delete obsolete spool requests and spool inconsistencies while executing the ABAP program RSP00041 (transaction SE38).
   c. Call transaction SP12 and run report RSP01043 for a spool data consistency check.
      For more information, see SAP Notes 98065 and 48400.

12. Configure batch jobs.
   a. Delete canceled and finished batch jobs while executing the RSBTCDEL ABAP program, selecting Delete with forced mode (transaction SE38).
   b. Adapt all jobs needed in the target system.

13. Maintain the security configuration.
   a. Call transaction STRUST.
   b. Replace all existing PSE files in the target system with new ones, which contain the new system’s information.
      For more information, see the SAP Online Documentation [page 13] at Security System Security System Security for SAP NetWeaver AS ABAP Only Trust Manager Creating PSEs and Maintaining the PSE Infrastructure Creating or Replacing a PSE

15. Adapt RFC server groups.
   Call transaction RZ12 and change the instance name of RFC server groups under Group assignment.

16. Adapt RFC destinations copied from the source system to the target system.
   △ Caution
   Before you delete RFC destinations, make sure that they are not needed in the target system.
   a. To check and adapt qRFC destination, call transaction SMQR.
   b. To check and adapt tRFC destination, call transaction SM58.
   c. To delete obsolete RFC destinations, call transaction SM59.

17. Check the ABAP Secure Store [page 149]

18. Configure the Transport Management System (TMS).
   a. Reschedule the transport dispatcher (RDDIMPDP) in client 000:
      1. Log on as user DDIC.
      2. Call transaction SE38.
      3. Run program RDDNEWPP and set the priority to high.
   b. Adapt the transport parameters and transport routes in the TMS as follows:
      1. Call transaction STMS.
2. To adapt the transport parameters, choose [Overview] > [Systems] > [your system] > [Transport Tool].

3. To adapt the transport routes, choose [Overview] > [Transport Routes].

4. Configure the domain controller in the Transport Management System (TMS) by using transaction STMS.

**i Note**

If you did not change the SAP system ID during the system copy, all open transport, repair, and customizing requests that have not been released in the source system will not be released automatically.

19. Make data archived in the source system (data that does not reside in the database but was moved to a different storage location using SAP Archive Management) accessible in the target system. Adapt the file residence information in the target system. For more information, see and the SAP Online Documentation at [Solution Life Cycle Management > Data Archiving](https://help.sap.com/).

20. Check self-defined external commands (transaction SM69).

21. Check the logical system names. If you need to change logical system names in the system that results from the system rename, change the logical system names at this time, as described in SAP Notes 103228 [🔗] and 544509 [🔗]. Follow your corporate naming strategy for logical systems when making this change.

To identify potential follow-up activities regarding logical system names, answer to the following question:

Does the renamed SAP system use logical system names?

- If not, this aspect is not relevant for your use case.
- If yes, answer to the following question:
  
  What naming convention was used for the logical system names?
  
  The default convention is `<SAPSID>CLNT<Client_Number>`, but it might have been adapted individually. If your logical system names contain attributes that were renamed as part of this procedure, see SAP Note 121163 [🔗] for information about how to convert logical system names.

  If you have renamed an SAP BW system, see SAP Note 886102 [🔗].

22. For every client in your SAP system check the detail settings (client role, changes and transports for client-dependent objects, changes for client-independent objects, protection level, restrictions) (transaction SCC4).

23. Check if you can delete clients that are no longer used in the target system (transaction SCC5).

24. Check the contexts and segments of remote application servers for the SAP Monitoring Infrastructure if required (transaction RE21).

25. Post-processing for customer objects:

- If customer objects are not original in the new system, use transaction SE06 to modify the corresponding entries in table TADIR.
- If you encounter problems modifying a customer development class using transaction STMS or SM31, try using the option Validate (ENTER) instead of the option Save to save your changes.

26. **BW only:** Start program RS_BW_POST_MIGRATION in the background. Program RS_BW_POST_MIGRATION performs necessary modifications on database-specific objects (mainly BW objects).

If you changed the database management system for example, IBM i to MaxDB) when copying the system, you have to start program RS_BW_POST_MIGRATION in the background with variant SAP&POSTMGRDB.
If you changed the database management system to SAP HANA database, use variant SAP&POSTMGRHDB.

27. Generate the ABAP load.

The ABAP loads are platform-dependent programs that are generated during runtime and stored in database tables. They are not exported when you use the R3load procedure to copy your SAP system. The ABAP loads are generated in the target system when they are first used.

Note
Make sure that you have sufficient space available on your database. The generation of all existing objects requires about 2 to 9 GB of free space.

For a detailed description about how to generate the ABAP load, call transaction SGEN and choose Information about the SAP Load Generator.

Related Information

Checking the ABAP Secure Store [page 149]

8.2.3.3.1 Checking the ABAP Secure Store

Procedure

1. Start transaction SECSTORE.
2. Choose Check Entries and Execute.
3. Filter the result by error messages.
   ○ If you see at least one error message of type SECSTORE 089 (“Key ... for entry ... is missing in the secure storage in the file system”), proceed as follows:
     1. Reimport encryption keys that were used in the source system and stored in the secure storage in the file system
        You can find information about this process in the Online Documentation [page 13] at:
     2. Repeat the check.
   ○ If you see at least one error message of type SECSTORE 030 (“Incorrect global key for entry ...”), you need to restore a legacy key-file that was used in the source system.
You can find information about this process in the Online Documentation [page 13] at:

- Function-Oriented View
- Security
- System Security
- System Security for SAP NetWeaver AS
- ABAP Only
- Secure Storage (ABAP)
- Key Management
- Legacy Method for Using Individual Encryption Key
- Importing Keys after a System Copy
- If you see at least one error message of type SECSTORE 031 ("System-dependent data for entry ... changed: ..."), you must perform a record migration.
- You can find information about this process in SAP Note 816861.

8.2.3.4 Checking the Target System

The following actions are required for checking the consistency of the target system.

**Procedure**

1. Perform an initial consistency check (transaction SM28).
2. Check the system log on all application servers (transaction SM21). In case of warnings, see SAP Note 43434.
3. Check the consistency of the database (transaction DB02).
4. Perform a server check (transaction SM51).
5. FI customers: Run the job SAPF190 (accounting reconciliation) and compare the results to those gained on the source system before the system copy (Accounting > Financial Accounting > General ledger > Periodic Processing > Closing > Check/count > Comparison).
6. FI customers: Run the jobs RFUMSVO0 (tax on sales/purchases), RAGITTO1 (asset history sheet), RAZUGA01 (asset acquisitions), and RAABGA01 (fixed asset retirements) and compare the results to those gained on the source system before the system copy.
7. CO customers: Run the report group 1SIF and compare the results to those gained on the source system before the system copy.

8.2.4 Enabling SAP EarlyWatch Alert for ABAP Systems on SAP HANA

**Context**

After the installation of any new SAP ABAP system running on SAP HANA, you have to enable the SAP EarlyWatch Alert (EWA) and send corresponding data to SAP – either by using SAP Solution Manager for SAP EarlyWatch Alert or by performing the automated configuration described below.
The SAP EarlyWatch Alert identifies potential problems early, avoids bottlenecks, and monitors the performance of your ABAP and Java systems and your most important business processes regularly, automatically, and effectively. For more information, see http://support.sap.com/ewa.

If you have not enabled SAP EarlyWatch Alert in your SAP Solution Manager (for more information, see SAP Note 1257308), we provide an automated procedure using our automation framework ABAP Task Manager, which is already part of the ABAP system. The automation task list “Early Watch Alert to SAP Configuration” sets up a periodical EWA data collection and transfers this data to SAP in Service Data Control Center (SDCCN), when executed by the ABAP Task Manager.

The task list comprises the following detailed tasks:

1. **Configuration of SAPOSS Connection (OSS1)**
   Creates standard RFC SAPOSS if it does not yet exist.

2. **SDCC_OSS Connection**
   Creates an RFC SDCC_OSS by copying RFC SAPOSS and adds this RFC to the SDCCN RFC list if it does not yet exist. This RFC is used in SDCCN to communicate with the SAP backend.

3. **SDCCN Activation**
   Activates the SDCCN in the system if not yet activated. An hourly job /BDL/TASK_PROCESSOR is scheduled after the activation.

4. **SDCCN Refresh Service Definition**
   Gets the newest Service Definitions from SAP. The Service Definitions define the data to be collected for the EWA session.

5. **SDCCN Schedule EWA to SAP**
   Schedules a weekly EWA session (with session number 000Z*) in SDCCN, if no session exists.

**Procedure**

1. Download the archive SAPK-74005INSTPI or higher at:

2. Apply the downloaded ST-PI archive via SPAM/SAINT.
   For more information, see http://help.sap.com/spmanager.

3. Start the ABAP Task Manager by calling transaction STC01.

4. Choose the task list /BDL/SDCCN_EWA_CONFIG.

5. Choose **Execute**.
   You are guided through the configuration steps.

**8.2.5 Installing the SAP License**

You must install a **permanent** SAP license. When you install your SAP system, a **temporary** license is automatically installed.
Context

⚠️ Caution

Before the temporary license expires, you must apply for a permanent license key from SAP. We recommend that you apply for a permanent license key as soon as possible after installing your system.

For more information about SAP license keys and how to obtain them, see [http://support.sap.com/licensekey](http://support.sap.com/licensekey).

Procedure

Install the SAP license as described in the SAP Online Documentation [page 13] at:

Solution Life Cycle Management > SAP Licenses

8.2.6 High Availability: Setting Up Licenses

You need to install a permanent license, which is determined by the hardware environment of the message server.

Prerequisites

The SAP system is up and running.

Context

SAP has implemented a license mechanism for switchover solutions and clustered environments. Your customer key is calculated on the basis of local information on the message server host. This is the host machine where the ABAP central services instance (ASCS instance) runs.

To be able to perform a switchover, the temporary license that is installed automatically with the ASCS instance is not sufficient. You first need to install a permanent license, which is determined by the hardware environment of the message server. Since SAP’s high-availability (HA) solution stipulates two or more cluster nodes (host machines) where the message server is enabled to run, you have to order as many license keys [page 151] as you have cluster nodes.

When we receive confirmation from your vendor that you are implementing a switchover environment, we provide the required license keys for your system, one key for each machine.
**Procedure**

1. To find the hardware ID of the primary host, log on to any application server instance of the SAP system and call transaction SLICENSE.

2. Perform a switchover of the ABAP central services instance (ASCS) to another node in the cluster and repeat the previous step.
   
   Repeat this for all remaining nodes in the cluster.

3. To obtain the two license keys, enter the hardware IDs for each cluster node, where message server is enabled to run: [http://support.sap.com/licensekey](http://support.sap.com/licensekey)

4. To import the files containing the two licenses, log on to any application server instance of the SAP system and call transaction SLICENSE.

5. Perform a switchover of the ABAP central services instance (ASCS) to another node in the cluster and repeat the previous step.
   
   Repeat this for all remaining nodes in the cluster.

**Results**

The license is no longer a problem during switchover. This means you do not need to call saplicense in your switchover scripts.

**8.2.7 Configuring the Remote Connection to SAP Support**

SAP offers its customers access to support and a number of remote services such as the Early Watch Service or the GoingLive Service. Therefore, you have to set up a remote network connection to SAP:

For more information, see SAP Support Portal at [https://support.sap.com/remote-support.html](https://support.sap.com/remote-support.html).

**8.2.8 Performing the Consistency Check**

We recommend that you check the consistency of the newly installed SAP ABAP system.

**Prerequisites**

- If the installation finished successfully, your SAP system should be up and running. Otherwise, start it as described in [Starting and Stopping SAP System Instances](page 212).
- You have [logged on to the SAP system](page 143).
**Context**

When logging on to the system for the first time, you need to trigger a consistency check manually. The function is then called automatically whenever you start the system or an application server.

The following checks are performed:

- Completeness of installation
- Version compatibility between the SAP release and the operating system
  - The release number in the SAP kernel matches the release number defined in the database system
  - The character set specified in the SAP kernel matches the character set specified in the database system
  - Critical structure definitions that are defined in both the data dictionary and the SAP kernel are identical. The structures checked by this function include SYST, T100, TSTC, TDCT and TFDIR.
- Accessibility of the message server
- Availability of all work process types
- Information about the standalone enqueue server and the update service

**Procedure**

1. Perform a system check:
   - Call transaction SICK.
     - You should see the entry SAP System Check | no errors reported
2. Perform a database check:
   - In the DBA Cockpit (transaction DBACOCKPIT), check for missing tables or indexes by choosing Diagnostics > Missing Tables and Indexes.

