Installation of SAP Systems Based on the Application Server ABAP of SAP NetWeaver 7.3 EHP1 to 7.52 on UNIX: SAP HANA Database
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<td>platform for SAP systems based on <a href="#">SAP NetWeaver 7.4</a> and higher,</td>
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<td>documented in: <a href="#">New Features</a>, <a href="#">General Installation Information</a> for</td>
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<td>• New Software Provisioning Manager Option <em>Download Media for a Maintenance Plan</em>, documented in: <em>New Features, Downloading the Media for a Maintenance Planner Transaction</em></td>
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<td>• Validity Check for <em>SUM</em>.SAR Archive, documented in: <em>New Features, Additional Parameters When Using a Stack XML File</em></td>
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<td>• Information “enqueue server” versus “enqueue server 2”, “enqueue replication server” versus “enqueue replication server 2” added: <em>High-Availability System</em>, <em>System Based on SAP NetWeaver AS for ABAP 7.52 only: Switching to Enqueue Server 2 and Enqueue Replication Server 2</em></td>
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<td>• Post-installation section <em>Systems Based on SAP NetWeaver AS for ABAP 7.52 Only: Run Software Provisioning Manager Option “Check and Adjust ABAP System” added</em></td>
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Updated version for software provisioning manager 1.0 SP22 (SL Toolset 1.0 SP22)

- **New Features:**
  - Digital signature check for installation archives, documented in: *New Features, Downloading SAP Kernel Archives (Archive-Based Installation) Archive-Based Installation for Diagnostics Agent, Downloading the SAP Kernel Archives Required for the Dual-Stack Split (Without Operating System and Database Migration), Downloading the SAP Kernel Archives Required for Operating System and Database Migration*
  - Software provisioning manager Log Files Improvements, documented in: *New Features, Useful Information about the Software Provisioning Manager, Troubleshooting with the Software Provisioning Manager*
  - Secure ABAP message server connection, documented in: *New Features, SAP System Parameters*
  - Enabling IPv6, documented in: *New Features, Prerequisites for Running the Software Provisioning Manager*
  - **New Features** section restructured: As of SP22, a dedicated subsection for each new SP has been created. New features below SP22 remain in a common table.
  - The Java SDT GUI - which was in the SP21 version still available in parallel to the SL-UI - has been deprecated with SP22. As of SP22, SL-UI is the only available GUI of the software provisioning manager:
    - The following sections which were explicitly related to Java SDT GUI were completely removed from this documentation: *Performing a Remote Installation Remote Processing of the Software Provisioning Manager (Java SDT GUI only), Starting the Java SDT GUI Separately, Running the Software Provisioning Manager in Accessibility Mode (general accessibility information was moved to Useful Information About the Software Provisioning Manager).*
    - The Java SDT GUI-specific information was removed from the common software provisioning manager sections: *Running the Software Provisioning Manager, Useful Information About the Software Provisioning Manager, Interrupted Processing of the Software Provisioning Manager, Troubleshooting with the Software Provisioning Manager, Deleting an SAP System or Single Instances*
    - New section *Using the Step State Editor (SAP Support Experts Only)* was added to section *Additional Information About the Software Provisioning Manager*
2.8  2017-09-11  Updated version for software provisioning manager 1.0 SP21 (SL Toolset 1.0 SP21)

- New Features:
  - Media Signature Check, documented in: New Features, Running the Software Provisioning Manager, Preparing the Installation Media
  This feature implies that section Creating Kernel Archives from an Existing SAP System has been deleted from this documentation because the related option in the software provisioning manager had to be removed.
  - Download Media for a Maintenance Plan, documented in: New Features, Downloading Media for a Maintenance Plan
  - SAP Host Agent Upgrade, documented in: New Features, SAP System Parameters, Downloading SAP Kernel Archives (Archive-Based Installation)
  - Load tools are now available as LOADTOOLS.SAR in the Software Provisioning Manager archive, documented in: New Features, Downloading and Extracting the Software Provisioning Manager Archive
  - Simplified additional application server instance installation, documented in: New Features, Preparing the Installation Media, Downloading SAP Kernel Archives (Archive-Based Installation)

2.7  2017-05-22  Updated version for software provisioning manager 1.0 SP20 (SL Toolset 1.0 SP20)

- New Features:
  - New SAPUI5-based graphical user interface (GUI) “SL-UI”, documented in: Prerequisites for Running the Software Provisioning Manager, Running the Software Provisioning Manager, Useful Information About the Software Provisioning Manager
  - Option for choosing to install an embedded gateway during the ASCS instance installation, documented in: Installation Options Covered by this Guide, SAP System Parameters, Parameters for Additional Components to be Included in the ASCS Instance, Post-Installation Checklist, SAP Gateway Configuration
  - Cleanup of operating system users, documented in: SAP System Parameters, Creating Operating System Users and Groups

2.6  2017-02-07  Updated version for software provisioning manager 1.0 SP19 (SL Toolset 1.0 SP19):

- New Features:
  Verification of the integrity of data units in Software Provisioning Manager, documented in: New Features, Downloading the Software Provisioning Manager Archive
  Archive-based Language Installation, documented in: Additional Parameters When Using a Stack XML File
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<td>Option to choose installing an embedded SAP Web Dispatcher during the</td>
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<td>ASCS instance installation, documented in: ASCS Instance with Embedded</td>
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<td>SAP Web Dispatcher [page 38].</td>
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<td>&quot;Archive-Based Installation&quot;, documented in:</td>
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<td>• New Features [page 21]</td>
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<td>• Preparing the Installation Media [page 107]</td>
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<td>Instead of a separate installation guide for each UNIX-based operating system,</td>
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<td>we now deliver a single installation guide for all UNIX-based operating</td>
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<td>systems. Sections that are only relevant for one or more specific operating</td>
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<td>systems are highlighted accordingly.</td>
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1 About this Document

This installation guide describes how to install an SAP system based on the application server ABAP of SAP NetWeaver 7.3 EHP1 to 7.52 using the installation tool software provisioning manager 1.0 SP39, which is part of SL Toolset 1.0 SP39.

This guide is valid for the operating systems AIX, HP-UX, Linux, and Solaris, and covers the SAP system products and releases listed in SAP Products Based on SAP NetWeaver 7.3 EHP1 to 7.52 Supported for Installation Using Software Provisioning Manager 1.0 [page 13].

Note
As an alternative to using Software Provisioning Manager, you can install 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/docs/SAP_LANDSCAPE_MANAGEMENT_ENTERPRISE.

For information about maintenance of SAP Business Suite and corresponding SAP NetWeaver versions, see SAP Note 1648480.

For information about supported operating system and database platforms for the SAP product you want to install, see the Product Availability Matrix at http://support.sap.com/pam.

Caution
Make sure you have read Before You Start [page 18] before you continue with this installation guide.

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. 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. During the installation of the SAP system, SoftwareProvisioning Manager (the “software provisioning manager”) accesses the SAP HANA database remotely to perform the necessary database-specific installation steps.

Note
However, if you are installing a standard system [page 29] on Linux, you can now install SAP systems based on SAP NetWeaver 7.4 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.

For SAP SCM only: If you want to use SAP liveCache on SAP HANA, you must install the LCAPPS package on the database server. For more information, see the SAP MaxDB Administration Guide at https://help.sap.com/maxdb.

SAP Products Based on SAP NetWeaver 7.3 EHP1 to 7.52 Supported for Installation Using Software Provisioning Manager 1.0 [page 13]
Here you can find a list of the SAP products based on SAP NetWeaver 7.3 EHP1 to 7.52 ABAP that are supported for installation using Software Provisioning Manager 1.0, on the specific operating system and database combination described in this guide.
1.1 SAP Products Based on SAP NetWeaver 7.3 EHP1 to 7.52 Supported for Installation Using Software Provisioning Manager 1.0

Here you can find a list of the SAP products based on SAP NetWeaver 7.3 EHP1 to 7.52 ABAP that are supported for installation using Software Provisioning Manager 1.0, on the specific operating system and database combination described in this guide.

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<td>SAP NetWeaver AS for ABAP 7.52</td>
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<td>• SAP S/4HANA Server</td>
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<tr>
<td>• AS ABAP for SAP S/4HANA Frontend</td>
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<tr>
<td>foundation 1709 on SAP NetWeaver Application Server for ABAP 7.52, version for SAP HANA</td>
<td>SAP NetWeaver AS for ABAP 7.52</td>
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<td>SAP NetWeaver AS for ABAP 7.52</td>
<td>SAP NetWeaver AS for ABAP 7.52</td>
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<td>SAP Product</td>
<td>Based on the following SAP NetWeaver Release</td>
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<td>SAP S/4HANA 1610 (Out of Maintenance since December 2021):</td>
<td>SAP NetWeaver AS for ABAP 7.51 innovation package</td>
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<tr>
<td>• SAP S/4HANA Server</td>
<td></td>
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<tr>
<td>• AS ABAP for SAP S/4HANA Frontend</td>
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<tr>
<td>Caution</td>
<td>The options for this product have been removed from software provisioning manager 1.0 as of SP37. These options are still available in the “frozen” software provisioning manager 1.0 SP35 (see SAP Note 3220901)</td>
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<tr>
<td>SAP NetWeaver AS for ABAP 7.51 innovation package</td>
<td>SAP NetWeaver AS for ABAP 7.51 innovation package</td>
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<td>Caution</td>
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<td>SAP S/4HANA on-premise edition 1511 Support Release 1 (Out of Maintenance since December 2020)</td>
<td>SAP NetWeaver 7.5</td>
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<td>• EHP4 for SAP SRM 7.0 ABAP</td>
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<tr>
<td>• EHP4 for SAP SCM 7.0 ABAP</td>
<td></td>
</tr>
<tr>
<td>SAP NetWeaver 7.4 Support Release 2</td>
<td></td>
</tr>
<tr>
<td>SAP NetWeaver 7.3 EHP1</td>
<td></td>
</tr>
</tbody>
</table>