**8.2.9 Configuring the Change and Transport System**

You have to perform some steps in the Transport Management System to be able to use the Change and Transport System (TMS).

**Note**

You can skip this task if one of the following is true:

- You already completed these steps as part of task list SAP_BASIS_SETUP_INITIAL_CONFIG have to perform these steps or at least some of these steps when running the ABAP task manager for lifecycle management automation (transaction STC01) immediately after the installation had completed. Note that SAP_BASIS_SETUP_INITIAL_CONFIG only covers the configuration of TMS as single system.
- You are using a stack configuration file (see Installation Using a Stack Configuration File (Optional) [page 37]) and chose Run TMS Configuration (for Single System) during the installation.
Context

Procedure

1. Call transaction STMS in the ABAP system to configure the domain controller in the Transport Management System (TMS).
   For more information, see the SAP Online Documentation [page 13] at:
   ![Solution Life Cycle Management > Software Logistics > Change and Transport System > Change and Transport System – Overview > Basics of the Change and Transport System > Transport Management System – Concept](image)

2. In addition, you must configure the system change options.
   For more information, see the SAP Online Documentation [page 13] at:
   ![Solution Life Cycle Management > Software Logistics > Change and Transport System > Transport Organizer (BC-CTS-ORG) > Requirements for Working with the Transport Organizer > Setting the System Change Option](image)

3. Call transaction SE38 to schedule a dispatcher job for transport programs by executing report RDDIMPDP.
   You schedule the transport dispatcher in the current client. This is equivalent to the execution of job RDDNEWPP in transaction SE38

8.2.10 Connecting the System to SAP Solution Manager

Here you find information about how to connect your newly installed SAP system to SAP Solution Manager.

Prerequisites

An SAP Solution Manager system must be available in your system landscape. For more information, see http://help.sap.com/solutionmanager.

Context

SAP Solution Manager gives you central access to tools, methods, and preconfigured content that you can use to evaluate and implement your solutions.
When your implementation is running, you can use SAP Solution Manager to manage, monitor, and update systems and business processes in your solution landscape, and also to set up and operate your own solution support.

**Procedure**

You connect a technical system to SAP Solution Manager by the following steps:

1. On the technical systems of your landscape, **data suppliers** are implemented, for example, with transaction RZ70 for Application Server ABAP and with Visual Administrator for Application Server Java.
   
   For more information, see the SAP Solution Manager Application Help:
   
   - If your SAP Solution Manager release is 7.1:
     
   
   - If your SAP Solution Manager release is 7.2:
     

2. The data suppliers send information about the hardware and installed software to a central **System Landscape Directory (SLD)**. Updates are sent to the SLD as well.
   
   For more information, see the Planning Guide - System Landscape Directory in the SAP Community Network at [System Landscape Directory (SLD) - Overview](http://help.sap.com/solutionmanager).

3. From the SLD, this information is regularly synchronized with **SAP Solution Manager** where it is managed in the Landscape Management Database (LMDB).
   
   For more information, see the SAP Solution Manager Application Help:
   
   - If your SAP Solution Manager release is 7.1:
     
   
   - If your SAP Solution Manager release is 7.2:
     
     [Version 7.2 SPS <No>](http://help.sap.com/solutionmanager) ➤ [Application Help (English)](http://help.sap.com/solutionmanager) ➤ [Technical Infrastructures] ➤ [Landscape Management Database (LMDB)] ➤ [Managing Technical System Information] ➤ [Connecting LMDB to System Landscape Directory (SLD)]

4. In the LMDB, you complete the information from the SLD manually.
   
   For more information, see the SAP Solution Manager Application Help:
   
   - If your SAP Solution Manager release is 7.1:
     
If your SAP Solution Manager release is 7.2:
http://help.sap.com/solutionmanager Version 7.2 SPS Application Help (English)
Technical Infrastructures Landscape Management Database (LMDB) Managing Technical System Information

Next Steps

For more information, see the following pages in the SAP Community Network:

- System Landscape Directory (SLD) - Overview
- Documentation for Landscape Management Database - LMDB

8.2.11 Applying the Latest Kernel and Support Package Stacks

We strongly recommend that you apply the latest kernel and Support Package stacks before you start configuring your SAP system.

**Note**

If you are using a stack configuration file (see Installation Using a Stack Configuration File (Optional) [page 37]), you already downloaded the stack.xml file and the delta archives using the Maintenance Optimizer in your SAP Solution Manager. If you then already called the Software Update Manager (SUM) from the installer and applied the Support Package Stacks after the installation had finished, you can skip this section.

Context

For more information about release and roadmap information for the kernel versions and how this relates to SAP NetWeaver support packages, including important notes on downward compatibility and release dates, see the document Understanding Kernel Releases for the SAP NetWeaver AS ABAP at http://scn.sap.com/docs/DOC-54170.

Procedure

- Download and apply the latest Kernel and Support Package stacks using the Software Update Manager (SUM) as described in the documentation Updating SAP Systems Using Software Update Manager <Release> available at https://support.sap.com/sitoolset System Maintenance Software Update Manager (SUM) scenarios Software Update/Upgrade with SUM <Release>
If you want to update the kernel manually, proceed as described below:

a. Log on as user <sapsid>adm to the hosts of the SAP system instances to be updated.
b. Download the latest kernel for your operating system and database platform as described in SAP Note 194664.
c. Back up the kernel directory that is specified by the profile parameter DIR_CT_RUN.
d. Extract the SAR files of the kernel Support Packages of the target SP level to a temporary directory using the SAPCAR tool.
e. Copy or move the extracted programs from the temporary directory to the local kernel directory.
f. Adjust the ownership and permissions of the kernel binaries by entering the following command sequence (Execute the saproot.sh script that is located in the kernel directory):

```
su - root
cd <Kernel_Directory>
./saproot.sh <SAPSID>
exit
```

8.2.12 Installing Additional Languages and Performing Language Transport

This section describes how to install and transport additional languages.

Note

You do not have to perform these steps or at least some of these steps if you are using a stack configuration file (see Installation Using a Stack Configuration File (Optional) [page 37]) and processed the Install Additional Languages screen during the installation.

Context

If you have problems during the language installation, see SAP Note 2456868.

Procedure

1. Configure the language settings by using transaction I18N and choosing I18N Customizing I18N System Configuration or by executing report RSCPINST directly.

For more information, see SAP Note 42305.

AIX: If you wish to use the Turkish locale with SAP on AIX, you must install the Turkish locale supplied by SAP instead of the one supplied with the operating system. For more information, see SAP Note 39718.

Follow-Up Activities
2. Perform the language transport using transaction SMLT:

   i Note
   German is already available in the system. Do not transport it via SMLT.

   a. Classify the language.
   b. Schedule the language transport.
   c. Schedule the language supplementation.

Next Steps

   i Note
   You can also install additional languages later, but if you install any Support Packages in the meantime, you have to do one of the following:
   
   • Install the Support Packages again.
   • Use the report RSTLAN_IMPORT_OCS to extract the language-relevant information from each Support Package.

   For information about the language transport, see the SAP Online Documentation [page 13] at:

   Solution Life Cycle Management ➤ Software Logistics ➤ Change and Transport System ➤ Language Transport (BC-CTS-LAN)

8.2.13 IP Multicast Configuration and Wake-Up Mechanism

The ABAP application server (AS ABAP) uses IP multicast datagrams with host local scope to wake up the internal processes (such as dispatcher, Gateway, internet communication manager, work processes) when dispatching requests.

The dispatcher checks during startup whether local IP multicast communication is working properly. You have to adjust the network configuration of AS ABAP as described in SAP Note 1931675.

A new event-based wake-up mechanism is available that replaces the multicast mechanism. SAP recommends using this new mechanism in case of problems with multicast. For details on activating the new mechanism see SAP Note 2050408 to ensure that local IP multicast communication works properly.
### 8.2.14 Configuring the User Management

After the installation has completed, configure the user management of your SAP system.

**Procedure**

After the installation of your SAP system has finished, you must decide whether you want to do the following:

- Add the system to Central User Administration (CUA)
- Use Lightweight Directory Access Protocol (LDAP) synchronization

For more information, see the SAP Online Documentation [page 13] at:

- Security ➔ Identity Management ➔ Identity Management for System Landscapes ➔ Integration of User Management in Your System Landscape ➔ Adding an ABAP System to Your System Landscape

### 8.2.15 Ensuring User Security

You need to ensure the security of the users that the installer created during the installation.

The tables below at the end of this section list the following users:

- Operating system users
- SAP system users

During the installation, the installer by default assigned the master password to all users created during the installation unless you specified other passwords.

#### Recommendation

In all cases, the user ID and password are encoded only when transported across the network. Therefore, we recommend using encryption at the network layer, either by using the Secure Sockets Layer (SSL) protocol for HTTP connections, or Secure Network Communications (SNC) for the SAP protocols dialog and RFC.

#### Caution

Make sure that you perform this procedure before the newly installed SAP system goes into production.

For the users listed below, take the precautions described in the relevant SAP security guide.

You can find the security guide in the **Security** section of the product page for your SAP product at [https://help.sap.com/](https://help.sap.com/).
Operating System and Database Users

After the installation, operating system users for SAP system, database, and SAP Host Agent are available as listed in the following table:

**→ Recommendation**

For security reasons, we recommend that you remove the operating system users from the group sapinst after you have completed the installation of your SAP system.

You do not have to do this if you specified this “cleanup” already during the Define Parameters phase on the Cleanup Operating System Users screen. Then the removal had already been done automatically when the processing of the installer had completed. For more information, see Operating System Users in SAP System Parameters [page 54].

### Operating System and Database Users

<table>
<thead>
<tr>
<th>User Type</th>
<th>User</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system user</td>
<td>&lt;sapsid&gt;adm</td>
<td>SAP system administrator</td>
</tr>
<tr>
<td>SAP HANA database user</td>
<td>SAP&lt;sapsid&gt;</td>
<td>SAP HANA database owner</td>
</tr>
</tbody>
</table>

### SAP Host Agent User

<table>
<thead>
<tr>
<th>User Type</th>
<th>User</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system user</td>
<td>sapadm</td>
<td>SAP Host Agent administrator is the user for central monitoring services.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You do not need to change the password of this user after the installation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This user is for administration purposes only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You are not able to log on as sapadm as this user is locked.</td>
</tr>
</tbody>
</table>

### SAP System Users

After the installation, ABAP system users are available. The following table shows these users with the SAP system clients in which they are available, together with recommendations on how you can ensure the security of these users.

**i Note**

Client 066 is no longer available in newly installed SAP systems based on SAP NetWeaver 7.5 or higher. For more information, see SAP Note 1749142. 1749142
**iNote**

Client 001 is no longer available in newly installed SAP systems based on SAP S/4HANA and SAP BW/4HANA.

### SAP System Users

<table>
<thead>
<tr>
<th>User</th>
<th>User Name</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP system user</td>
<td>SAP*</td>
<td>User exists in SAP system client 000.</td>
</tr>
<tr>
<td></td>
<td>DDIC</td>
<td>User exists in SAP system client 000.</td>
</tr>
</tbody>
</table>

### 8.2.16 Performing the Client Copy

To get a production client, you have to perform a copy of the SAP reference client.

**Context**

The installer creates ABAP client 000 during the installation.
Use client 000 as source client for the client copy.

**Procedure**

1. Maintain the new client with transaction SCC4.
2. Activate kernel user SAP*:  
   a. Set the profile parameter `login/no_automatic_user_sapstar` to 0.  
   b. Restart the application server.
3. Log on to the new client with kernel user SAP* and password PASS.
4. Copy the client with transaction SCCL and profile SAP_CUST.
5. Check the log files with transaction SCC3.
6. Create the required users. These users must have at least the authorizations required for user administration and system administration. Create a user SAP* with all required authorizations for this user. If you want to have other users for system administration, you can also create user SAP* without authorizations.
7. Deactivate kernel user SAP*:
   a. Reset `login/no_automatic_user_sapstar` to 1.  
   b. Restart the application server.
Next Steps

For more information about the client copy and about how to perform it, see the SAP Online Documentation [page 13] at:

[Application Server] [Application Server ABAP] [Administration of Application Server ABAP] [Change and Transport System] [BC – Client Copy and Transport]

8.2.17 Installation or Upgrade of SAP HANA Studio

Here you find documentation about how to install or upgrade the SAP HANA Studio.