About this Document

Installation of SAP Systems Based on the Application Server ABAP of SAP NetWeaver 7.3 EHP1 to 7.52 on UNIX: SAP HANA Database
### SAP Product

<table>
<thead>
<tr>
<th>SAP Product</th>
<th>Based on the following SAP NetWeaver Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP BW/4HANA 1.0 (Out of Maintenance since December 2021)</td>
<td>SAP NetWeaver 7.5</td>
</tr>
<tr>
<td></td>
<td>SAP NetWeaver 7.4 Support Release 2</td>
</tr>
<tr>
<td></td>
<td>SAP NetWeaver 7.3 EHP1</td>
</tr>
<tr>
<td><strong>Caution</strong></td>
<td></td>
</tr>
<tr>
<td>The options for this product have been removed from software provisioning manager 1.0 as of SP37. These options are still available in the “frozen” software provisioning manager 1.0 SP35 (see SAP Note 3220901)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SAP Business Suite 7i 2013 Support Release 2:</th>
<th>SAP NetWeaver 7.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>• EHP3 for SAP CRM 7.0 ABAP Support Release 2</td>
<td>SAP NetWeaver 7.4 Support Release 2</td>
</tr>
<tr>
<td>• EHP7 for SAP ERP 6.0 ABAP Support Release 2</td>
<td>SAP NetWeaver 7.3 EHP1</td>
</tr>
<tr>
<td>• EHP7 for SAP ERP 6.0 ABAP including SAP Simple Finance 1.0 / 1503</td>
<td></td>
</tr>
<tr>
<td>• EHP3 for SAP SRM 7.0 ABAP Support Release 2</td>
<td></td>
</tr>
<tr>
<td>• EHP3 for SAP SCM 7.0 ABAP Support Release 2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SAP NetWeaver 7.5</th>
<th>SAP NetWeaver 7.5</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>SAP Solution Manager 7.2 Support Release 2</th>
<th>SAP NetWeaver 7.4 Support Release 2</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>AS ABAP 7.4, OEM version 1.0</th>
<th>SAP NetWeaver 7.4 Support Release 2</th>
</tr>
</thead>
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<table>
<thead>
<tr>
<th>SAP NetWeaver 7.4 Support Release 2</th>
<th>SAP NetWeaver 7.4</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>SAP Business Suite, powered by SAP HANA (Out of Maintenance since December 2020):</th>
<th>SAP NetWeaver 7.3 EHP1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Caution</strong></td>
<td></td>
</tr>
<tr>
<td>The options for this product have been removed from software provisioning manager 1.0 as of SP37. These options are still available in the “frozen” software provisioning manager 1.0 SP35 (see SAP Note 3220901)</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>• EHP2 for SAP CRM 7.0 On SAP HANA</td>
<td></td>
</tr>
<tr>
<td>• EHP6 for SAP ERP 6.0 On SAP HANA</td>
<td></td>
</tr>
<tr>
<td>• EHP2 for SAP SCM 7.0 On SAP HANA</td>
<td></td>
</tr>
</tbody>
</table>
1.2 Naming Conventions

This section lists the naming conventions that are currently apply for the software provisioning manager 1.0 and terms used in this documentation.

- The software provisioning manager 1.0 is the successor of the product- and release-specific delivery of provisioning tools, such as “SAPinst”.
  Before you perform an installation from scratch or a target system installation in the context of a system copy, we strongly recommend that you always download the latest version of the software provisioning manager 1.0 which is part of the Software Logistics Toolset 1.0 (“SL Toolset” for short). For more information, see Preparing the Installation Media [page 107].
  This way, you automatically get the latest version with the latest fixes of the tool and supported processes. For more information about the software provisioning manager 1.0 as well as products and releases supported by it, see SAP Note 1680045 and https://wiki.scn.sap.com/wiki/display/SL/Software+Provisioning+Manager+1.0+and+2.0.
  The “SAPinst” tool has been renamed to “software provisioning manager”, but the terms “SAPinst” and “sapinst” are still used in:
  - The name of the technical framework of the software provisioning manager. For more information about the current SAPinst Framework version, see SAP Note 3207613 (SAPinst Framework 753 Central Note).
  - Texts and screen elements in the the software provisioning manager’s SL-UI
  - Names of executables, for example sapinst
  - Names of command line parameters, for example SAPINST_STACK_XML
  - Names of operating system user groups, such as the additional group sapinst
  - “usage type”, “technical usage”, and “product instance”
    As of software provisioning manager 1.0 SP07 (SL Toolset 1.0 SP12), the term “product instance” replaces the terms “usage type” and “technical usage”. For more information, see SAP Note 1970349.
    For more information, see New Features [page 21].
  - “SAP system” refers to SAP system based on the application server of 7.3 including Enhancement Package 1 / Application Server ABAP 7.4 / SAP NetWeaver 7.4 / SAP NetWeaver 7.5 / SAP NetWeaver Application Server for ABAP 7.51 innovation package / SAP NetWeaver Application Server for ABAP 7.52.
  - “Diagnostics Agent” refers to the SAP Solution Manager Diagnostics Agent which is the remote component of End-to-End Root Cause Analysis. It allows having a connection between SAP Solution Manager and managed systems, and then to collect information from the managed systems for reporting purposes.

1.3 Constraints

This section lists the naming constraints that are currently valid for the software provisioning manager 1.0 and this documentation.

- Effective immediately, the software provisioning manager no longer supports the deprecated CPU architectures and/or operating system versions listed in SAP Note 2998013.
**Note**

- If your current operating system is listed as deprecated in SAP Note 2998013, we strongly recommend that you migrate to a supported platform.
- If you continue to run Software Provisioning Manager on the deprecated CPU architectures and/or operating system versions listed in SAP Note 2998013, you do so at your own risk and without support from SAP. The software provisioning manager 1.0 SP36 and higher will still run on the deprecated CPU architectures and/or operating system versions listed in SAP Note 2998013 but it may run into an error. When you start the software provisioning manager, you will see a warning like the following: “Platform Support : Support for SAP JVM on PPC64 big endian for Linux ends June 30th, 2022. See SAP note 2998013.” If you run into an issue, you must use the “frozen” software provisioning manager 1.0 SP35 software and the related installation guide. For more information, see SAP Note 3220901.

**End of support for SAP products based on SAP NetWeaver 7.10, 7.11, 7.20, 7.30, 7.40 SR1**

**Note**

SAP products based on SAP NetWeaver 7.10, 7.11, 7.20, 7.30, 7.40 SR1 (with the exception of SAP Solution Manager 7.2 ABAP, which will continue to be supported) are only supported in mainstream maintenance until the end of 2020. Extended maintenance will not be provided.

For more information, see SAP Note 2980160.

You can download the last published version of the guide set for the last Software Provisioning Manager 1.0 SP30 for out-of-maintenance products (SWPM1ORMSP30_<Version>.SAR) from SAP Note 2980160. The guide set attached to SAP Note 2980160 covers only the SAP product versions which have reached end of maintenance.

- The Dual Stack option, which integrates an AS ABAP and AS Java in a single system (common System ID <SAPSID>, common startup framework, common database), is no longer supported in SAP systems based on SAP NetWeaver 7.5. So if you want to install a new SAP NetWeaver 7.5 Process Integration (PI) system which is based on SAP NetWeaver 7.5, do not use the documentation Installation Guide - SAP Systems Based on the Application Server ABAP+Java of SAP NetWeaver on <OS>: <DB>. Instead, use the Installation Guide - SAP Systems Based on the Application Server ABAP of SAP NetWeaver on <OS>: <DB> to install the ABAP stack with its own <SAPSID> and the Installation Guide - SAP Systems Based on the Application Server Java of SAP NetWeaver on <OS>: <DB> to install the Java stack with its own <SAPSID>. For more information, see the implementation sequence in the Master Guide - SAP NetWeaver 7.5 at http://help.sap.com/netweaver

- Not all SAP NetWeaver releases or SAP Business Suite applications that are available in Software Provisioning Manager 1.0 and are described in this installation guide have already been released. Always check the list of supported products [page 13] and SAP Note 1680045 to ensure that the installation options you want to perform are already supported. For information about supported operating system and database platforms, see the Product Availability Matrix at http://support.sap.com/pam.

- Note that a complete system installation from scratch is not available for every product. For some products - such as SAP NetWeaver 7.5 - a complete new system installation from scratch is only provided for the highest support release. If there are one or more support releases, then a complete system installation is only available for the highest of these support releases. As for the lower support releases, only options for system copy and additional application server instances are provided.

- Your operating system platform must be 64-bit.
• The `startsap` and `stop.sap` commands have been deprecated. For more information and for information on alternatives, see Starting and Stopping SAP System Instances Using Commands [page 244].
• 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.
• Client 001 is no longer available in newly installed SAP systems based on SAP S/4HANA and SAP BW/4HANA.

1.4 Before You Start

Make sure that you have read the release-specific “Master Guide” - called “Installation Guide” for SAP S/4HANA - for your SAP Business Suite application, SAP NetWeaver application, or SAP Solution Manager system before you continue with this installation guide.

The “Master Guide” - also called “Installation Guide” for SAP S/4HANA - is the central document leading you through the overall implementation process for your SAP system installation. It contains crucial 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 “Master Guide” - or “Installation Guide” - of the SAP system application for which you can use this installation guide, 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>
</table>
1.5 SAP Notes for the Installation

This section lists the most important SAP Notes relevant for an installation using Software Provisioning Manager.

You must read the following SAP Notes before you start the installation. These SAP Notes contain the most recent information on the installation, as well as corrections to the installation documentation.

Make sure that you have the up-to-date version of each SAP Note, which you can find at https://support.sap.com/notes.

SAP Notes for the Installation

<table>
<thead>
<tr>
<th>SAP Note Number</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1680045</td>
<td>Release Note for software provisioning manager 1.0</td>
<td>software provisioning manager 1.0 with installation and system copy for SAP NetWeaver-based systems</td>
</tr>
<tr>
<td>SAP Note Number</td>
<td>Title</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2378874</td>
<td>Install SAP Solutions on Linux on IBM Power Systems (little endian)</td>
<td>Information about how to install SAP solutions on Linux on IBM Power Systems (little endian)</td>
</tr>
<tr>
<td>2365849</td>
<td>Installation of SAP Systems Based on SAP NetWeaver: SAP HANA Database</td>
<td>Platform-specific information about the SAP system installation and corrections to this document</td>
</tr>
<tr>
<td>1830427</td>
<td>Installation of SCM on HANA with integrated liveCache</td>
<td>This SAP Note contains information that is specific to the SAP system installation of SCM on HANA with integrated liveCache</td>
</tr>
<tr>
<td>73606</td>
<td>Supported Languages and Code Pages</td>
<td>Information on possible languages and language combinations in SAP systems</td>
</tr>
<tr>
<td>1972803</td>
<td>SAP on AIX: Recommendations</td>
<td>This SAP Note contains recommendations and clarifications for many topics relevant for SAP on AIX.</td>
</tr>
<tr>
<td>1075118</td>
<td>SAP on HP-UX: FAQ</td>
<td>This SAP Note contains information that is specific to the SAP system installation on HP-UX</td>
</tr>
<tr>
<td>2369910</td>
<td>SAP Software on Linux: General information</td>
<td>This SAP Note contains Linux-specific information about the SAP system installation</td>
</tr>
<tr>
<td>1669684</td>
<td>SAP on Oracle Solaris 11</td>
<td>This SAP Note contains information and references to SAP Notes relevant for Solaris 11</td>
</tr>
<tr>
<td>1067221</td>
<td>Composite SAP Note for heterogeneous installation</td>
<td>This SAP Note and its related SAP Notes describe the released operating system and database combinations for heterogeneous SAP systems landscapes.</td>
</tr>
<tr>
<td>7892200</td>
<td>Support Package levels for SAP NetWeaver installations/upgrades</td>
<td>Information about the ABAP Support Package levels and kernel patch levels contained in the current SAP NetWeaver release</td>
</tr>
<tr>
<td>8197222</td>
<td>Support Package levels for SRM installations/upgrades</td>
<td>Information about the ABAP Support Package levels and kernel patch levels contained in the current SAP SRM release</td>
</tr>
<tr>
<td>7746155</td>
<td>Support Package levels of ERP/ECC installations/upgrades</td>
<td>Information about the ABAP Support Package levels and kernel patch levels contained in the current SAP ERP release</td>
</tr>
<tr>
<td>8374135</td>
<td>Support Package levels for CRM installations/upgrades</td>
<td>Information about the ABAP Support Package levels and kernel patch levels contained in the current SAP CRM release</td>
</tr>
</tbody>
</table>
### 1.6 New Features

This section provides an overview of the new features in software provisioning manager 1.0.

Make sure that you also read the Release Notes for your SAP product at [https://help.sap.com](https://help.sap.com) &lt;Search your SAP Product&gt; &lt;Select your SAP Product Version&gt; What’s New.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>New SAPinst Framework Version 753</td>
<td>The SAPinst framework patch level has been upgraded from version 749 (SAP Note 2393060 SAPinst Framework 749 Central Note) to 753. For more information, see SAP Note 3207613 SAPinst Framework 753 Central Note.</td>
<td>software provisioning manager 1.0 SP36 (SL Toolset 1.0 SP36)</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Availability</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Linux: Native systemd support</td>
<td><strong>Linux only:</strong> Starting with SUSE Linux Enterprise Server 15, Red Hat Enterprise Linux 8, and Oracle Linux 8, and the respective SAP kernel patch levels, native support for the software suite systemd for Linux is available for SAP systems. For more information about Linux with systemd, see SAP Note 3139184. When you install SAP systems using software provisioning manager 1.0 SP34 or higher, native systemd support is automatically activated.</td>
<td>software provisioning manager 1.0 SP34 (SL Toolset 1.0 SP34)</td>
</tr>
<tr>
<td>Support of AIX 7.3</td>
<td>AIX 7.3 is now supported for all software lifecycle management options from software provisioning manager. For more information, see SAP Note 3104875.</td>
<td>software provisioning manager 1.0 SP34 (SL Toolset 1.0 SP34)</td>
</tr>
<tr>
<td>Switch from 7.21_EXT Kernel to 7.22_EXT Kernel</td>
<td>Kernel 7.21 has reached end of maintenance. In addition, some issues have been fixed with the new 7.22_EXT kernel media.</td>
<td>software provisioning manager 1.0 SP31 (SL Toolset 1.0 SP31)</td>
</tr>
<tr>
<td>Configuring the Number of Work Processes during the Installation</td>
<td>You can now enter the number of work processes interactively when performing an installation in custom mode. For more information, see Basic Installation Parameters [page 60].</td>
<td>software provisioning manager 1.0 SP30 (SL Toolset 1.0 SP30)</td>
</tr>
<tr>
<td>Support of SAP HANA SSL Certificates</td>
<td>Software Provisioning Manager 1.0 supports SAP HANA SSL Certificates for configuring secure access to the SAP HANA database. For more information, see Establishing Secure Connection to the SAP HANA Database [page 104].</td>
<td>software provisioning manager 1.0 SP29 (SL Toolset 1.0 SP29)</td>
</tr>
<tr>
<td>Support of Linux on IBM Power Systems (little endian)</td>
<td>Software provisioning manager supports as of now Linux on IBM Power Systems (little endian) as operating system platform for SAP systems based on SAP NetWeaver 7.4 and higher. For more information, see SAP Note 2378874.</td>
<td>software provisioning manager 1.0 SP27 (SL Toolset 1.0 SP27)</td>
</tr>
<tr>
<td>Support of Secure Connection to SAP HANA database</td>
<td>Software Provisioning Manager 1.0 supports configuring the SAP system to be installed to access the SAP HANA database using encryption. For more information, see Establishing Secure Connection to the SAP HANA Database [page 104].</td>
<td>software provisioning manager 1.0 SP26 (SL Toolset 1.0 SP26)</td>
</tr>
<tr>
<td>New Look and Feel of SL-UI</td>
<td>As of version 1.0 SP24 Patch Level (PL) 5, the software provisioning manager comes with a new look and feel of the SL-UI. For more information, see <a href="https://blogs.sap.com/2018/11/10/new-look-for-software-provisioning-manager/">https://blogs.sap.com/2018/11/10/new-look-for-software-provisioning-manager/</a>.</td>
<td>software provisioning manager 1.0 SP24, PL05 (SL Toolset 1.0 SP24)</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Availability</td>
</tr>
<tr>
<td>--------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>New software provisioning manager Option Download Software Packages for Maintenance Planner Transaction</td>
<td>If you perform an installation using a Stack XML file, you can now download media according to a Maintenance Plan. For more information, see Installation Using a Stack XML File [page 43], Downloading Software Packages for a Maintenance Planner Transaction [page 119], and <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 1.0 SP23 (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 XML file and choose to extract the SUM*.SAR archive, the validity of this archive is now checked by the software provisioning manager. For more information, see entry Extract the SUM*.SAR Archive in Additional Parameters When Using a Stack XML File [page 75].</td>
<td>software provisioning manager 1.0 SP23 (SL Toolset 1.0 SP23)</td>
</tr>
<tr>
<td>Secure ABAP Message Server Connection</td>
<td>The software provisioning manager now uses secure connections to the ABAP message server of the SAP system being installed. For more information, see the ABAP Message Server Port entry within the Ports table in SAP System Parameters [page 61].</td>
<td>software provisioning manager 1.0 SP22 (SL Toolset 1.0 SP22)</td>
</tr>
<tr>
<td>software provisioning manager Log Files Improvements</td>
<td>Software provisioning manager log files are now available immediately after software provisioning manager has been started, that is before a product has been selected on the Welcome screen. For more information, see Useful Information about Software Provisioning Manager [page 145] and Troubleshooting with Software Provisioning Manager [page 156].</td>
<td>software provisioning manager 1.0 SP22 (SL Toolset 1.0 SP22)</td>
</tr>
<tr>
<td>Digital Signature Check of Installation Archives</td>
<td>The digital signature of installation archives is checked automatically by software provisioning manager during the Define Parameters phase while processing the Software Package Browser screens. As of now software provisioning manager only accepts archives whose digital signature has been checked. For more information, see Downloading SAP Kernel Archives (Archive-Based Installation) [page 115].</td>
<td>software provisioning manager 1.0 SP22 (SL Toolset 1.0 SP22)</td>
</tr>
<tr>
<td>LOADTOOLS.SAR archive in software provisioning manager enabled for NUC</td>
<td>The load tools in SNP10SP&lt;Support_Package_Number&gt;_&lt;Version_Number&gt;.SAR are now also enabled for an installation using non-Unicode (NUC) SAP kernel version 7.40 or higher. For more information, see Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 113]</td>
<td>software provisioning manager 1.0 SP22 (SL Toolset 1.0 SP22)</td>
</tr>
</tbody>
</table>