To install or upgrade SAP HANA studio, see the documentation SAP HANA Studio Installation and Update Guide at https://help.sap.com/viewer/p/SAP_HANA_PLATFORM Installation and Upgrade.

8.2.18 Follow-Up Activities for the SAP HANA Database

- Checking the secondary database connections [page 163]
- Checking the RFC connections [page 164]
- Checking the spool configuration [page 164]
- Changing the logical system name [page 164]
- Adjusting the SAP HANA calculation views [page 164]
- Backing Up the SAP HANA Database [page 165]
- Configuring Memory Settings [page 165]

8.2.18.1 Checking the secondary database connections

Procedure

After you have copied the database, the target system has the same database connections - for example, for the DBA Cockpit - as the source system; this might cause problems. Therefore, you must check the database connections in transaction DBCO and adjust them if required.
8.2.18.2 Checking the RFC connections

Procedure

After you have copied the database, the target system has the same RFC connections as the source system; this may cause problems. Therefore, you must check the RFC connections in transaction SM59 and adjust them if required.

8.2.18.3 Checking the spool configuration

Procedure

After you copy the database, the target system has the same spool configuration as the source system. Therefore, you must check the spool configuration in transaction SPAD and adjust it if required.

8.2.18.4 Changing the logical system name

Procedure

If the System ID of the ABAP system has changed, use transaction BDLS to change the logical system name.

8.2.18.5 Adjusting the SAP HANA calculation views

Procedure

If you copied a BW system, you must adjust the SAP HANA calculation to the new system names views after the migration. This is done when calling the report RS_BW_POST_MIGRATION with all options.
8.2.18.6 Backing Up the SAP HANA Database

We recommend that you back up the SAP HANA database after the installation has completed.

Back up the SAP HANA database as described in section SAP HANA Database Backup and Recovery of the SAP HANA Administration Guide, which you can find here:


Alternatively, as of SAP HANA 2.0, you can use the SAP HANA cockpit to do so. For more information, see section Backup and Recovery of the documentation SAP HANA Administration with SAP HANA Cockpit, which you can find here:


i Note

Make sure that you perform a “Complete Data Backup”.

8.2.18.7 Configuring Memory Settings

You have to make sure that the SAP system and the SAP HANA database do not compete for memory resources.

Context

This procedure is necessary so that the systems – that is, AS ABAP and SAP HANA database – on each host do not compete for memory resources. The exact settings depend on the size of your hosts and the sizing required for each system, SAP HANA and SAP Business Suite.

SAP AS ABAP (for the SAP Business Suite) and the SAP HANA database can only run together on one host if the sizing of ABAP plus the sizing of HANA does not exceed the total size of the HANA server in terms of memory. You configure the values resulting from the ABAP sizing (see SAP note 1793345) with PHYS_MEMSIZE and you configure the values for the SAP HANA database with GLOBAL_ALLOCATION_LIMIT (see SAP note 1872170). If you have extra memory available, allocate it to the SAP HANA database.

Procedure

1. Change the profile for the SAP HANA database either by using the SAP HANA Administration Console of the SAP HANA studio or at the command line as follows:

Modify the file global.ini from /usr/sap/<DB_SID>/SYS/global/hdb/custom/config as user <sapsid>adm as follows:

```ini
[memorymanager]
```
2. Change the profile for AS ABAP:
   a. Log on to the AS ABAP system.
   b. Start transaction RZ10.
   c. Edit the profile for the primary application server instance.
   d. Select *Extended maintenance*.
   e. Set the parameter **PHYS_MEMSIZE** to a value suitable for your host size.

### 8.2.19 Changing Keys for the Secure Storage

The secure storage in the file system and the secure storage in the database have been encrypted with a randomly generated individual encryption key or with a default key.

In the first case, you have made a backup of the individual key because you need this value in case of failure to recover the data.

No matter what you chose during installation, you can change the encryption key at any time using the respective maintenance tool.

#### Recommendation

SAP recommends using an individual encryption key.

- For the secure storage in the file system, the key change is described in the SAP Online Documentation [page 13] at:
- For the secure storage in the database, the key change is described in the SAP Online Documentation [page 13] at:

#### More Information

See also the entry *Individual Encryption Key for the Secure Storage* in table SAP System Parameters in SAP System Parameters [page 54].
8.2.20 Performing a Full Installation Backup

You must perform a full offline backup after the configuration of your SAP system. If required, you can also perform a full offline backup after the installation (recommended). In addition, we recommend you to regularly back up your database.

⚠ Caution
Make sure that you fully back up your database so that you can recover it later if necessary.

The UNIX commands used in this procedure work on all hardware platforms. For more information about operating system-specific backup tools, see your operating system documentation.

You need to back up the following directories and files:

- All SAP-specific directories:
  - `/usr/sap/<SAPSID>`
  - You have logged on as user as `/usr/sap/trans`
  - `<sapmnt>/<SAPSID>`
  - Home directory of the user `<sapsid>adm`
- All database-specific directories
- The root file system
  This saves the structure of the system and all configuration files, such as file system size, logical volume manager configuration, and database configuration data.

⚠ Note
This list is only valid for a standard installation.

Prerequisites

You have logged on as user `<sapsid>adm` and stopped the SAP system and database [page 212].

Use the backup tool of your choice and refer to the backup software documentation. You can also use the standard UNIX commands as described below.

Backing Up the Installation

1. Log on as user `root`.
2. Manually create a compressed `tar` archive that contains all installed files:
   - Saving to tape:
     ```
     tar -cf - <file_system> | compress -c > <tape_device>
     ```
   - Saving to the file system:
     ```
     tar -cf - <file_system> | compress -c > ARCHIVENAME.tar.Z
     ```
**Restoring Your Backup**

If required, you can restore the data that you previously backed up.

ckaution

Check for modifications in the existing parameter files before you overwrite them when restoring the backup.

1. Log on as user root.
2. Go to the location in your file system where you want to restore the backup image.
3. Restore the data with the following commands:
   - From tape:
     ```
     cat <tape_device> | compress -cd | tar -xf -
     ```
   - From the file system:
     ```
     cat ARCHIVENAME.tar.Z | compress -cd | tar -xf -
     ```

**i Note**

**Linux only:** If you want to restore the data from a GNU tar archive, you have to execute the following command:

```

tar -xz <ARCHIVENAME>.tgz
```
8.2.21 Logging on to the SAP Web Dispatcher Management Console

This section describes how to log on to the SAP Web Dispatcher.

Context

i Note
This step is only required if you chose to install an integrated SAP Web Dispatcher instance within the ASCS instance.

You must log on to the SAP Web Dispatcher Management Console to do the following:

- Check whether the SAP Web Dispatcher was installed successfully.
- Change the password of the webadm user.
- Access monitoring and administration tools.

Procedure

1. Open a web browser.
2. Enter the following URL, depending on whether you use HTTP or HTTPS:
   \[http(s)://<Webdispatcher_Host>:<HTTP(S)_PORT>/sap/wdisp/admin/public/default.html\]
   \[Example\]
   \[https://plx282:44300/sap/wdisp/admin/public/default.html\]
3. Log on as user webadm with the password that you entered during the input phase of the installation.
   The SAP Web Dispatcher Monitor screen appears.
4. We recommend that you change the password of webadm immediately after the installation for security reasons.

For more information, see the Web Dispatcher documentation in the SAP Online Documentation [page 13] at:
[Application Help ➤ Function-Oriented View ➤ Application Server Infrastructure ➤ Components of SAP NetWeaver Application Server ➤ SAP Web Dispatcher ➤ Administration of the SAP Web Dispatcher ➤ Using the Web Administration Interface ➤ Area menu ➤ Section “HTTP Handler”]
Related Information

ASCS Instance with Integrated SAP Web Dispatcher [page 34]

8.2.22 SAP Web Dispatcher Configuration (Optional)

After installing SAP Web Dispatcher, you must configure it to be able to use it.

**i Note**

This step is only required if you chose to install an integrated SAP Web Dispatcher instance within the ASCS instance.

You can find the configuration information in the SAP Online Documentation [page 13] at:

Application Server Infrastructure ➤ Components of SAP NetWeaver Application Server ➤ SAP Web Dispatcher

Related Information

ASCS Instance with Integrated SAP Web Dispatcher [page 34]

8.2.23 Gateway Configuration (Optional)

You have to configure the gateway to be able to use it.

**i Note**

This step is only relevant if you installed a gateway integrated in the ASCS instance. For more information, see ASCS Instance with Integrated Gateway [page 36].

You can find all relevant configuration information in the gateway documentation in the SAP Online Documentation [page 13] at:

Application Server ➤ Application Server Infrastructure ➤ Components of SAP NetWeaver Application Server ➤ Gateway

Related Information

ASCS Instance with Integrated Gateway [page 36]
9 Additional Information

The following sections provide additional information about optional preparation, installation, and post-installation tasks.

There is also a section describing how to delete an SAP system.

9.1 Integration of LDAP Directory Services

This section explains the benefits of using the SAP system with the Lightweight Directory Access Protocol (LDAP) directory and gives an overview of the configuration steps required to use an SAP system with the directory.

LDAP defines a standard protocol for accessing directory services, which is supported by various directory products such as Microsoft Active Directory, and OpenLDAP slapd. Using directory services enables important information in a corporate network to be stored centrally on a server. The advantage of storing information centrally for the entire network is that you only have to maintain data once, which avoids redundancy and inconsistency.

If an LDAP directory is available in your corporate network, you can configure the SAP system to use this feature. For example, a correctly configured SAP system can read information from the directory and also store information there.

i Note

The SAP system can interact with the Active Directory using the LDAP protocol, which defines:

- The communication protocol between the SAP system and the directory
- How data in the directory is structured, accessed, or modified

If a directory other than the Active Directory also supports the LDAP protocol, the SAP system can take advantage of the information stored there. For example, if there is an LDAP directory on a UNIX or Windows server, you can configure the SAP system to use the information available there. In the following text, directories other than the Active Directory that implement the LDAP protocol are called generic LDAP directories.

This section does not provide information about the use of LDAP directories with the LDAP Connector. For more information about using and configuring the LDAP Connector for an ABAP system, see the SAP Online Documentation [page 24] at:

Security ➤ Identity Management ➤ User and Role Administration of Application Server ABAP ➤ Configuration of User and Role Administration ➤ Directory Services ➤ LDAP Connector
Prerequisites

You can only configure the SAP system for Active Directory services or other LDAP directories if these are already available on the network. As of Windows 2000 or higher, the Active Directory is automatically available on all domain controllers. A generic LDAP directory is an additional component that you have to install separately on a UNIX or Windows server.

- You can only configure the SAP system for Active Directory services or other LDAP directories if these are already available on the network. As of Windows 2000 or higher, the Active Directory is automatically available on all domain controllers. A generic LDAP directory is an additional component that you have to install separately on a UNIX or Windows server.
- Make sure that the required software is installed:

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Required Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX</td>
<td>IBM Tivoli Directory Server client packages</td>
</tr>
<tr>
<td>HP-UX</td>
<td>The LDAP libraries listed in SAP Note 541344</td>
</tr>
<tr>
<td>Linux</td>
<td>You must have at least the following RPM packages installed:</td>
</tr>
<tr>
<td></td>
<td>- Oracle Linux: openldap2</td>
</tr>
<tr>
<td></td>
<td>- Red Hat Linux: openldap2</td>
</tr>
<tr>
<td></td>
<td>- SUSE LINUX: openldap2 openldap2-client</td>
</tr>
<tr>
<td>Solaris</td>
<td>You must have at least the libldap.so library installed.</td>
</tr>
</tbody>
</table>

Features

In the SAP environment, you can exploit the information stored in an Active Directory or generic LDAP directory by using:

- SAP Logon
- The SAP Microsoft Management Console (SAP MMC)
  For more information about the automatic registration of SAP components in LDAP directories and the benefits of using it in SAP Logon and SAP MMC, see the documentation SAP System Information in Directory Services at: https://archive.sap.com/documents/docs/DOC-14384
- The SAP Management Console (SAP MC)

SAP Logon

Instead of using a fixed list of systems and message servers, you can configure SAP Logon in the sapmsg.ini configuration file to find SAP systems and their message servers from the directory. If you configure SAP logon
to use the LDAP directory, it queries the directory each time Server or Group selection is chosen to fetch up-to-date information on available SAP systems.