I Note

This feature enhances feature LOADTOOLS.SAR archive in Software Provisioning Manager of software provisioning manager 1.0 SP21 (SL Toolset 1.0 SP21) (see entry LOADTOOLS.SAR archive in software provisioning manager below in this table).
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabling IPv6</td>
<td>You can now set up a new SAP system or SAP system instance using Internet Protocol Version 6 (IPv6). For more information, see Prerequisites for Running Software Provisioning Manager [page 133].</td>
<td>software provisioning manager 1.0 SP22 (SL Toolset 1.0 SP22)</td>
</tr>
<tr>
<td>Media Signature Check</td>
<td>The digital signature of media is checked automatically by the software provisioning manager during the Define Parameters phase while processing the Media Browser screens. The software provisioning manager only accepts media whose digital signature has been checked. For more information, see Preparing the Installation Media [page 107] and Running the software provisioning manager [page 137].</td>
<td>software provisioning manager 1.0 SP21 (SL Toolset 1.0 SP21)</td>
</tr>
<tr>
<td>SAP Host Agent Upgrade During the Installation (Optional)</td>
<td>During the Define Parameters phase of the installation, software provisioning manager prompts you whether you want to upgrade an existing version of the SAP Host Agent on the installation host. If there is no SAP Host Agent on the installation host, it is installed automatically without prompt. For more information, see the General Parameters table in SAP System Parameters [page 61].</td>
<td>software provisioning manager 1.0 SP21 (SL Toolset 1.0 SP21)</td>
</tr>
<tr>
<td>Simplified Additional Application Server Instance Installation</td>
<td>During an additional application server installation, SAP kernel archives are only prompted if they cannot be retrieved from the primary application server instance of the existing SAP system. For more information, see Preparing the Installation Media [page 107].</td>
<td>software provisioning manager 1.0 SP21 (SL Toolset 1.0 SP21)</td>
</tr>
<tr>
<td>LOADTOOLS.SAR archive in software provisioning manager</td>
<td>An up-to-date version of the load tools - such as R3load, R3szchk, R3ldct1, SAPuptool - which were available so far only in the SAPEREDB.SAR archive of the kernel media, has now been made available in the software provisioning manager archive. For more information, see SAP Note 2472835. For an installation using Unicode kernel version 7.40 or higher, the load tools from the SWPM&lt;Support Package Number&gt;_&lt;Version Number&gt;.SAR are used automatically. For more information, see Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 113].</td>
<td>software provisioning manager 1.0 SP21 (SL Toolset 1.0 SP21)</td>
</tr>
<tr>
<td>SL-UI with SAPINST 749</td>
<td>With the new software provisioning manager framework version SAPINST 7.49, you can now use the new SAPUI5-based graphical user interface (GUI) “SL-UI”. For more information, see Useful Information about Software Provisioning Manager [page 145], Running Software Provisioning Manager [page 137].</td>
<td>software provisioning manager 1.0 SP20 (SL Toolset 1.0 SP20)</td>
</tr>
<tr>
<td>Cleanup of Operating System Users</td>
<td>You can now specify during the Define Parameters phase that the operating system users are to be removed from group sapinst after the execution of software provisioning manager has completed. For more information, see Operating System Users in SAP System Parameters [page 61].</td>
<td>software provisioning manager 1.0 SP20 (SL Toolset 1.0 SP20)</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Availability</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Option to install an SAP Gateway in an ASCS instance</td>
<td>You can now install an SAP Gateway in an ASCS instance. You can choose this option while running the ASCS instance installation. For more information, see ASCS Instance with Embedded Gateway [page 40]</td>
<td>software provisioning manager 1.0 SP20 (SL Toolset 1.0 SP20)</td>
</tr>
<tr>
<td>Verification of Integrity of Data Units in software provisioning manager</td>
<td>The integrity of data units extracted from the software provisioning manager archive is verified. For more information, see Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 113]. In addition, check SAP Note 1680045 whether additional information is available.</td>
<td>software provisioning manager 1.0 SP19 (SL Toolset 1.0 SP19)</td>
</tr>
<tr>
<td>Support of Linux on IBM Power Systems (little endian)</td>
<td>software provisioning manager supports as of now Linux on IBM Power Systems (little endian) as operating system platform for SAP systems based on SAP NetWeaver 7.5 and higher on SAP HANA. For more information, see SAP Note 2378874.</td>
<td>software provisioning manager 1.0 SP19 (SL Toolset 1.0 SP19)</td>
</tr>
<tr>
<td>Archive-based Language Installation</td>
<td>If you perform an installation using a Stack XML file, you can now add language archives to the download basket and use them for language installation. This feature is currently restricted to the latest products only. For more information, see Additional Parameters When Using a Stack XML File [page 75]</td>
<td>software provisioning manager 1.0 SP19 (SL Toolset 1.0 SP19)</td>
</tr>
<tr>
<td>Option to install an SAP Web Dispatcher in an ASCS instance</td>
<td>You can now install an SAP Web Dispatcher in an ASCS instance. You can choose this option while running the ASCS instance installation. For more information, see ASCS Instance with Embedded SAP Web Dispatcher [page 38]</td>
<td>software provisioning manager 1.0 SP18 (SL Toolset 1.0 SP18)</td>
</tr>
<tr>
<td>Archive-Based Installation</td>
<td>You can now download the required installation archives instead of the complete SAP kernel installation media. For more information, see section Downloading Specific Installation Archives (Archive-Based Installation) in Preparing the Installation Media [page 107].</td>
<td>software provisioning manager 1.0 SP17 (SL Toolset 1.0 SP17)</td>
</tr>
<tr>
<td>Diagnostics Agent</td>
<td>The Diagnostics Agent is no longer installed automatically with the SAP system. The Install Diagnostics Agent check box on the Install Diagnostics Agent screen is no longer available. You now have to install the Diagnostics Agent always separately. We recommend that you install it prior to the installation of your SAP system(s). For more information, see the Diagnostics Agent Installation Strategy attached to SAP Note 1365123, to SAP Note 1833501, and to SAP Note 1858920 and the attached Diagnostics Agent Setup Guide.</td>
<td>software provisioning manager 1.0 SP10 (SL Toolset 1.0 SP16)</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Availability</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| **System Provisioning for SAP NetWeaver 7.5 and SAP NetWeaver 7.5-based Products** | All system provisioning tasks (installation, system copy, system rename) are available for the new SAP NetWeaver 7.5 release. The Dual Stack option, which integrates an AS ABAP and AS Java in a single system (common System ID `<SAPSID>`, common startup framework, common database), is no longer supported in SAP systems based on SAP NetWeaver 7.5.  
- After upgrading to SAP NetWeaver 7.5 PI, you first have to split the still existing dual stack-system before you can use SAP NetWeaver 7.5 PI productively. For more information, see the Upgrade Master Guide - SAP NetWeaver 7.5 at: [http://help.sap.com/nw75](http://help.sap.com/nw75) Installation and Upgrade.
- SAP NetWeaver 7.5 is Unicode only.
- The primary application server instance directory has been renamed from `/usr/sap/<SAPSID>/DVEBMGS<Instance_Number>` to `/usr/sap/<SAPSID>/D<Instance_Number>`. For more information, see SAP Directories [page 92].
- Declustering and depooling of tables during the installation is enabled by default. For more information, see SAP Note 1892354. | software provisioning manager 1.0 SP09 (SL Toolset 1.0 SP15) |

<p>| <strong>System Provisioning for SAP Solution Manager 7.2</strong> | All system provisioning tasks (installation, system copy, system rename) are available for the new SAP Solution Manager 7.2 release. Compared to previous SAP Solution Manager releases, SAP Solution Manager 7.2 is no longer provided as a classical dual-stack system (ABAP system with Java Add-in), but consists of a separate ABAP and Java stack. | software provisioning manager 1.0 SP09 (SL Toolset 1.0 SP15) |</p>
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating Kernel Archives from existing SAP</td>
<td>You can reuse the binaries of a dedicated SAP system for a new SAP system installation or target system installation in the context of a system copy by creating *.SAR archives based on the * . lst files from the executable (exe) directories of the source SAP system.</td>
<td>software provisioning manager 1.0 SP09 (SL Toolset 1.0 SP14)</td>
</tr>
<tr>
<td></td>
<td>* Note</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This feature is only available for Unicode systems.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Caution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>This feature has been deprecated with Software Provisioning Manager 1.0 SP21 (SL Toolset 1.0 SP21) and the related option has been removed from the Welcome screen. This deprecation has been accomplished to ensure compliance with the new feature “Media Signature Check” of Software Provisioning Manager 1.0 SP21 (SL Toolset 1.0 SP21) described above in this table.</td>
<td></td>
</tr>
<tr>
<td>Installation Using a Stack XML File</td>
<td>You can start software provisioning manager using a Stack XML file generated by the Maintenance Planner. The configuration parameters in this file can then be used by software provisioning manager to improve the integration with SUM and to simplify the process of installation for a new system on target software level.</td>
<td>software provisioning manager 1.0 SP07 (SL Toolset 1.0 SP12)</td>
</tr>
<tr>
<td></td>
<td>For more information, see Installation Using a Stack XML File [page 43].</td>
<td></td>
</tr>
<tr>
<td>Adaptive Installation</td>
<td>You can assign virtual host names to SAP system instances during the input phase of the installation directly on the screens where you define the instance parameters.</td>
<td>software provisioning manager 1.0 SP07 (SL Toolset 1.0 SP12)</td>
</tr>
<tr>
<td></td>
<td>For more information, see SAP System Parameters [page 61].</td>
<td></td>
</tr>
<tr>
<td>Feedback Evaluation Form</td>
<td>SAP SE’s aim is to provide fast and efficient procedures. To evaluate the procedure you just carried out, we need information generated by the tool during process execution and your experience with the tool itself. A new evaluation form contains a simple questionnaire and XML data generated during the procedure. Port 4239 is used for displaying the feedback evaluation form. For more information, see Prerequisites for Running Software Provisioning Manager [page 133].</td>
<td>software provisioning manager 1.0 SP07 (SL Toolset 1.0 SP12)</td>
</tr>
<tr>
<td>Feature</td>
<td>Description</td>
<td>Availability</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Option <em>Verify Signed Media</em></td>
<td>The digital signature ensures that the signatory of a digital document can be identified unambiguously and signatory’s name is documented together with the signed document, the date, and the time. For more information, see SAP Note 1979965.</td>
<td>software provisioning manager 1.0 SP06 (SL Toolset 1.0 SP11)</td>
</tr>
<tr>
<td>Installation of SAP systems on the same host as the SAP HANA database</td>
<td>You can now install SAP systems based on Application Server ABAP 7.4 on the <strong>same host</strong> as the SAP HANA database, without applying additional environment settings. For more information, see SAP Note 1953429.</td>
<td>software provisioning manager 1.0 SP06 (SL Toolset 1.0 SP11)</td>
</tr>
</tbody>
</table>
2 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.