To use LDAP operation mode, check that the sapmsg.ini file contains the following:

```
[Address]
Mode=LDAPdirectory
LDAPserver=
LDAPnode=
LDAPoptions=
```

Distinguish the following cases:

- If you use an Active Directory, you must set \texttt{LDAPoptions=“DirType=NT5ADS”}. For more information, see the SAP system profile parameter \texttt{ldap/options}.

  - You must specify the directory servers (for example, \texttt{LDAPserver=pcintel6 p24709}) if one of the following is true:
    - The client is not located in the same domain forest as the Active Directory
    - The operating system does not have a directory service client (Windows NT and Windows 9X without installed \texttt{dsclient}).

    For more information, see the SAP system profile parameter \texttt{ldap/servers}.

- For other directory services, you can use \texttt{LDAPnode} to specify the distinguished name of the SAP root node. For more information, see the SAP system profile parameter \texttt{ldap/saproot}.

**SAP MMC**

The SAP MMC is a graphical user interface (GUI) for administering and monitoring SAP systems from a central location. It is automatically set up when you install an SAP system on Windows. If the SAP system has been prepared correctly, the SAP MMC presents and analyzes system information that it gathers from various sources, including the Active Directory.

Integrating the Active Directory as a source of information has advantages for the SAP MMC. It can read system information straight from the directory that automatically registers changes to the system landscape. As a result, up-to-date information about all SAP application servers, their status, and parameter settings is always available in the SAP MMC.

If you need to administer distributed systems, we especially recommend that you use the SAP MMC together with Active Directory services. You can keep track of significant events in all of the systems from a single SAP MMC interface. You do not need to manually register changes in the system configuration. Instead, such changes are automatically updated in the directory and subsequently reflected in the SAP MMC.

If your SAP system is part of a heterogeneous SAP system landscape that comprises systems or instances both on Unix and Windows operating systems, you can also use the SAP MMC for operating and monitoring the instances running on Unix.

**SAP MC**

The SAP MC is a graphical user interface (GUI) for administering and monitoring SAP systems from a central location. The SAP MC is automatically set up when you install an SAP system on any platform. If the SAP system has been prepared correctly, the SAP MC presents and analyzes system information that it gathers from various sources, including a generic LDAP Directory.
Integrating a generic LDAP Directory as a source of information has advantages for the SAP MC. It can read system information straight from the directory that automatically registers changes to the system landscape. As a result, up-to-date information about all SAP application servers, their status, and parameter settings is always available in the SAP MC.

For more information about the SAP MC and about how to configure it to access LDAP directories, see the documentation SAP Management Console in the SAP Online Documentation [page 13] at:

Solution Life Cycle Management  SAP Management Console

Configuration Tasks for LDAP Directories

This section describes the configuration tasks for the Active Directory or other (generic) LDAP directories.

- **Configuration Tasks for Active Directory**
  To enable an SAP system to use the features offered by the Active Directory, you have to configure the Active Directory so that it can store SAP system data.
  To prepare the directory, you use the installer to automatically:
  - Extend the Active Directory schema to include the SAP-specific data types
  - Create the domain accounts required to enable the SAP system to access and modify the Active Directory. These are the group SAP_LDAP and the user sapldap.
  - Create the root container where information related to SAP is stored
  - Control access to the container for SAP data by giving members of the SAP_LDAP group permission to read and write to the directory
  You do this by running the installer on the Windows server on which you want to use Active Directory Services and choosing Generic Installation Options  Preparations  LDAP Registration  Active Directory Configuration. For more information about running the installer on Windows, see the documentation Installation of SAP Systems Based on the Application Server ABAP of <Your Product> on Windows: <Database> at https://support.sap.com/sitoolset  System Provisioning  Installation Option of Software Provisioning Manager 2.0.

  **Note**
  You have to configure the directory server only once. Then all SAP systems that need to register in this directory service can use this setup.

- **Configuration Tasks for Generic LDAP Directories**
  To configure other LDAP directories, refer to the documentation of your directory vendor.

- **Configuration Tasks for Generic LDAP Directories on Windows**
  To configure other LDAP directories, refer to the documentation of your directory vendor. The installer software contains schema extensions for directory servers Netscape/iPlanet (ldregns4.txt, ldregns5.txt) and OpenLDAP slapd (ldregslapd.schema). Both files are located in the directory \<Unpack_Directory>\COMMON\ADS. After you have applied the schema extension, you need to create a root container to store the SAP-related information and create a directory user that the SAP application server can use to write information to the directory.
  For more information about how to set up a Netscape/iPlanet directory server, see the documentation SAP System Information in Directory Services at: https://archive.sap.com/documents/docs/DOC-14384.

- **Enabling the SAP System LDAP Registration**
  Once you have correctly configured your directory server, you can enable the LDAP registration of the SAP system by setting some profile parameters in the default profile.
To do this, run the installer [page 124] once for your system and choose:

- **Generic Installation Options**
- **<Database>**
- **Preparations**
- **LDAP Registration**
- **LDAP Support**

If you use a directory server other than Microsoft Active Directory and/or non-Windows application servers, you have to store the directory user and password information by using `ldappasswd pf=<any_instance_profile>`. The information is encrypted for storage in `DIR_GLOBAL` and is therefore valid for all application servers. After restarting all application servers and start services, the system is registered in your directory server. The registration protocols of the components are `dev_ldap*`. The registration is updated every time a component starts.

### 9.2 Installation of Multiple Components in One Database

You can install [multiple] SAP systems in a single database. This is called Multiple Components in One Database (MCOD).

**→ Recommendation**

MCOD is generally available and there is no intention to de-support this installation feature.

However, SAP recommends that customers should not use the MCOD feature when installing new systems. The major drawbacks are as follows:

- Previous-point-in-time (PPT) recovery of a single system within an MCOD installation becomes a highly complex and time-consuming procedure.
- SAP Landscape Management (LaMa) is generally not supported for MCOD installations. For more information, see SAP Note [1709155](https://service.sap.com/).
- There are strong dependencies, for example on the database version used for the MCOD system.
- Downtime - planned or unplanned - always affects all systems sharing the same database.

**Exception:** In case of a dual-stack split you can use the “Keep Database” option thus keeping ABAP and Java stack in one database. There, the PPT recovery problem does not apply because both stacks belong logically together and would always be recovered jointly anyhow. However, keep in mind that even for this specific case the introduction of SAP Landscape Management would require a split into separate database subsystems.

Additional information is available in SAP Note [2146542](https://service.sap.com/).

MCOD is available with all SAP components and all the major databases for the SAP system. No extra effort is required because the MCOD installation is fully integrated into the standard installation procedure. MCOD is not an additional installation option. Instead, it is an option of the database instance installation.

A productive SAP system with SAP HANA database cannot be an MCOD system. For more information about the supported MCOD systems with SAP HANA Database, see SAP Notes [1661202](https://service.sap.com/) and [1681092](https://service.sap.com/).

With MCOD we distinguish two scenarios:

- The installation of an SAP system in a new database
- The installation of an additional SAP system in an existing database (MCOD)
Prerequisites

- For more information about MCOD and its availability on different platforms, see *Multiple Components in One Database (MCOD)* at: https://wiki.scn.sap.com/wiki/pages/viewpage.action?pageId=448466580.
- Since SAP does not support mixed solutions with MCOD, your SAP system must contain Unicode SAP instances only.
- Improved sizing required
  You calculate the CPU usage for an MCOD database by adding up the CPU usage for each individual SAP system. You can do the same for memory resources and disk space.
  You can size multiple components in one database by sizing each individual component using the Quick Sizer tool and then adding the requirements together. For more information about the Quick Sizer, see http://sap.com/sizing.

Features

- Reduced administration effort
- Consistent system landscape for backup, system copy, administration, and recovery
- Increased security and reduced database failure for multiple SAP systems due to monitoring and administration of only one database
- Independent upgrade
  In an MCOD landscape, you can upgrade a single component independently from the other components running in the same database, assuming that the upgraded component runs on the same database version. However, if you need to restore a backup, be aware that all other components are also affected.

**Note**

Special MCOD considerations and differences from the standard procedure are listed where relevant in the installation documentation.

Constraints

- We strongly recommend that you test MCOD in a test or development system. We recommend that you run MCOD systems in the same context. We do not recommend that you mix test, development, and production systems in the same MCOD.
- In the event of database failure, all SAP systems running on the single database are affected.
- Automated support in an MCOD landscape for the following administrative tasks depends on your operating system and database:
  ○ Copying a single component from an MCOD landscape to another database at database level.
  ○ Uninstalling a single component from an MCOD landscape requires some additional steps. You can use a remote connection to SAP support to request help with these tasks. For more information, see http://support.sap.com/remoteconnection.
- You cannot install a Unicode ABAP system with a non-Unicode ABAP system in one database.
- For the first SAP system, the database system ID can be different from the SAP system ID.
For the second SAP system, you must use the same <DBSID> as for the first SAP system.

If you decide to turn off database logging during the database load phase of the installation, you need to plan downtime for all MCOD systems sharing the database.

9.3 Creating a User for LDAP Directory Access

If you use LDAP directory services, you have to set up a user with a password on the host where the SAP system is running. This permits the SAP system to access and modify the LDAP directory.

Prerequisites

During the SAP instance installation you chose to configure the SAP system to integrate LDAP services.

Context

For more information, see Integration of LDAP Directory Services [page 171].

Procedure

1. Log on as user <sapsid>adm.
2. Enter the following:
   `ldappasswd pf=<Path_and_Name_of_Instance_Profile>`
3. Enter the required data.

   ❄️ Example
   The following is an example of an entry to create an LDAP Directory User:
   `CN=sapldap,CN=Users,DC=nt5,DC=sap-ag,DC=de`

9.4 Exporting and Mounting Directories via NFS
Related Information

Exporting and Mounting Directories via NFS for Linux [page 180]
Exporting and Mounting Directories via NFS for AIX [page 178]
Exporting and Mounting Directories via NFS for Oracle Solaris [page 182]
Exporting and Mounting Directories via NFS for HP-UX [page 179]

9.4.1 Exporting and Mounting Directories via NFS for AIX

This topic is only valid for 'Platform': AIX

This procedure describes how to export and mount directories via NFS for AIX using the command line.

Context

This section only provides the basic procedure. If you need more detailed information, check your OS vendor’s documentation.

Procedure

- To export an NFS filesystem, do the following steps:
  a. Take the backup of the exports file:
     \texttt{cp -p /etc/exports /etc/exports\_bak}
  b. Create an entry for each directory to be exported, using the full path name of the directory:
     \texttt{vi /etc/exports}
  c. Read the /etc/exports file and export all the directories listed:
     \texttt{exportfs -a}
  d. Confirm the exported directory listed:
     \texttt{showmount -e}
  e. Confirm the nfs client name and directory list:
     \texttt{showmount -a}
- Mounting the NFS filesystem on the client:
  a. Verify if the NFS server has exported the directory.
     \texttt{showmount -e <server\_name>}
  b. Create the mounting directory if not already exist.
     \texttt{mkdir /local\_directory}
  c. Mount the remote directory on the client:
mount <ServerName>:<remote_directory> /<local_directory>

d. Confirm that the NFS filesystem has been mounted:
   
   df -gt <NFS mount_name>

End of 'Platform': AIX

9.4.2 Exporting and Mounting Directories via NFS for HP-UX

This topic is only valid for 'Platform': HP-UX

This section describes how to export and mount directories via NFS for HP-UX manually.

Context

This section only provides the basic procedure. If you need more detailed information, check your OS vendor’s documentation.

Procedure

1. On the host where you want to export directories do the following:
   a. Add the file system that you want to export to the file /etc/dfs/dfstab using the following syntax:

      share -F nfs -o root=<client_1>:<client_n> access=<client_1>:<client_n> <file system to share>

      share -F nfs -o root=hw5111:hw5115, access=hw511:hw5115 /sapmnt/C11/exe.

      If you encounter problems, try using the FQDN (Fully Qualified Domain Name).
   b. To make the file system available to NFS clients, enter the following command:

      /usr/sbin/shareall

2. On the host where you want to mount the directories you exported in the previous step, do the following:
   a. Add the remote file system to /etc/fstab.

      hw5115:/sapmnt/C11 /sapmnt/C11 nfs defaults 0 0
   b. Mount the file system.
9.4.3 Exporting and Mounting Directories via NFS for Linux

To export directories via NFS, perform the following steps.

Context

This section only provides the basic procedure. If you need more detailed information, check your OS vendor’s documentation.

The following procedure assumes that the central instance host is the NFS server.

Procedure

1. Log on as user root to the NFS server.
2. Make sure that your host is configured as NFS server as follows:
   - On Red Hat Linux, make sure that the output of the command:
     `chkconfig --list nfs`
     The output looks as follows:
     ```
     nfs 0:off 1:off 2:off 3:on 4:on 5:on 6:off
     ```
   - On SUSE Linux, enter the following command:
     ```
     yast2
     ```
     You can set up your host as NFS server as follows:
     ```
     On Red Hat Linux, enter the following command:
     `system-config-users`
     On SUSE Linux, enter the following command:
     `yast2`
     ```
3. To export a directory from a local file system, you can proceed as follows:
   ```
   On Red Hat Linux, use the following tool:
   `system-config-nfs`
   On SUSE Linux, use the following tool:
   `yast2`
   ```
   Perform the configuration manually.
To perform the configuration manually, proceed as follows:

a. To add a line to the local file /etc/exports, enter the following:

```
#/etc/exports
<directory> <hostname> (<options>)
```

**Note**

There must not be a blank between <hostname> and <options>. Otherwise, the directory is exported with default option (ro) (read-only) to the host specified by <hostname> and with the option specified by <options> to all other hosts.

To export directories on Linux with root permissions, use the option no_root_squash. For security reason, only use this option during installation.

**Example**

○ To export the directory /usr/sap/trans in read-only mode to the NFS client host.wdf.sap-ag.de, enter the following:

```
#/etc/exports
/usr/sap/trans host.wdf.sap-ag.de(ro)
```

○ To export the directory in read-write mode with root permissions, enter the following:

```
#/etc/exports
/usr/sap/trans host.wdf.sap-ag.de(rw,no_root_squash)
```

○ To export the directory to all NFS clients of the domain using a wildcard (*), enter the following:

```
#/etc/exports
/usr/sap/trans *.wdf.sap-ag.de(rw)
```

b. To activate the changes (that is, inform the NFS daemon about the changes performed in /etc/exports), enter the following command:

```
exportfs -r
```

c. To see a list of all currently exported directories, enter the following command:

```
exportfs -v
```

For more information, consult the man page by entering `man exports`.

4. Log on as user root to the host where the file system is to be imported.

5. To mount the file systems, enter the following command:

```
mount <nfs_server>:<file_system> <mount_point>
```

System Copy for SAP ABAP Systems Based on UNIX : SAP HANA 2.0 Database - Using Software Provisioning Manager 2.0

Additional Information
9.4.4 Exporting and Mounting Directories via NFS for Oracle Solaris

This topic is only valid for 'Platform': Oracle Solaris

To mount directories via NFS from the host where the directory resides that you want to mount, log on as user root and proceed as follows.

Context

This section only provides the basic procedure. If you need more detailed information, check your OS vendor's documentation.

Procedure

- On the host on which the directory to be mounted resides:
  a. Enter the following command:

        /usr/sbin/share

  b. To add file systems shared via NFS, edit file /etc/dfs/dfstab:

        vi /etc/dfs/dfstab

  Add the following line for each file system:

        share -F nfs -o root=<nfsclient1>:<nfsclient2>,anon=0 -d "description" <file_system_to_be_shared>

  **Note**
  Depending on your configuration, a full qualified name may be required for nfsclient, for example, myclient.mydomain.com.

  **Caution**
  After your SAP system has been installed successfully, in the above line you have to change -o root to -o rw (or remove anon=0, respectively) for all exported directories:

        share -F nfs -o rw=<nfsclient1>:<nfsclient2> -d "description" <file_system_to_be_shared>
c. If the /etc/dfs/dfstab was empty, the NFS server is not active.
   ○ On Solaris 9, start the NFS server with the following command:
     `/etc/init.d/nfs.server start`
   ○ On Solaris 10, start the NFS server with the following command:
     `svcadm enable svc:/network/nfs/server:default`

d. To see if the NFS server is active and which partitions are mountable, enter the command:
   
   `showmount -e <NFS-server>

   ● On the host on which the additional instance runs:
   a. If you are mounting NFS disks for the first time, the NFS client software is not active.
      ○ On Solaris 9, start the NFS server with the following command:
        `/etc/init.d/nfs.client start`
      ○ On Solaris 10, start the NFS server with the following command:
        `svcadm enable svc:/network/nfs/client:default`
   b. Edit the file /etc/vfstab to mount the directory:

      Edit the file /etc/vfstab to mount the directory:

      `vi /etc/vfstab`

      Add the following line for each file system:

      `<host_name_where_directory_resides>:<file_system_to_be_shared> - <mount point> nfs - yes -`

      If the mount point exists, mount `<file_system_to_be_shared>` with the command:

      `mount <mount point>`

| End of 'Platform': Oracle Solaris |

9.5 **Heterogeneous SAP System Installation**

This section provides information on the installation of an SAP system in a heterogeneous system landscape. “Heterogeneous system landscape” means that application servers run on different operating systems.

See SAP Note 1067221 for more information on:

- Supported combinations of operating systems and database systems
- How to install an application server on Windows in a heterogeneous (UNIX) SAP system environment
- Heterogeneous SAP system landscapes with different UNIX operating systems

System Copy for SAP ABAP Systems Based on UNIX : SAP HANA 2.0 Database - Using Software Provisioning Manager 2.0

Additional Information
9.6 SAP Systems Based on Application Server ABAP on One Host with SAP HANA Database - High-Availability Setup Based on SAP HANA System

On Linux, you can install SAP systems on the same host as the SAP HANA database as a high-availability setup with system replication. This approach is described in this section.

Overview [page 184]
Prerequisites [page 186]
Preparation [page 187]
Installation of SAP HANA [page 188]
Installation of the AS ABAP System [page 191]
Post-Installation Configuration [page 204]
Failover for Disaster Recovery [page 207]
Additional Information [page 210]

9.6.1 Overview

9.6.1.1 Installation Sequence

Context

You need to perform the following main steps to complete the installation:

Procedure

1. Check the Prerequisites [page 186].
2. Do the required Preparation [page 187] steps.
3. Install the SAP HANA database instance and AS ABAP:
   a. Install the empty SAP HANA database instance on the two hosts:
      1. Install the SAP HANA database instance on the primary host (host A).
For more information, see Installation of SAP HANA [page 188]

2. Install the SAP HANA database instance on the secondary host (host B).
   For more information, see Installation of SAP HANA [page 188]

3. On host A, execute the SAP Host Agent (which must be already installed) to bind all virtual host names.
   For more information, see Binding Virtual Host Names [page 190]

4. Install the enqueue replication server (ERS) instance on the secondary host (host B).
   For more information, see Installation of the AS ABAP System [page 191]

Result [page 190]

b. Install the instances of AS ABAP distributed on the two hosts:
   1. Install the ASCS instance on the primary host (host A).
      For more information, see Installation of the AS ABAP System [page 191]
   2. Install the enqueue replication server (ERS) instance on the secondary host (host B).
      For more information, see Installation of the AS ABAP System [page 191]
   3. Install the contents of the SAP HANA database instance on the secondary host remotely into the primary host (host A).
      You need to remotely (that is, from host B) bring the contents of the pre-installed database instance on host B to the pre-installed database on host A. Therefore, you need to perform the installation instructions in this section on host B.
      For more information, see Installation of the AS ABAP System [page 191]

   △ Caution

   When the installer prompts you for the database host, make sure that you specify the virtual host name bound to the network interface on host A.

   In addition, make sure that you specify the same database ID as you entered during the installation of SAP HANA.

4. Install the primary application server (PAS) instance on the primary host (host A).
   For more information, see Installation of the AS ABAP System [page 191]

4. Perform post-installation steps
   a. Back up the new SAP HANA database installation
      For more information, see Backing Up the SAP HANA Database [page 201].
   b. Disable autostart of the Enqueue Replication Server
      For more information, see Disabling Autostart of Enqueue Replication Server [page 201].
   c. Adapt the hdbuserstore
      For more information, see Adapting hdbuserstore [page 202].

5. Perform the post-installation configuration of the system:
   a. Configure SAP HANA system replication.
      For more information, see Enabling SAP HANA System Replication [page 205].
   b. Configure memory settings on SAP HANA and AS ABAP.
      For more information, see Configuring Memory Settings [page 206].
   c. Install the required Diagnostics Agents.
      For more information, see Diagnostics Agent Installation [page 207].
9.6.1.2 Failover for Disaster Recovery

Context

In the event of failure of the primary host (host A), you need to perform a takeover to recover the system on host B.

Procedure

1. Move the virtual IPs and host names.
   For more information, see Moving the Virtual IPs and Virtual Host Names [page 208]
2. Perform takeover of the SAP HANA database.
   For more information, see Performing Takeover of the SAP HANA Database [page 209]
3. Start the missing instance agents and instances on host B.
   For more information, see Registering and Starting Failed Instance Services and Instances from Host A on Host B [page 209]

Related Information

Failover for Disaster Recovery [page 207]

9.6.2 Prerequisites

- Shared file system suitable for high availability and shared between data centers for ABAP host names
- Adaptive computing approach required for all ABAP instances. No local storage or file systems.

9.6.2.1 Hardware and Software Requirements

- The hosts need to be able to support the SAP HANA database plus AS ABAP. Make sure that both hosts meet these combined requirements:

System Copy for SAP ABAP Systems Based on UNIX : SAP HANA 2.0 Database - Using Software Provisioning Manager 2.0 Additional Information
9.6.3 Preparation

9.6.3.1 Exporting the Shared File System

Procedure

Export the shared file systems. The shared file systems are /usr/sap/<SAPSID> and /sapmnt/<SAPSID>.

Related Information

Exporting and Mounting Global Directories [page 118]

9.6.3.2 Setting Up Users and Groups

Procedure

Make sure that the following user IDs and group IDs are identical on both hosts so they can be accessed in the same way via the shared file system. You can do this either by setting up the users on each host now (that is, before starting the installation) or when prompted during the installation:

○ Central groups:
  sapsys, sapinst
○ Central users:
You need to install the SAP HANA database using the SAP HANA installer (hdblcm) tool on both hosts, the primary (host A) and secondary (host B). For more information, see the SAP HANA Server Installation and Update Guide at https://help.sap.com/hana. You install the software in the same way on both host A and host B – that is, the same SIDs and instance numbers for both databases. This is important for system replication and (if required) failover to function correctly. We use the system ID HAN in the examples in this section.

You must use a different SAP system ID (<SAPSID>) for the SAP HANA database than the one you later specify for the installation of the AS ABAP.

To install the SAP HANA database beforehand, proceed as described in this section.

- You use the tool hdblcm or the GUI version hdblcmgui to install SAP HANA. In this documentation we use hdblcm.
- You must run the installer (hdblcm or hdblcmgui) as root user from the following directory where you downloaded [page 107] and extracted the installation software, such as from one of the following:
  - <Media root directory>/DATA_UNITS/HDB_LCM_LINUX_X86_64
  - <Media root directory>/DATA_UNITS/HDB_LCM_LINUX_PPC64LE
  - <Media root directory>/DATA_UNITS/HDB_LCM_LINUX_PPC64
9.6.4.2 Installing SAP HANA

Prerequisites

You must run the installation described below on host A and on host B.

⚠️ Caution
Make sure that the operating system and database users and groups are exactly the same on host A and host B.

Procedure

1. Change to the directory containing `hdblcm` and enter the command `hdblcm` to start the installation.
2. Choose `Install new system` and select the additional components required:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP HANA Studio</td>
<td>Installs the components of the SAP HANA Studio</td>
</tr>
<tr>
<td>SAP HANA Lifecycle Manager</td>
<td>Installs the components of the SAP HANA Lifecycle Manager</td>
</tr>
<tr>
<td>SAP HANA Database Client</td>
<td>Installs the components of the SAP Database Client</td>
</tr>
</tbody>
</table>

3. Specify the required installation parameters.
   In most cases you can accept the default values unless you have specific requirements, such as for the SAP system ID.