**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, the software provisioning manager 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 based on Application Server ABAP 7.4 or higher on the same host as the SAP HANA database, without applying additional environment settings. For more information, see SAP Systems Based on Application Server ABAP on One Host with SAP HANA Database - High-Availability Setup Based on SAP HANA System [page 211] and 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.

After you have decided on the installation option that you want to use, continue with Planning [page 42].

- Standard System [page 29]
- Distributed System [page 31]
- High-Availability System [page 32]
- Additional Application Server Instance [page 35]
- ASCS Instance with Embedded SAP Web Dispatcher [page 38]
- ASCS Instance with Embedded Gateway [page 40]

2.1 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
  In a standard
  - Optionally, you can install the ASCS instance with an embedded SAP Web Dispatcher. For more information, see ASCS Instance with Embedded SAP Web Dispatcher [page 38].
• Optionally, you can install the ASCS instance with an embedded gateway. For more information, see ASCS Instance with Embedded Gateway [page 40].

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

**i Note**

If you are installing a standard system on Linux, you can install SAP systems based on Application Server ABAP 7.4 or higher on the same host as the SAP HANA database, without applying additional environment settings, as shown in the figure below. If the SAP HANA database does not yet exist, it is installed automatically by Software Provisioning Manager. For more information, see SAP Note 1953429.

This installation scenario is available for the following releases:

• SAP HANA Database 1.0 SPS 8 (revision 80 and higher)
• SAP HANA Database 2.0
• SAP products based on SAP NetWeaver 7.4 and higher
• SAP products based on ABAP Platform 1809 and higher
• SAP Enhancement Package 7 for SAP ERP 6.0 and higher
• SAP Enhancement Package 3 for CRM 7.0 and higher
• SAP Enhancement Package 3 for SCM 7.0 and higher
• SAP Enhancement Package 3 for SRM 7.0 and higher
2.2 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
  - Optionally, you can install the ASCS instance with an embedded SAP Web Dispatcher. For more information, see ASCS Instance with Embedded SAP Web Dispatcher [page 38].
  - Optionally, you can install the ASCS instance with an embedded gateway. For more information, see ASCS Instance with Embedded Gateway [page 40].
- 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 [page 35].
### 2.3 High-Availability System

*S 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 https://www.sap.com/documents/2016/05/f8e5eeba-737c-0010-82c7-eda71af511fa.html.

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

*S Note
ASCS instance with “Standalone Enqueue Server” versus ASCS instance with new “Standalone Enqueue Server 2”**: Software Provisioning Manager 1.0 installs the “Standalone Enqueue Server” by default for all SAP system releases in the ASCS instance. However, if you have installed the ASCS instance for an SAP system based on SAP NetWeaver AS for ABAP 7.52, you can switch to the new “Standalone Enqueue Server 2” after the installation has completed. For more information, see https://help.sap.com/nw752abap and Application Help > SAP NetWeaver Library: Function-Oriented View > SAP NetWeaver Application Server for ABAP > Components of SAP NetWeaver Application Server for ABAP > Standalone Enqueue Server 2 > High Availability with Standalone Enqueue Server 2.
Systems Based on SAP NetWeaver AS for ABAP 7.52 only: Switching to Standalone Enqueue Server 2 and Enqueue Replicator 2 [page 180].

- Optionally you can install the ASCS instance with an embedded SAP Web Dispatcher. For more information, see ASCS Instance with Embedded SAP Web Dispatcher [page 38].
- Optionally you can install the ASCS instance with an embedded gateway. For more information, see ASCS Instance with Embedded Gateway [page 40].
- 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 “Enqueue Replication Server” versus ERS instance with new “Enqueue Replicator 2”: Software Provisioning Manager 1.0 installs the ERS instance with the classic “Enqueue Replication Server” by default for all SAP system releases. However, if you have installed the ERS instance for an SAP system based on SAP NetWeaver AS for ABAP 7.52, you can switch to “Enqueue Replicator 2” after the installation has completed. For more information, see https://help.sap.com/nw752abap Application Help SAP NetWeaver Library: Function-Oriented View SAP NetWeaver Application Server for ABAP Components of SAP NetWeaver Application Server for ABAP Standalone Enqueue Server 2 and Systems Based on SAP NetWeaver AS for ABAP 7.52 only: Switching to Standalone Enqueue Server 2 and Enqueue Replicator 2 [page 180].

- 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.

We recommend that you run the ASCS instance in a switchover cluster infrastructure.

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 35].

The following figure shows an example for the distribution of the SAP system instances in a high-availability system.
On Linux, you can install SAP systems based on Application Server ABAP 7.4 or higher 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 211].

This installation scenario is available for the following releases:

- SAP HANA Database 1.0 SPS 8 (revision 80 and higher)
- SAP HANA Database 2.0
- SAP products based on SAP NetWeaver 7.4 and higher
- SAP products based on ABAP Platform 1809 and higher
- SAP Enhancement Package 7 for SAP ERP 6.0 and higher
- SAP Enhancement Package 3 for CRM 7.0 and higher
- SAP Enhancement Package 3 for SCM 7.0 and higher
- SAP Enhancement Package 3 for SRM 7.0 and higher
### 2.4 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 211]. 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 29].

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 31].

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
2.5 ASCS Instance with Embedded SAP Web Dispatcher

You can install an SAP Web Dispatcher embedded 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.

**Recommendation**

The embedded SAP Web Dispatcher is subject to a number of limitations. For more information, see SAP Note 3115889. It is a convenience option for small systems, but is not recommended for production systems. The general recommendation is to install a standalone SAP Web Dispatcher instead.

**Note**

We only recommend this option for special scenarios. For more information, see SAP Note 908097. The embedded SAP Web Dispatcher is subject to a number of limitations. For more information, see SAP Note 3115889. It is a convenient option for small systems, but is not recommended for production systems. The general recommendation is to install a standalone SAP Web Dispatcher instead. For an SAP Web Dispatcher installation, a standalone installation (see below) continues to be the default scenario.
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 Installation of SAP Web Dispatcher for SAP Systems Based on SAP NetWeaver 7.0 to 7.52 on <OS> which you can find at https://support.sap.com/sitoolset. Installation Option of Software Provisioning Manager 1.0 Installation Option of Software Provisioning Manager 1.0 Installation Guides - Standalone Engines and Clients - Software Provisioning Manager 1.0 SAP Web Dispatcher.
More Information

For more information about the architecture and the functions of SAP Web Dispatcher, see the SAP Web Dispatcher documentation in the SAP Library at:

<table>
<thead>
<tr>
<th>SAP Release and SAP Library Quicklink</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
</table>
| • SAP NetWeaver 7.3 including Enhancement Package 1  
  http://help.sap.com/nw731 |  Application Help  
  Function-Oriented View  
  Application Server  
  Application Server Infrastructure  
  Components of  
  SAP NetWeaver Application Server  
  SAP Web Dispatcher |
| • SAP NetWeaver 7.4  
  http://help.sap.com/nw74 | |
| • SAP NetWeaver 7.5  
  http://help.sap.com/nw75 | |
| • SAP NetWeaver Application Server for ABAP 7.51 innovation package  
  https://help.sap.com/nw751abap | |
| • SAP NetWeaver AS for ABAP 7.52  
  https://help.sap.com/nw752abap | |

Related Information

Parameters for Additional Components to be Included in the ASCS Instance [page 77]

2.6 ASCS Instance with Embedded Gateway

You can install a gateway embedded 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 `<SAPS1D>` 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 7.1 to 7.5x at https://support.sap.com/sltoolset Installation Option of Software Provisioning Manager 1.0 Installation Guides - Standalone Engines and Clients - Software Provisioning Manager 1.0 Standalone Gateway Instance.

**Related Information**

Parameters for Additional Components to be Included in the ASCS Instance [page 77]
3 Planning

3.1 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 Master Guide available at the appropriate download location as described in Before You Start [page 18].
2. You have decided on your installation option (see Installation Options Covered by this Guide [page 29]).

Standard, Distributed, or High-Availability System

i Note

In a standard system [page 29], 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 HANASince an SAP system on IBM Db2 for z/OS database, see the SAP HANA Server Installation and Update Guide at https://help.sap.com/hana_platform.

The database instance is remotely installed by the software provisioning manager from the primary application server host.

However, if you are installing a standard system on Linux, you can install SAP systems based on Application Server ABAP 7.4 or higher on the same host as the SAP HANA database, without applying additional environment settings. For more information, see SAP Systems Based on Application Server ABAP on One Host with SAP HANA Database - High-Availability Setup Based on SAP HANA System [page 211] and SAP Note 1953429.

1. Installation Using a Stack XML File [page 43]:
   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 the software provisioning manager 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).

→ 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. **Installation Using a Stack XML File [page 43]:**
   If you want to install an SAP Process Integration 7.5 system or an SAP Solution Manager 7.2 system comprising ABAP and Java, both the ABAP and the Java system must be installed with the identical Support Package (SP) level.

3. You check the hardware and software requirements [page 46] on every installation host.

4. You plan how to set up user and access management [page 59].

5. You identify Basic SAP System Installation Parameters [page 60].

6. You decide on the transport host to use [page 78].

7. You decide whether you want to integrate LDAP Directory Services in your SAP system [page 198].

8. To install a high-availability system, you read Planning the Switchover Cluster for High Availability [page 79].

9. Optionally, you decide whether you want to install multiple components in one database (MCOD) [page 203].

10. Continue with Preparation [page 82].

**Additional Application Server Instance**

1. You check the hardware and software requirements [page 46] 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 60].

3. Continue with Preparation [page 82].

### 3.2 Installation Using a Stack XML File

The option to perform an installation using a Stack XML 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:

- The Maintenance Planner
- software provisioning manager (the “software provisioning manager” for short)
- Software Update Manager (abbreviated as “SUM”)
The software provisioning manager then can take over more default settings that are already predefined in the Maintenance Planner.

→ Recommendation
We recommend that you perform the installation using a Stack XML file for new products, such as SAP S/4HANA or SAP Solution Manager 7.2.

i Note
During Maintenace Planner stack generation, SAP HANA and non-SAP HANA SUM archives are provided. Exclude the SUM archive which is not applicable for the new system planning from the stack generation.

Restrictions
You cannot perform a target system installation in the context of a system copy as an installation with a Stack XML file.

Prerequisites
- You must have an S-User with the authorization to access and use the Maintenance Planner at https://apps.support.sap.com/sap/support/mp.
- For additional information about involved tools and supported SAP system releases, see SAP Note 2277574.

Features
An installation using a Stack XML file provides the following features:
- You can use a Stack XML file generated by the Maintenance Planner at https://apps.support.sap.com/sap/support/mp. The parameters contained in the Stack XML file can then be processed by software provisioning manager 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://support.sap.com/en/tools/software-logistics-tools/landscape-management-process.html.
- When processing a Stack XML file, software provisioning manager 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/.
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 also run an installation using a Stack XML file in unattended mode as described in System Provisioning Using an Input Parameter File [page 147].

- You can use software provisioning manager to directly download the installation software from SAP by providing the Maintenance Plan to software provisioning manager while running software provisioning manager option Download Software Packages for Maintenance Planner Transaction. For more information, see Downloading Software Packages for a Maintenance Planner Transaction [page 119].

**Integration**

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

If you want to install an SAP Process Integration 7.5 system or an SAP Solution Manager 7.2 system comprising ABAP and Java, consider the following additional requirements:

- Both the ABAP and the Java system must be installed with the identical Support Package (SP) level.
- The SAP system ID (SAPSID) of the ABAP system must be different from the SAPSID of the Java system.
- The installation with Stack XML file must be run separately, first for the ABAP system, then for the Java system.

The Software Update Manager (SUM) is started by the software provisioning manager at the end of the installation process. A browser window opens with a link to UI of the SUM that is already running. Follow the instructions on the SUM dialogs and in the SUM Guide at https://support.sap.com/slttoolset System Maintenance.

Each section in this guide describing steps that are completely or at least partially automatized when using a Stack XML files is marked with an appropriate note at the beginning. These are the following sections:

- Planning Checklist [page 42]
- Additional Parameters When Using a Stack XML File [page 75]
- Downloading Software Packages for a Maintenance Planner Transaction [page 119]
- Running Software Provisioning Manager [page 137]
- Configuring the Change and Transport System [page 172]
- Applying the Latest Kernel and Support Package Stacks [page 176]
- Installing Additional Languages and Performing Language Transport [page 182]
3.3 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 47].
     • Integrated in the installation tool (mandatory) as part of the installation process
       For more information, see Running Software Provisioning Manager [page 137].
   • The hardware and software requirements tables in Requirements for the SAP System Hosts [page 48].
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
3.3.1 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 software provisioning manager 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 1.0 Archive [page 113].
2. Make either the separate SAPEXE<Version>.SAR archive or the complete kernel medium available as described in Preparing the Installation Media [page 107].
3. Start the software provisioning manager as described in Running Software Provisioning Manager [page 137].
4. On the Welcome screen, chooseIPP=<SAP_Product>IPP=<Database>IPP=PreparationsIPP=PrerequisitesCheck.
5. Follow the instructions in the software provisioning manager dialogs and enter the required parameters.

i 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 1.0 Archive [page 113]
Preparing the Installation Media [page 107]

3.3.2 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.

\textbf{i Note}

The information here and in the following sections is \textbf{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 49]
Hardware Requirements [page 50]
Software Requirements [page 54]
Other Requirements [page 58]
### 3.3.2.1 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.

#### General Installation Information for Your Operating System

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AIX</strong></td>
<td>Before you start the installation, make sure that you have read SAP Note 2 in addition to the hardware and software requirements listed here, make sure that you also consult the hardware and software requirements provided by IBM at <a href="https://www.sap.com/community/topic/aix.html">1972803</a>. 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><strong>HP-UX</strong></td>
<td>In addition to the hardware and software requirements listed here, make sure that you have read SAP Note <a href="https://www.sap.com/community/topic/hp-ux.html">1075118</a>. 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><strong>Linux</strong></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 <a href="https://www.sap.com/community/topic/linux.html">2369910</a>. 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>. Only valid for Platform: Linux Software Provisioning Manager supports Linux on IBM Power Systems (little endian) as operating system platform for SAP systems based on SAP NetWeaver 7.4 and higher. For more information, see SAP Note <a href="https://www.sap.com/community/topic/oracle-solaris.html">2378874</a>.</td>
</tr>
<tr>
<td><strong>Solaris</strong></td>
<td>Before you start the installation, make sure that you have read SAP Note <a href="https://www.sap.com/community/topic/oracle-solaris.html">1669684</a>. 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>

Installation of SAP Systems Based on the Application Server ABAP of SAP NetWeaver 7.3 EHP1 to 7.52 on UNIX: SAP HANA Database
3.3.2.2 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.

Hardware Requirements

<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>Processing units</td>
<td><strong>For application server instances and database instances:</strong> The number of physical or virtual processing units usable by the operating system image must be equal to or greater than 2.</td>
</tr>
<tr>
<td></td>
<td><strong>For an ASCS instance running on a separate host:</strong> One physical or virtual processing unit usable by the operating system image might be sufficient.</td>
</tr>
<tr>
<td></td>
<td>Examples of processing units are processor cores or hardware threads (multithreading).</td>
</tr>
<tr>
<td></td>
<td>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:**
  - 2 GB of temporary disk space for each required physical installation media - or alternatively the downloaded SAP kernel archives - that you have to copy to a local hard disk. For more information, see Preparing the Installation Media [page 107].
  - If you prefer downloading the separate SAP kernel archives instead of using the complete SAP kernel media, you require 2 GB of temporary disk space for the set of SAP kernel archives that you have to copy to a local hard disk. For more information, see Downloading SAP Kernel Archives (Archive-Based Installation) [page 115].
  - 2 GB of temporary disk space for the installation.
  - 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.

  **i Note**
  If you are installing a standard system on Linux, you can install SAP systems based on Application Server ABAP 7.4 or higher 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 92] and the appropriate database-specific information listed below.

  - **ABAP central services instance (ASCS):**
    - Minimum 2 GB
    - If you install the ASCS instance with an embedded 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 embedded gateway, you require at least 1 GB of hard disk space in addition.

  - **ERS instance for the ASCS instance (if required):**
    - Minimum 2 GB

  - **Primary application server instance:**
    - Minimum 2 GB (SAP NetWeaver BW server: Minimum 30 GB)
    - Plus 1 GB for the SAP HANA database client software

  - **Additional application server instance:**
    - Minimum 2 GB (SAP NetWeaver BW server: Minimum 30 GB)
    - The XML table in this file contains a field called Plus 1 GB for the SAP HANA database client software

  - **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>
<tr>
<td></td>
<td><strong>Note</strong></td>
</tr>
<tr>
<td></td>
<td>AIX: Keep in mind that the operating system itself requires about 10% of the available RAM.</td>
</tr>
<tr>
<td></td>
<td>End of 'Platform': AIX</td>
</tr>
</tbody>
</table>

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.

**Note**

If you are installing a standard system on Linux, you can install SAP systems based on Application Server ABAP 7.4 or higher 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](#).

- ABAP central services instance (ASCS instance)
  - Minimum 1 GB
    
    If you install the ASCS instance with an embedded SAP Web Dispatcher, see SAP Note [2007212](#) 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

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

**HP-UX**: Refer to SAP Note [1112627](#) for the commands to display the RAM size on HP-UX.

**End of 'Platform': HP-UX**

**Only valid for 'Platform': Linux**

**Linux**: For more information about how to evaluate main memory consumption on Linux, see SAP Note [1382721](#).

**End of 'Platform': Linux**
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
</table>
| **AIX: Paging space** | You need hard disk drives with sufficient paging space. You can calculate the required paging space as follows:  
• Optimistic strategy:  
  You need at least 20 GB for the **primary application server instance** and at least another 10 GB for every **additional application server instance**.  
• Defensive strategy:  
  3 * RAM, at least 20 GB  
In addition, for the database instance you need:  
• 0.75 * RAM, if RAM is greater than 8 GB  
• 1 * RAM, if RAM is less than 8 GB  
For the latest information about recommended paging space, see SAP Note [1121904](https://support.sap.com). |
| **HP-UX: Swap space** | You need hard disk drives with sufficient space for swap. You can calculate the required swap space as follows:  
2 * RAM, at least 20 GB  
**SAP NetWeaver Process Integration 7.5 or higher**: 2 * RAM or 80 GB, whichever is higher  
For more information about HP-UX swap space recommendations and about how to set up swap space, see SAP Note [1112627](https://support.sap.com). |
| **Linux: Swap space** | 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 [1597355](https://support.sap.com). 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. |
| **Oracle Solaris**: Swap space | You need hard disk drives with sufficient space for swap.  
At least 20 GB are required. For more information, see SAP Note [570375](https://support.sap.com). |
To verify paging space size and kernel settings, you can execute `memlimits` as follows:

1. Make sure that the SAPCAR program is available on the installation host. If SAPCAR is not available, you can download it from https://launchpad.support.sap.com/#/software-center

2. Make the SAPEXE.SAR archive available on the installation host. Either download it as described in Downloading SAP Kernel Archives (Archive-Based Installation) [page 115] or take it from the kernel media, where this archive is contained in the folder K_<Kernel_Version>_<U/N>_<OS>/DBINDEP.