Next Steps

If required, you can check that the SAP Host Agent is running although it should normally be running automatically.
9.6.4.3 Binding Virtual Host Names

Procedure

As root on host A, execute the SAP Host Agent (which is already installed) to bind all virtual host names as below:

```
/usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr <virtual host name of database> -netmask <subnet mask of network adapter>
```

Example

```
/usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr hadrdbhan -netmask 255.255.252.0
```

9.6.4.4 Result

You now have a SAP HANA system with an empty database on host A and on host B, a shared file system (for the installation of AS ABAP), and a virtual host name for the SAP HANA database, as shown in the figure below.

Note:
- `/usr/sap/<ABAP SAPSID>` and `/sapmnt/<ABAP SAPSID>` are the installation directories of the SAP AS ABAP system
- `/hana` is the installation directory of the SAP HANA database
If required, you can check that the SAP Host Agent is running, although it should normally be running automatically.

Now you are ready to install AS ABAP on host A and on host B.

Related Information

Installation of the AS ABAP System [page 191]
Checking the SAP Host Agent [page 210]

9.6.5 Installation of the AS ABAP System

You need to install the instances of the AS ABAP system distributed on both hosts, using the Software Provisioning Manager as follows:

1. On host A, you run the installer [page 124] to install the primary application server and the ASCS instances.
2. On host A, you install the contents of the SAP HANA database instance on the secondary host remotely into the primary host (host A).
   You need to run the installer [page 124] remotely (that is, from host B) to bring the contents of the pre-installed database instance on host B to the pre-installed database on host A. Therefore, you need to perform the installation instructions in this section on host B.

   💡 Caution
   When the installer prompts you for the database host, make sure that you specify the virtual host name bound to the network interface on host A.
   In addition, make sure that you specify the same database ID as you entered during the installation of SAP HANA.

3. On host B, you run the installer [page 124] to install the enqueue replication server instance.

   💡 Caution
   You must use a different SAP system ID (SAPSID) for the AS ABAP system than that already specified for the installation of the SAP HANA database.

Preparation [page 192]
Installation [page 194]
Post-Installation [page 200]
Result [page 203]
9.6.5.1 Preparation

Mounting the Shared File Systems to Directories [page 192]
Binding the Virtual Host Names [page 193]
Reviewing the Installation Parameters [page 194]
Preparing the Installation Media [page 194]

9.6.5.1.1 Mounting the Shared File Systems to Directories

Context

On host A and on host B, do the following:

Procedure

1. Create the following directories:
   ```
   mkdir -p /usr/sap/<SAPSID>
   mkdir -p /sapmnt/<SAPSID>
   ```
2. Mount the shared file systems to these directories:
   ```
   mount <hostname>:<export name / path>/usr/sap/<SAPSID>
   mount <hostname>:<export name / path>/sapmnt/<SAPSID>
   ```

Related Information

Exporting and Mounting Global Directories [page 118]
9.6.5.1.2 Binding the Virtual Host Names

Context

Execute the following commands to bind the virtual host names on the corresponding network adapter of the installation hosts.

Note

In most cases you can accept the default values unless you have specific requirements, such as for the SAP system ID.

Procedure

1. On host A, execute a SAP Host Agent function to bind all virtual host names to the subnet mask of the network adapter:

   ```
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr <virtual host name of ASCS instance> -netmask <subnet mask of network adapter>
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr <virtual host name of PAS instance> -netmask <subnet mask of network adapter>
   ```

   Example

   ```
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr hadrcsamg -netmask 255.255.252.0
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr hadrclamg -netmask 255.255.252.0
   ```

2. On host B, execute a SAP Host Agent function to bind all virtual host names to the subnet mask of the network adapter:

   ```
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr <virtual host name of ERS instance> -netmask <subnet mask of network adapter>
   ```

   Example

   ```
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr hadreramg -netmask 255.255.252.0
   ```
9.6.5.1.3   Reviewing the Installation Parameters

Procedure

During the installation, the installer prompts you for several parameters. To review these before starting the installation, see Basic Installation Parameters [page 52].

Related Information

Basic Installation Parameters [page 52]

9.6.5.1.4   Preparing the Installation Media

Procedure

Download and set up the installation media, making sure you always use the current version. This comprises:

- The Software Provisioning Manager, containing the installer, which you can get from Download Software Provisioning Manager at: http://support.sap.com/sitoolset. System Provisioning.
- The installation media of SAP BW/4 HANA, or SAP S/4HANA.

Related Information

Providing the Installation Software [page 98]

9.6.5.2   Installation

1. Prerequisites [page 195]
2. Installing the ASCS Instance on Host A [page 195]
3. Installing the ERS Instance on Host B [page 196]
4. Installing the Contents of the Database Instance from Host B to Host A [page 198]
5. Installing the Primary Application Server Instance on Host A [page 199]

9.6.5.2.1 Prerequisites

- You use Software Provisioning Manager (the “installer” for short) to install the various instances.
- You check that you meet the prerequisites described in Prerequisites for Running the Installer [page 121].
- You use the installation options for a High-Availability System in the installer, as described below.

Parent topic: Installation [page 194]

Next task: Installing the ASCS Instance on Host A [page 195]

9.6.5.2.2 Installing the ASCS Instance on Host A

Procedure

1. Log on to host A as the root user and change to the directory where you unpacked Software Provisioning Manager archive.
2. Perform the following steps on host A to install the ASCS instance:
   a. Enter the following command to start the installer:
      ```bash
      ./sapinst
      ```
      Note
      If it is not possible to assign the virtual host name to the ASCS instance to be installed by specifying it as an input parameter on the ASCS Instance screen (see below), you must assign it by starting the installer with the SAPINST_USE_HOSTNAME property:
      ```bash
      ./sapinst SAPINST_USE_HOSTNAME=<virtual host name of ASCS instance>
      ```
      For example, if your virtual host name is hadrcsamg, enter the following command:
      ```bash
      ./sapinst SAPINST_USE_HOSTNAME=hadrcsamg
      ```
   b. On the Welcome screen, choose the option:
      ```
      <your SAP Business Suite scenario> ➤ SAP HANA Database ➤ Installation ➤ Application Server ABAP ➤ High-Availability System ➤ ASCS Instance
      ```
   c. Choose Next.
   d. Follow the instructions in the installer, entering the parameters you defined.
\[\text{Caution}\]

You must use a different SAP system ID (SID) for the AS ABAP system than that already specified for the installation of the SAP HANA database.

\[\text{Caution}\]

If you did not start the installer with the `SAPINST_USE_HOSTNAME` property (see above), make sure that you assign the required virtual host name by specifying it in the `ASCS Host Name` field of the `ASCS Instance` screen.

e. On the Parameter Summary screen, check all the parameters
   If required, you can revise the parameters before starting the installation.
   f. To start the installation, choose \textit{Start}.

\textbf{Results}

The installer starts the installation and displays the progress of the installation. When the installation has finished, the installer shows the message:

\textit{Execution of <Option_Name> has completed.}

\textit{Task overview: Installation [page 194]}

Previous: \textit{Prerequisites [page 195]}

Next task: \textit{Installing the ERS Instance on Host B [page 196]}

\textbf{Related Information}

Reviewing the Installation Parameters [page 194]
Running the Installer [page 124]

\textbf{9.6.5.2.3 Installing the ERS Instance on Host B}

\textbf{Procedure}

1. Log on to \textbf{host B} as the \textit{root} user and change to the directory where you unpacked Software Provisioning Manager archive.
2. Perform the following steps on host B to install the ERS instance:
   a. Enter the following command to start the installer:
      ```
      ./sapinst
      ```
      **Note**
      If it is not possible to assign the virtual host name to the ERS instance to be installed by specifying it as an input parameter on the ERS Instance screen (see below), you must assign it by starting the installer with the SAPINST_USE_HOSTNAME property:
      ```
      ./sapinst SAPINST_USE_HOSTNAME=<virtual host name of ERS instance>
      ```
      For example, if your virtual host name is hadrerhan, enter the following command:
      ```
      ./sapinst SAPINST_USE_HOSTNAME=hadrerhan
      ```
   b. On the Welcome screen, choose the option:
      - SAP HANA Database
      - Installation
      - Application Server ABAP
      - High-Availability System
      - Enqueue Replication Server Instance
   c. Choose Next.
   d. Follow the instructions in the installer, entering the parameters you defined.
      **Caution**
      If you did not start the installer with the SAPINST_USE_HOSTNAME property (see above), make sure that you assign the required virtual host name by specifying it in the ERS Host Name field of the ERS Instance screen.
   e. On the Parameter Summary screen, check all the parameters
      If required, you can revise the parameters before starting the installation.
   f. To start the installation, choose Start.
      The installer starts the installation and displays the progress of the installation. When the installation has finished, the installer shows the message:
      Execution of <Option_Name> has completed.

3. On host A, restart the ASCS instance by entering this command:
   ```
   sapcontrol –nr <ASCS instance number> -function RestartInstance
   ```
   A message like the following appears to confirm that the instance has been restarted:
   ```
   29.10.2013 08:53:31
   RestartInstance
   OK
   ```

**Task overview:** Installation [page 194]

**Previous task:** Installing the ASCS Instance on Host A [page 195]

**Next task:** Installing the Contents of the Database Instance from Host B to Host A [page 198]
9.6.5.2.4 Installing the Contents of the Database Instance from Host B to Host A

Context

You need to remotely (that is, from host B) bring the contents of the pre-installed database instance on host B to the pre-installed database on host A. Therefore, you need to perform the installation instructions in this section on host B.

Procedure

1. Log on to host B as the root user and change to the directory where you unpacked the Software Provisioning Manager archive.
2. On host B, perform the following steps to install the contents of the SAP HANA database into the existing SAP HANA database instance on host A:
   a. Enter the following command to start the installer:
      ```bash
      ./sapinst
      ```
   b. On the Welcome screen, choose the option:
      ```
      <your SAP Business Suite scenario> > SAP HANA Database > SAP Systems > Application Server ABAP > High-Availability System > Database Instance
      ```
   c. Choose Next.
   d. Follow the instructions in the installer, entering the parameters you defined.
   e. On the Parameter Summary screen, check all the parameters
      If required, you can revise the parameters before starting the installation.
   f. To start the installation, choose Start.
Results

The installer starts the installation and displays the progress of the installation. When the installation has finished, the installer shows the message:

*Execution of* `<Option_Name>` *has completed.*

**Task overview:** Installation [page 194]

**Previous task:** Installing the ERS Instance on Host B [page 196]

**Next task:** Installing the Primary Application Server Instance on Host A [page 199]

Related Information

- Reviewing the Installation Parameters [page 194]
- Running the Installer [page 124]

9.6.5.2.5 **Installing the Primary Application Server Instance on Host A**

**Procedure**

1. Log on to host A as the root user and change to the directory where you unpacked the Software Provisioning Manager archive.
2. Perform the following steps on host A to install the primary application server (PAS) instance:
   a. Enter the following command to start the installer:
      
      ```bash
      ./sapinst
      ```

      **Note**

      If it is **not possible** to assign the virtual host name to the PAS instance to be installed by specifying it as an input parameter on the *Primary Application Server Instance* screen (see below), you must assign it by starting the installer with the `SAPINST_USE_HOSTNAME` property:

      ```bash
      ./sapinst SAPINST_USE_HOSTNAME=<virtual host name for PAS instance>
      ```

      For example, if your virtual host name is `hadrciamg`, enter the following command:

      ```bash
      ./sapinst SAPINST_USE_HOSTNAME=hadrciamg
      ```

   b. On the *Welcome* screen, choose the option:
c. Choose Next.
d. Follow the instructions in the installer, entering the parameters you defined.

⚠️ Caution
When specifying the profile directory, use a different SAP system ID (SID) than that already specified for the installation of the SAP HANA database.

⚠️ Caution
If you did not start the installer with the SAPINST_USE_HOSTNAME property (see above), make sure that you assign the required virtual host name by specifying it in the PAS Instance Host Name field of the Primary Application Server Instance screen.

e. On the Parameter Summary screen, check all the parameters.
   If required, you can revise the parameters before starting the installation.
f. To start the installation, choose Start.

Results

The installer starts the installation and displays the progress of the installation. When the installation has finished, the installer shows the message:

Execution of <Option_Name> has completed.

Task overview: Installation [page 194]

Previous task: Installing the Contents of the Database Instance from Host B to Host A [page 198]

Related Information

Reviewing the Installation Parameters [page 194]
Running the Installer [page 124]

9.6.5.3 Post-Installation

If required, you can check the replication of the lock table of the SAP ABAP enqueue replication server (ERS instance).

Backing Up the SAP HANA Database [page 201]
Disabling Autostart of Enqueue Replication Server [page 201]
Adapting hdbuserstore [page 202]

Related Information

Checking Replication of the Lock Table [page 211]

9.6.5.3.1 Backing Up the SAP HANA Database

We recommend that you back up the SAP HANA database after the installation has completed.

Back up the SAP HANA database as described in section SAP HANA Database Backup and Recovery of the SAP HANA Administration Guide, which you can find here:


Alternatively, as of SAP HANA 2.0, you can use the SAP HANA cockpit to do so. For more information, see section Backup and Recovery of the documentation SAP HANA Administration with SAP HANA Cockpit, which you can find here:


i Note

Make sure that you perform a “Complete Data Backup”.

9.6.5.3.2 Disabling Autostart of Enqueue Replication Server

Procedure

Disable autostart of the enqueue replication server (ERS) instance by editing the value of the profile parameter Autostart to 0 in the following file:

/usr.sap/<SID>/ERS11/profile/<ERS instance profile name>
9.6.5.3.3 Adapting hdbuserstore

Context

On host A and B, the installer writes the physical host names of the SAP HANA database to `hdbuserstore`. However, the virtual host names are required. This procedure describes how to achieve this.

Perform the following procedure on both hosts.

Procedure

1. Log on as the `<sid>adm` user of AS ABAP.
2. Delete the current entry of `hdbuserstore` with the following command:
   
   `hdbuserstore delete default`

3. Make the new entry as follows:

   `hdbuserstore set default <virtual host name of SAP HANA database>:3<instance number of SAP HANA database>15 SAP<SAP ABAP Schema SID> <schema password defined during installation>`

4. To check, execute the following command as the `<sid>adm` user of the system AS ABAP:

   `R3trans -d`

Results

The results should look like:

R3trans finished (0000)
### 9.6.5.4 Result

You now have a full AS ABAP system, with a loaded database on host A, an empty database on host B, a shared file system, and a set of virtual host names:

- **<ABAP SID>** = AMG with instances:
  - ASCS01 (virtual host: hadrcsamg)
  - ERS11 (virtual host: hadrernamg)
  - DVEBMGS10 (virtual host: hadrciamg)
- **<HANA SID>** = HAN (instance HDB00) running on physical hosts:
  - hdshana17
  - hdshana02

In the SAP Management Console (SAP MC) and the SAP Microsoft Management Console (SAP MMC) with snap-in SAP Systems Manager, you can see the instances that are started initially, as in the examples in the screenshots below, where:

- **<ABAP SID>** = AMG with instances:
  - ASCS01 (virtual host: hadrcsamg)
  - ERS11 (virtual host: hadrernamg)
  - DVEBMGS10 (virtual host: hadrciamg)
- **<HANA SID>** = HAN (instance HDB00) running on physical hosts:
  - hdshana17
  - hdshana02

For more information on how to start and stop SAP instances, see [Starting and Stopping SAP System Instances](#).
9.6.6 Post-Installation Configuration

Configuration of SAP HANA System Replication [page 204]
Configuring Memory Settings [page 206]
Diagnostics Agent Installation [page 207]

9.6.6.1 Configuration of SAP HANA System Replication

Enabling SAP HANA System Replication [page 205]
Registering the Secondary SAP HANA System for Replication [page 205]
9.6.6.1.1 Enabling SAP HANA System Replication

Procedure

1. In the SAP HANA Administration Console of the SAP HANA studio, right-click the secondary system and choose Stop.
2. In the SAP HANA Administration Console of the SAP HANA studio, select the primary system, right-click and choose System Replication > Enable System Replication and choose Next.
3. Enter the Primary System Logical Name and choose Finish.

9.6.6.1.2 Registering the Secondary SAP HANA System for Replication

Procedure

1. In the SAP HANA Administration Console of the SAP HANA studio, select the primary system, right-click and choose System Replication > Register Secondary System.
2. Enter the details for the secondary system, including logical name, physical host name, and user and password.
   If required, you can also select Start the secondary system after registration.
3. Choose Finish.
4. If you did not start the secondary system in a previous step, perform this action in the SAP HANA Administration Console of the SAP HANA studio.

Next Steps

If required, you can check SAP HANA system replication.

Related Information

Checking SAP HANA System Replication [page 211]
9.6.6.2 Configuring Memory Settings

You have to make sure that the SAP system and the SAP HANA database do not compete for memory resources.

Context

This procedure is necessary so that the systems – that is, AS ABAP and SAP HANA database – on each host do not compete for memory resources. The exact settings depend on the size of your hosts and the sizing required for each system, SAP HANA and SAP Business Suite.

SAP AS ABAP (for the SAP Business Suite) and the SAP HANA database can only run together on one host if the sizing of ABAP plus the sizing of HANA does not exceed the total size of the HANA server in terms of memory. You configure the values resulting from the ABAP sizing (see SAP note 1793345) with PHYS_MEMSIZE and you configure the values for the SAP HANA database with GLOBAL_ALLOCATION_LIMIT (see SAP note 1872170). If you have extra memory available, allocate it to the SAP HANA database.

Procedure

1. Change the profile for the SAP HANA database either by using the SAP HANA Administration Console of the SAP HANA studio or at the command line as follows:
   a. On host A, modify the following file as user <SID>adm:
      /usr/sap/<DB_SID>/SYS/global/hdb/custom/config/global.ini
      It must look as follows:
      [memorymanager]
      global_allocation_limit = <your HANA sizing result>
   b. Repeat this step on host B.
2. Change the profile for AS ABAP:
   a. Log on to AS ABAP on host A.
   b. Start transaction RZ10.
   c. Edit the profile for the primary application server instance.
   d. Select Extended maintenance.
   e. Set the parameter PHYS_MEMSIZE to a value suitable for your host size.
9.6.6.3 Diagnostics Agent Installation

Context

You must install a Diagnostics Agent for each installed virtual instance.

Procedure

Install a diagnostics agent as described below:

- SAP Note 1365123 - Installation of Diagnostic Agents
- SAP Note 1833501 - Diagnostics Agent - Installer Versions
- Diagnostics Agent installation guides at https://help.sap.com/viewer/swpm10guides

9.6.7 Failover for Disaster Recovery

You perform the procedures below if host A fails so that the system can resume operation on host B.

\[\text{Note}\]

All SAPGUI sessions are disconnected following failure of host A.

If you have not already done so, mount the shared file systems of the AS ABAP:

- Moving the Virtual IPs and Virtual Host Names [page 208]
- Performing Takeover of the SAP HANA Database [page 209]
- Registering and Starting Failed Instance Services and Instances from Host A on Host B [page 209]
9.6.7.1 Moving the Virtual IPs and Virtual Host Names

Procedure

1. If host A is still running, enter the following commands as root on host A to unbind the virtual IPs and host names (assuming that eth0 is the production network interface):
   
   ```
   /usr/sap/hostctrl/exe/saphostctrl -function RemoveIpAddress -ifName eth0 -addr <virtual host name of PAS instance>
   /usr/sap/hostctrl/exe/saphostctrl -function RemoveIpAddress -ifName eth0 -addr <virtual host name of ASCS instance>
   /usr/sap/hostctrl/exe/saphostctrl -function RemoveIpAddress -ifName eth0 -addr <virtual host name of DB instance>
   ```

   Example:
   
   ```
   /usr/sap/hostctrl/exe/saphostctrl -function RemoveIpAddress -ifName eth0 -addr hadrciamg
   /usr/sap/hostctrl/exe/saphostctrl -function RemoveIpAddress -ifName eth0 -addr hadrcsamg
   /usr/sap/hostctrl/exe/saphostctrl -function RemoveIpAddress -ifName eth0 -addr hadrdbhan
   ```

2. On host B, enter the following commands to bind the virtual IPs and host names on the new host:
   
   ```
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr <virtual host name of PAS instance> -netmask <subnet mask of network adapter>
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr <virtual host name of ASCS instance> -netmask <subnet mask of network adapter>
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr <virtual host name of DB instance> -netmask <subnet mask of network adapter>
   ```

   Example:
   
   ```
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr hadrciamg -netmask 255.255.252.0
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr hadrcsamg -netmask 255.255.252.0
   /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr hadrdbhan -netmask 255.255.252.0
   ```
9.6.7.2 Performing Takeover of the SAP HANA Database

Procedure

On host B, enter the following commands to take over the SAP HANA database on the secondary host:

```
su - hanadm
hdbnsutil -sr_takeover
```

Next Steps

You can also do this using the SAP HANA Administration Console of the SAP HANA studio: right-click the secondary system and choose `System Replication` > `Perform Takeover`.

9.6.7.3 Registering and Starting Failed Instance Services and Instances from Host A on Host B

Context

On host B, do the following to start the required instance agents and instances so that AS ABAP can resume operation.

Procedure

1. Log on as root user to the operating system and copy the following entries (retrieved from host A) to the `/usr/sap/sapservices` file on host B:

```
LD_LIBRARY_PATH=/usr/sap/<SAPSID>/ASCS<number of ASCS instance>/exe:$LD_LIBRARY_PATH; export LD_LIBRARY_PATH;
LD_LIBRARY_PATH=/usr/sap/<SAPSID>/ASCS<number of ASCS instance>/exe/sapstartsrv
```

   ```
   LD_LIBRARY_PATH=/usr/sap/<SAPSID>/DVEBMGS<number of PAS instance>/exe:$LD_LIBRARY_PATH; export LD_LIBRARY_PATH;
   LD_LIBRARY_PATH=/usr/sap/<SAPSID>/DVEBMGS<number of PAS instance>/exe/sapstartsrv
   ```
pf=/usr/sap/<SAPSID>/SYS/profile/<SAPSID>_DVEBMGS<number of PAS instance>_<virtual host name of PAS instance> -D -u <sapsid>adm

Example:
LD_LIBRARY_PATH=/usr/sap/AMG/ASCS01/exe:$LD_LIBRARY_PATH; export
LD_LIBRARY_PATH; /usr/sap/AMG/ASCS01/exe/sapstartsrv
pf=/usr/sap/AMG/SYS/profile/AMG_ASCS01_hadrcsamg -D -u amgadm

LD_LIBRARY_PATH=/usr/sap/AMG/DVEBMGS10/exe:$LD_LIBRARY_PATH; export
LD_LIBRARY_PATH; /usr/sap/AMG/DVEBMGS10/exe/sapstartsrv
pf=/usr/sap/AMG/SYS/profile/AMG_DVEBMGS10_hadrciamg -D -u amgadm

2. Log on to host B as the operating system user <sapsid>adm:
su – <sapsid>adm

3. Enter the following commands to start the instance agents of the ASCS and PAS instances:
sapcontrol -nr <number of ASCS instance> -function StartService <SAPSID>
sapcontrol -nr <number of PAS instance> -function StartService <SAPSID>

4. Enter the following commands to start the ASCS and PAS instances:
sapcontrol -nr <number of ASCS instance> -function Start
sapcontrol -nr <number of PAS instance> -function Start

9.6.8 Additional Information

Checking the SAP Host Agent [page 210]
Checking Replication of the Lock Table [page 211]
Checking SAP HANA System Replication [page 211]

9.6.8.1 Checking the SAP Host Agent

Procedure

1. Check that the SAP Host Agent is installed and running by entering this command:
/usr/sap/hostctrl/exe/saphostexec -status
If the SAP Host Agent is running, you see something like this:
saphostexec running (pid = 21942)
sapstartsrv running (pid =21944)

2. If the SAP Host Agent is installed but not running, enter the following:
/usr/sap/hostctrl/exe/saphostexec -restart
Next Steps

For more information on SAP Host Agent, including how to download and install it, see SAP Note 1031096.

9.6.8.2 Checking Replication of the Lock Table

Procedure

Check that the lock table from the enqueue server of the ASCS instance for the AS ABAP is being replicated correctly by entering a command as the operating system user <sid>adm like the following on host B, where the enqueue replication server (ERS) is running:
ensmon pf=/sapmnt/<SAPSID>/profile/<profile name of ERS instance> 2

Results

This message is displayed if replication is running correctly:
Replication is enabled in server, repl. Server is connected
Replication is active

9.6.8.3 Checking SAP HANA System Replication

Procedure

1. In the SAP HANA Administration Console of the SAP HANA studio, choose the Overview tab for host A.
   The entry for System Replication Status is as follows if SAP HANA system replication is functioning correctly:
   All systems are active and in sync
2. Choose Landscape System Replication.
   The entry in the column REPLICATION_STATUS for each host is as follows if SAP HANA system replication is functioning correctly:
   ACTIVE
9.7 Starting and Stopping SAP System Instances

Start or stop SAP system instances in one of the following ways:

- Using the SAP Management Console (SAP MC) [page 212]
- Using commands [page 214].