3. To unpack the file `memlimits`, enter the following command:
   
   ```
   SAPCAR -xvfg SAPEXE.SAR memlimits
   ```

4. Start `memlimits` using the following command:

   ```
   ./memlimits -l 20000
   ```

   In case of error messages, increase the paging space and rerun `memlimits` until there are no more errors.

### 3.3.2.3 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.

Software Requirements

<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>
</tbody>
</table>

  - Check the Product Availability Matrix (PAM) at [http://support.sap.com/pam](http://support.sap.com/pam) for supported operating system versions.
  - Contact your OS vendor for the latest OS patches.
  - Minimal OS requirements for the specific SAP Kernel releases are listed in SAP Note 1780629 [↩](#).
  - You require at least AIX 7.1 TL1 SP1 to be able to run the software provisioning manager. |
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP-UX: Operating system version</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>Linux: Operating system version</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></td>
<td><strong>Only valid for 'Platform': Linux</strong></td>
</tr>
<tr>
<td></td>
<td>If you are installing on SUSE Linux Enterprise Server (SLES), see SAP Note 1275776 to prepare SLES for SAP environments.</td>
</tr>
<tr>
<td></td>
<td><strong>End of 'Platform': Linux</strong></td>
</tr>
<tr>
<td>Linux Secure Enabled Linux (SELI-</td>
<td>Set Linux Secure Enabled Linux (SELinux)</td>
</tr>
<tr>
<td>nux) Mode</td>
<td></td>
</tr>
<tr>
<td>Oracle Solaris: Operating system</td>
<td>Your operating system platform must be 64-bit.</td>
</tr>
<tr>
<td>version</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>SAP Kernel Releases and Versions</td>
<td>For more information about release and roadmap information for the SAP Kernel versions, and how this relates to SAP system support packages - including important notes on downward compatibility and release dates - see the central SAP Kernel notes:</td>
</tr>
<tr>
<td></td>
<td>To use regular software provisioning manager (<code>SWPM10&lt;Version&gt;.SAR</code>) with SAP kernel up to 7.53 on RHEL 6 or SLES 11 or Oracle Linux 6, you must install the required <code>libstdc++</code> RPM packages. For more information, see SAP Note 2195019.</td>
</tr>
<tr>
<td>Requirement</td>
<td>Values and Activities</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>AIX</strong>: Kernel parameters</td>
<td>To adjust AIX Virtual Memory Management settings, see SAP Note <a href="#">973227</a>.</td>
</tr>
<tr>
<td><strong>HP-UX</strong>: 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></td>
<td><strong>Caution</strong></td>
</tr>
<tr>
<td></td>
<td>We recommend that a UNIX system administrator performs all kernel modifications.</td>
</tr>
<tr>
<td></td>
<td>Proceed as follows:</td>
</tr>
<tr>
<td></td>
<td>1. Check SAP Note <a href="#">172747</a> for recommendations on current HP-UX kernel parameters.</td>
</tr>
<tr>
<td></td>
<td><strong>Caution</strong></td>
</tr>
<tr>
<td></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, reduce the parameter value. In some cases this might improve the performance of your SAP applications.</td>
</tr>
<tr>
<td></td>
<td>2. If necessary, modify the kernel parameters in one of the following ways:</td>
</tr>
<tr>
<td></td>
<td>• Manually, as described in SAP Note <a href="#">172747</a>.</td>
</tr>
<tr>
<td></td>
<td>• Interactively, using the HP-UX System Administrator Manager (SAM) or System Management Homepage (SMH).</td>
</tr>
<tr>
<td><strong>Linux</strong>: Kernel parameters</td>
<td>Check SAP Note <a href="#">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></td>
<td>• SLES 15: SAP Note <a href="#">2578899</a></td>
</tr>
<tr>
<td></td>
<td>• SLES 12: SAP Note <a href="#">1984787</a></td>
</tr>
<tr>
<td></td>
<td>• RHEL8: SAP Note <a href="#">2772999</a></td>
</tr>
<tr>
<td></td>
<td>• RHEL7: SAP Note <a href="#">2002167</a></td>
</tr>
<tr>
<td></td>
<td>• RHEL6: SAP Note <a href="#">1496410</a></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.</td>
</tr>
<tr>
<td></td>
<td>• Oracle Solaris 10: SAP Note <a href="#">724713</a></td>
</tr>
<tr>
<td></td>
<td>• Oracle Solaris 11: SAP Note <a href="#">1797712</a></td>
</tr>
<tr>
<td><strong>HP-UX</strong>: OS patches</td>
<td>To check the minimum required OS patches, see SAP Note <a href="#">837670</a>.</td>
</tr>
<tr>
<td>Requirement</td>
<td>Values and Activities</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Oracle Solaris: OS patches</strong></td>
<td>Check the relevant SAP Note for required Oracle Solaris patches:</td>
</tr>
<tr>
<td></td>
<td>• Sun Solaris 10 on SPARC: SAP Note <a href="https://documents.sap.com">832871</a></td>
</tr>
<tr>
<td></td>
<td>• Oracle Solaris 11: SAP Note <a href="https://documents.sap.com">1797712</a></td>
</tr>
<tr>
<td><strong>AIX: National Language Support</strong></td>
<td>Make sure that National Language Support (NLS) and corresponding locales are installed.</td>
</tr>
<tr>
<td>(NLS)</td>
<td>You can check this as follows:</td>
</tr>
<tr>
<td></td>
<td>• Enter the following commands to check whether National Language Support (NLS) is installed:</td>
</tr>
<tr>
<td></td>
<td>swlist -v</td>
</tr>
<tr>
<td></td>
<td>The output should contain the string NLS-AUX ...</td>
</tr>
<tr>
<td></td>
<td>• Enter the following commands to check which locales are available:</td>
</tr>
<tr>
<td></td>
<td>locale -a</td>
</tr>
<tr>
<td></td>
<td>The following files must be available: de_DE.iso88591, en_US.ISO8859.1</td>
</tr>
<tr>
<td><strong>HP-UX: National Language Support</strong></td>
<td>Make sure that National Language Support (NLS) and corresponding locales are installed.</td>
</tr>
<tr>
<td>(NLS)</td>
<td>You can check this as follows:</td>
</tr>
<tr>
<td></td>
<td>• Ensure that the required locales such as the following are available:</td>
</tr>
<tr>
<td></td>
<td>de_DE, en_US</td>
</tr>
<tr>
<td></td>
<td>• Check SAP Note <a href="https://documents.sap.com">187864</a> for information about corrected operating system locales and SAP blended Code Pages.</td>
</tr>
<tr>
<td><strong>Linux: National Language Support</strong></td>
<td>Make sure that National Language Support (NLS) and corresponding locales are installed.</td>
</tr>
<tr>
<td>(NLS)</td>
<td>You can check this as follows:</td>
</tr>
<tr>
<td></td>
<td>• Enter the following command to check which locales are available:</td>
</tr>
<tr>
<td></td>
<td>locale -a</td>
</tr>
<tr>
<td></td>
<td>The following locale must be available: en_US.ISO8859-1</td>
</tr>
<tr>
<td><strong>Oracle Solaris: National Language Support</strong></td>
<td>Make sure that National Language Support (NLS) and corresponding locales are installed.</td>
</tr>
<tr>
<td>(NLS)</td>
<td>Enter the following command to check which locales are available:</td>
</tr>
<tr>
<td></td>
<td>locale -a</td>
</tr>
<tr>
<td></td>
<td>The following locale must be available: en_US.ISO8859-1</td>
</tr>
<tr>
<td><strong>System language</strong></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>
### 3.3.2.4 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 software provisioning manager’s SL-UI:  
  • 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-UI, 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 |
| **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 software provisioning manager only prompts you for this parameter if you use a login shell other than 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

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP-UX: Mount and file system configuration</td>
<td>For recommendations about block size and mount option configuration, see SAP Note <a href="#">1077887</a>.</td>
</tr>
</tbody>
</table>

Shared file systems for decentralized systems

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared file systems for decentralized systems</td>
<td>If application servers are installed decentralized, a &quot;shared&quot; file system must be installed, for example Network File System (NFS).</td>
</tr>
</tbody>
</table>

AIX: C++ Runtime environment

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Values and Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX: C++ Runtime environment</td>
<td>Minimal C++ runtime requirements for the specific SAP Kernel releases are listed in SAP Note <a href="#">1780629</a>.</td>
</tr>
</tbody>
</table>

## 3.4 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 133].
**More Information**

For more information about configuring the user management of your SAP system to be installed, see the SAP Library at:

<table>
<thead>
<tr>
<th>SAP Release and SAP Library Quicklink</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SAP NetWeaver 7.3 including Enhancement Package 1</td>
<td>Application Help ➤ SAP NetWeaver Library: Function-Oriented View ➤ Security ➤ Identity Management ➤ User and Role Administration of Application Server ABAP ➤ Configuration of User and Role Administration ➤ Directory Services ➤ LDAP Connector</td>
</tr>
<tr>
<td>• SAP NetWeaver 7.4</td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver 7.5</td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver Application Server for ABAP 7.51 innovation package</td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver AS for ABAP 7.52</td>
<td></td>
</tr>
</tbody>
</table>

### 3.5 Basic Installation Parameters

The software provisioning manager 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 software provisioning manager 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
    - **SAP systems based on SAP NetWeaver 7.40 and higher**: 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.
You cannot change from Custom to Typical mode or from Typical to Custom mode on the Parameter Summary screen.

- If you want to ASCS Instance with Embedded SAP Web Dispatcher, you must choose Custom. Otherwise, you are not prompted for the SAP Web Dispatcher installation parameters during the Define Parameters phase of the ASCS instance installation.
- If you want to ASCS Instance with Embedded Gateway, 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 software provisioning manager screens.