9.7.1 Starting and Stopping SAP System Instances Using the SAP Management Console

You can start and stop all instances of your SAP system using the SAP Management Console (SAP MC) except the database instance.

Prerequisites

- Make sure that the host names defined in the DNS server match the names of the SAP system instance hosts. In particular, keep in mind that host names are case-sensitive. For example, if the names of the SAP system instance hosts are in upper case, but the same host names are defined in the DNS server in lower case, starting and stopping the system does not work.
- If you want to start or restart remote systems or instances, make sure that you have registered them in the SAP Management Console (SAP MC). You do not need to register SAP systems or instances installed on the local host, because the SAP MC displays them automatically.
- The SAP Host Agent is installed on the host where the application server of the SAP system or instance runs.
- You have installed Java Runtime Environment (JRE) 5.0 or higher.
- Your Web browser supports Java.
- Your Web browser's Java plug-in is installed and enabled to run scripting of Java applets.

Context

- Recommendation
  
  If you experience any issues when starting or using the SAP MC, refer to SAP Note 1153713.

- For more information about handling the SAP MC, see the SAP Online Documentation [page 13] at: Solution Life Cycle Management > SAP Management Console.

- If your newly installed SAP system is part of a heterogeneous SAP system landscape comprising systems or instances on Windows platforms, you can also start and stop it from a Windows system or instance using the SAP Microsoft Management Console (SAP MMC).
  
  For more information about handling the SAP MMC, see the SAP Online Documentation [page 13] at: Solution Life Cycle Management > SAP Microsoft Management Console: Windows.
Procedure

- **Starting the Web-Based SAP Management Console**
  1. Start a Web browser and enter the following URL:
     \[ \text{http://<Host Name>:5<Instance Number>13} \]
     
     ![Example]
     
     If the instance number is 53 and the host name is saphost06, you enter the following URL:
     \[ \text{http://saphost06:55313} \]
     
     This starts the SAP MC Java applet.

     ![i Note]
     
     If your browser displays a security warning message, choose the option that indicates that you trust the applet.

     2. Choose **Start**.
     The SAP Management Console (SAP MC) appears.
     By default, the instances installed on the host you have connected to are already added in the SAP MC.

     ![i Note]
     
     If the instances have not been added or if you want to change the configuration to display systems and instances on other hosts, you have to register your system manually. This is described in **Registering Systems and Instances in the SAP Management Console** below.

- **Starting SAP Systems or Instances**
  Similarly, you can start or restart all SAP systems and individual instances registered in the SAP MC.
  1. In the navigation pane, open the tree structure and navigate to the system node that you want to start.
  2. Select the system or instance and choose **Start** from the context menu.
  3. In the **Start SAP System(s)** dialog box, choose the required options.
  4. Choose **OK**.
     The SAP MC starts the specified system or system instances.

     ![i Note]
     
     The system might prompt you for the SAP system administrator credentials. To complete the operation, you require administration permissions.

     Log in as user <sapsid>adm.

**Starting SAP System Instances Successively**

If you need to start the instances of an SAP system successively – for example when you want to start a distributed or a high-availability system – proceed as follows:

1. Start the database instance.
2. Start the ABAP central services instance ASCS<Instance Number>.
3. Start the primary application server instance D<Instance Number>. 
4. Start additional application server instances \texttt{D<Instance\_Number>}, if there are any.

- **Stopping SAP Systems or Instances**

  Similarly, you can stop all SAP systems and individual instances registered in the SAP MC.

  1. Select the system or instance you want to stop and choose \textit{Stop} from the context menu.
  2. In the \textit{Stop SAP System(s)} dialog box, choose the required options.
  3. Choose \textit{OK}.

  The SAP MC stops the specified system or system instances.

  \begin{itemize}
  \item \textbf{i Note}
  \begin{itemize}
  \item The system might prompt you for the SAP system administrator credentials. To complete the operation, you require administration permissions.
  \item Log in as user \texttt{<sapsid>adm}.
  \end{itemize}
  \end{itemize}

  \textbf{Stopping SAP System Instances Successively}

  If you need to stop the instances of an SAP system successively – for example when you want to start a distributed or a high-availability system – proceed as follows:

  1. Stop additional application server instances \texttt{D<Instance\_Number>}, if there are any.
  2. Stop the primary application server instance \texttt{D<Instance\_Number>}.
  3. Stop the ABAP central services instance \texttt{ASCS<Instance\_Number>}.
  4. Stop the database instance.

\subsection*{9.7.2 Starting and Stopping SAP System Instances Using Commands}

\textbf{Prerequisites}

You are logged on to the SAP system host as user \texttt{<sapsid>adm}.

\textbf{Context}

\begin{itemize}
  \item \textbf{i Note}
  \begin{itemize}
  \item The \texttt{startsap} and \texttt{stopsap} commands are deprecated. SAP recommends that you do not use them any longer. For more information, see SAP Notes \texttt{1763593} and \texttt{809477}.
  \end{itemize}
\end{itemize}

This section only lists the basic commands how to start or stop an SAP system. You can find a detailed list of all \texttt{SAPControl} options and features in the command line help, which you can call as follows:

\texttt{/usr/sap/hostctrl/exe/sapcontrol --help}
Procedure

- Starting an SAP System or Instance
  - Starting an SAP System:
    You can start an SAP system by executing the following commands from the command line
    `<Instance_Number>` can be the number of any instance of the SAP system):
    
    ```sh
    /usr/sap/hostctrl/exe/sapcontrol -nr <instance_number> -function StartSystem
    ```
  
  - Starting an SAP System Instance
    You can start an SAP system instance by executing the following commands from the command line:
    
    ```sh
    /usr/sap/hostctrl/exe/sapcontrol -nr <instance_number> -function Start
    ```
    For remote instances, the syntax is slightly different, because you also have to apply the `-host` and `-user` parameters:
    
    ```sh
    /usr/sap/hostctrl/exe/sapcontrol –nr <instance_number> -host <remote host> -user <sapsid>adm <password> -function Start
    ```

- Stopping an SAP System or Instance
  - Stopping an SAP System:
    You can stop an SAP system by executing the following commands from the command line
    `<Instance_Number>` can be the number of any instance of the SAP system):
    
    ```sh
    /usr/sap/hostctrl/exe/sapcontrol -nr <instance_number> -function StopSystem
    ```
  
  - Stopping an SAP System Instance
    You can stop an SAP system instance by executing the following commands from the command line:
    
    ```sh
    /usr/sap/hostctrl/exe/sapcontrol -nr <instance_number> -function Stop
    ```
    For remote instances, the syntax is slightly different, because you also have to apply the `-host` and `-user` parameters:
    
    ```sh
    /usr/sap/hostctrl/exe/sapcontrol –nr <instance_number> -host <remote host> -user <sapsid>adm <password> -function Stop
    ```

- Checking System Instance and Processes
  - With the following command you get a list of system instances, their status, and the ports used by them (`<Instance_Number>` can be the number of any instance of the SAP system):
    
    ```sh
    /usr/sap/hostctrl/exe/sapcontrol -nr <instance_number> -host <remote host> -user <sapsid>adm <password> -function GetSystemInstanceList
    ```
  
  - With the following command you get a list of instance processes and their status:
    
    ```sh
    /usr/sap/hostctrl/exe/sapcontrol -nr <instance_number> -host <remote host> -user <sapsid>adm <password> -function GetProcessList
    ```

- Troubleshooting
If you get an error like "FAIL: NIECONN_REFUSED", execute `sapcontrol -nr <Instance_Number> -function StartService <SAPSID>` to ensure that `sapstartsrv` is running. Then execute again the start or stop command.

### 9.8 Deleting an SAP System or Single Instances

This section describes how to delete a complete SAP system or single SAP instances with the `Uninstall` option of the installer.

#### Prerequisites

- You have installed your SAP system with standard SAP tools according to the installation documentation.
- You are logged on as a user with `root` permissions.

⚠️ **Caution**

Do not use the `<sapsid>adm` user to delete the SAP system.

- Make sure that the SAP system, or single instance, or standalone engine, or optional standalone unit to be deleted is down and that you are not logged on as one of the SAP system users. Also check that all SAP-related processes are stopped. If there is a lock on one of the SAP system objects, the uninstall fails.

ℹ️ **Note**

You do not have to stop the SAP Host Agent. The SAP Host Agent is stopped automatically during the uninstall process.

- When starting the uninstall, make sure that there are no SAP system user sessions still open.

#### Context

Note the following when deleting an SAP system or single instances:

- We strongly recommend that you delete an SAP system or single instances using the installer. However, you can also delete an SAP system or single instance manually. For more information, see SAP Note 1259982.°
- You cannot delete an SAP system remotely.
- If you delete network-wide users, groups or service entries in an environment with Network Information System (NIS), other SAP installations might also be affected. Make sure that the users, groups, and service entries to be deleted are no longer required.
- During the uninstall process, all file systems and subdirectories of the selected SAP system or single instance are deleted. Before you start uninstalling, check that you have saved a copy of all files and directories that you want to keep to a secure location.
The uninstall process is designed to remove as much as possible of the SAP system to be deleted. If an item cannot be removed, a message informs you that you have to remove this item manually. You can do this either at once or after the uninstall process has finished. As soon as you confirm the message, the uninstall process continues.

**Procedure**

1. Start the installer as described in Running the Installer [page 124].
2. On the Welcome screen, choose:
   - **Generic Installation Options** ➔ **<Database>** ➔ **Uninstall** ➔ **Uninstall SAP Systems or Single Instances**
3. Follow the instructions on the installer screens to delete a complete SAP system or single instances.

   **Note**

   To find more information on each parameter during the Define Parameters phase, position the cursor on the required parameter input field, and choose either F1 or the HELP tab. Then the available help text is displayed in the HELP tab.

The following table provides information about deleting a complete system or single instances with the installer.

<table>
<thead>
<tr>
<th>Deletion of</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard system</td>
<td>You can delete a standard system (where all instances except the database instance reside on the same host) in one installer run.</td>
</tr>
</tbody>
</table>
### Deletion of Distributed or High-Availability System

If you want to delete a distributed or high-availability system, you have to run the installer to delete the required instances **locally** on each of the hosts belonging to the SAP system in the following sequence:

1. Additional application server instances, if there are any

<table>
<thead>
<tr>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do <strong>not</strong> select checkbox <strong>Uninstall all instances of the SAP system from this host</strong> if you do <strong>not</strong> want to uninstall the complete SAP system or standalone engine. For example, do not select this checkbox if you only want to uninstall an additional application server instance of an existing SAP system distributed over several hosts. Otherwise the contents of mounted global directories under <code>/&lt;sapmnt&gt;/&lt;SAPSID&gt;/</code>, such as instance profiles and kernel executables, are also deleted.</td>
</tr>
</tbody>
</table>

2. Primary application server instance
3. Database instance

<table>
<thead>
<tr>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do <strong>not</strong> delete the SAP HANA database instance. However, you can delete the database clients and the database users on the SAP application servers.</td>
</tr>
</tbody>
</table>

4. ABAP Central services instance (ASCS)

<table>
<thead>
<tr>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>To delete system directories mounted from an NFS server, you have to run the installer on the NFS server.</td>
</tr>
</tbody>
</table>

### Additional Application Server

If you want to delete additional application server instances of an existing SAP system, you have to run the installer to delete them **locally** on each additional application server instance host.

### Standalone SAP Host Agent

The SAP Host Agent is automatically uninstalled from a host together with the last remaining SAP system instance.

If you want to uninstall a **standalone** SAP Host Agent, deselect **Profiles Available** and select **Uninstall Standalone SAP Host Agent** on the **General SAP System Parameters** screen.

4. When you have finished, delete the relevant directory structure on the global host.

5. If you created the directories `/usr/sap/<SAPSID>` and `/<sapmnt>//<SAPSID>` as mount points, but not as directories on the local file system, you have to remove them manually.

6. To remove obsolete SLD data, see the following document: [https://wiki.scn.sap.com/wiki/display/SL/More+on+System+Landscape+Directory+-+Duplicate+System+Entries]
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