### Related Information

- SAP System Parameters [page 61]
- SAP System Database Parameters [page 71]
- Additional Parameters when Installing SAP Process Integration 7.5 or SAP Solution Manager 7.2 [page 74]
- Additional Parameters When Using a Stack XML File [page 75]
- Parameters for Additional Components to be Included in the ASCS Instance [page 77]

### 3.5.1 SAP System Parameters

The tables in this section 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 software provisioning manager screens.

#### General Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unicode System</td>
<td>Every new installation of an SAP system is Unicode.</td>
</tr>
<tr>
<td></td>
<td><strong>SAP systems based on SAP NetWeaver 7.5 or higher</strong> are Unicode only.</td>
</tr>
<tr>
<td></td>
<td>If you install an additional application server instance in an existing non-Unicode system (that has been upgraded to the current release), the additional application server instance is installed automatically as a non-Unicode instance. The software provisioning manager checks whether a non-Unicode system exists and chooses the right executables for the system type.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SAP System ID</td>
<td>The SAP system ID (&lt;SAPSID&gt;) identifies the entire SAP system. The software provisioning manager prompts you for the &lt;SAPSID&gt; when you execute the first installation option to install a new SAP system. If there are further installation options to be executed, the software provisioning manager prompts you for the profile directory. For more information, see the description of the parameter SAP System Profile Directory.</td>
</tr>
</tbody>
</table>

**Example**

This prompt appears when you install the AS CS 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 92].</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 software provisioning manager 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 Software Provisioning Manager [page 137].

**End of Platform: HP-UX**
**Virtual Host Name**

Virtual host name (network name) of the SAP\(<SAPSID>\) cluster group

You can assign a virtual host name to an SAP instance in one of the following ways:

- You can assign a virtual host name for the instance to be installed, by specifying it in the `<Instance Name> Host Name` field of the `Instance` screen. Then this instance is installed with this virtual host name.
- Alternatively you can assign virtual host names also by starting the software provisioning manager with the `SAPINST_USE_HOSTNAME` property. For more information, see Running Software Provisioning Manager [page 137].

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 software provisioning manager.

You must have already reserved the virtual host name (network name) and its IP address on a DNS server before you run the software provisioning manager. For more information, see Using Virtual Host Names [page 102].

**Note**

Fully qualified host names, IPv4, IPv6 are not accepted as virtual host names.

---

**SAP Process Integration (PI) 7.5, SAP Solution Manager 7.2:**

If you want to install the primary application server instance of the **different** host from the host of the primary application server instance of the ABAP system, then you must specify the host of the Java primary application server instance during the Define Parameters phase of the primary application server instance installation of the ABAP system.

This is to set up the connection between the ABAP and the Java system.

**SAP System Profile Directory**

If you want to install the primary application server instance of the existing SAP system.

The software provisioning manager retrieves parameters from the SAP system profile directory of an existing SAP system.

SAP profiles are operating system files that contain instance configuration information.

The software provisioning manager 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.

`/usr/sap/<SAPSID>/SYS/profile` is the soft link referring to `/<sapmnt>/<SAPSID>/profile`. 
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Password</td>
<td>Common password for all users that are created during the installation:</td>
</tr>
<tr>
<td></td>
<td>• Operating system users (for example <code>&lt;sapid&gt;adm</code>)</td>
</tr>
<tr>
<td></td>
<td>△ Caution</td>
</tr>
<tr>
<td></td>
<td>If you did not create the operating system users manually before the installation, the software provisioning manager 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.</td>
</tr>
<tr>
<td></td>
<td>• ABAP users: SAP*, DDIC, and EARLYWATCH.</td>
</tr>
<tr>
<td>Secure Store key phrase</td>
<td>• SAP systems based on SAP NetWeaver 7.4 and Higher: For more information, see line Key Phrase for Secure Store Settings and line Individual Encryption Key for the Secure Storage in this table.</td>
</tr>
<tr>
<td></td>
<td>Basic Password policy</td>
</tr>
<tr>
<td></td>
<td>The master password must meet the following requirements:</td>
</tr>
<tr>
<td></td>
<td>• It can be 8 to 30 characters long</td>
</tr>
<tr>
<td></td>
<td>• It must contain at least one letter (a-z, A-Z)</td>
</tr>
<tr>
<td></td>
<td>• It must contain at least one digit (0-9)</td>
</tr>
<tr>
<td></td>
<td>• It must not contain \ (backslash) or &quot; (double quote).</td>
</tr>
<tr>
<td></td>
<td>Additional restrictions depending on SAP HANA database:</td>
</tr>
<tr>
<td></td>
<td>• It must consist of at least one number, one lowercase letter, and one uppercase letter.</td>
</tr>
<tr>
<td></td>
<td>• It can only contain the following characters: _ a-z A-Z 0-9 # @ $ ! and must not start with a number or an underscore (_).</td>
</tr>
<tr>
<td></td>
<td>Depending on the installation option, additional restrictions may apply.</td>
</tr>
<tr>
<td></td>
<td>→ Recommendation</td>
</tr>
<tr>
<td></td>
<td>The Master Password feature can be used as a simple method to obtain customer-specific passwords for all newly created users. A basic security rule is not to have identical passwords for different users. Following this rule, we strongly recommend individualizing the values of these passwords after the installation is complete.</td>
</tr>
<tr>
<td></td>
<td>For more information, see Ensuring User Security [page 184].</td>
</tr>
</tbody>
</table>
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.

SAP systems based on SAP NetWeaver 7.4 and Higher only:

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 Library - depending on the SAP NetWeaver release your SAP system is based on - at:
  - http://help.sap.com/nw74
  - http://help.sap.com/nw75
  - https://help.sap.com/nw71abap
  - https://help.sap.com/nw72abap

- For more information on the secure storage in the database, see the SAP Library - depending on the SAP NetWeaver release your SAP system is based on - at:
  - http://help.sap.com/nw74
  - http://help.sap.com/nw75
  - https://help.sap.com/nw71abap
  - https://help.sap.com/nw72abap


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNS Domain Name for SAP System</td>
<td>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: <code>&lt;Host_Name&gt;..&lt;Domain_Name&gt;</code> 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.</td>
</tr>
<tr>
<td>SAP Host Agent Upgrade (Optional)</td>
<td>If there already exists an SAP Host Agent on the installation host, the software provisioning manager 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&lt;Version&gt;.SAR archive. For more information, see Downloading SAP Kernel Archives (Archive-Based Installation) [page 115]</td>
</tr>
</tbody>
</table>

### Ports

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABAP Message Server Port</td>
<td><strong>Caution</strong> 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. <strong>ABAP Message Server Port</strong> 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. The <strong>external</strong> message server port uses the parameter rdisp/msserv with default value 36&lt;ABAP_Message_Server_Instance_Number&gt;. The <strong>internal</strong> message server port uses the parameter rdisp/msserv_internal with default value 39&lt;ABAP_Message_Server_Instance_Number&gt;. 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(<code>system/secure_communication = ON</code>) if the kernel supports secure connections to the message server. For more information, see SAP Note 2040644.</td>
</tr>
</tbody>
</table>
### Operating System Users

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System Users and Groups</td>
<td>The software provisioning manager processes the operating system users as follows:</td>
</tr>
<tr>
<td></td>
<td>• If the operating system users do not exist, the software provisioning manager creates the following users:</td>
</tr>
<tr>
<td></td>
<td>• The SAP system administrator user <code>&lt;sapid&gt;adm</code></td>
</tr>
<tr>
<td></td>
<td>• Database administrator users</td>
</tr>
<tr>
<td></td>
<td>The software provisioning manager sets the master password for these users by default. You can overwrite and change the passwords either by using the parameter mode Custom or by changing them on the parameter summary screen.</td>
</tr>
<tr>
<td></td>
<td>• If the operating system users already exist, the software provisioning manager prompts you for the existing password, 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 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, it is created automatically as a local group. For security reasons, we recommend removing the operating system users from the group <code>sapinst</code> after the execution of the software provisioning manager has completed.</td>
</tr>
<tr>
<td></td>
<td>During the Define Parameters phase of the software provisioning manager, you can specify that the operating system users are to be removed automatically from the group <code>sapinst</code> after the execution of the software provisioning manager 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 86].</td>
</tr>
<tr>
<td></td>
<td>For more information about the <code>sapinst_instdir</code> directory, see Useful Information about Software Provisioning Manager [page 145].</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User Management Engine Parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Java Administrator User</strong></td>
<td>The software provisioning manager creates this user in the ABAP system.</td>
</tr>
<tr>
<td><strong>i 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>
</tbody>
</table>

**Note:**
- After the installation, this user is available both in the ABAP and in the Java system.
- The software provisioning manager sets the user name `J2EE_ADMIN` and the master password by default.
- If required, you can choose another user name and password according to your requirements.
### Java Guest User

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>i 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>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.</td>
</tr>
<tr>
<td></td>
<td>The software provisioning manager creates this user in the ABAP system.</td>
</tr>
<tr>
<td></td>
<td>After the installation, it is available both in the ABAP and in the Java system.</td>
</tr>
<tr>
<td></td>
<td>The software provisioning manager sets the user name J2EE_GUEST 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>
<tr>
<td></td>
<td>For more information about supported UME data sources and change options, see SAP Note <a href="#">718383</a>.</td>
</tr>
</tbody>
</table>

### Communication User

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>i 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>This user is used for the communication between the ABAP system and the Java system.</td>
</tr>
<tr>
<td></td>
<td>The software provisioning manager creates this user in the ABAP system.</td>
</tr>
<tr>
<td></td>
<td>After the installation, it is available both in the ABAP and in the Java system.</td>
</tr>
<tr>
<td></td>
<td>This user is used for the communication between the ABAP system and the Java system.</td>
</tr>
<tr>
<td></td>
<td>The software provisioning manager sets the user name SAPJSF 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>
<tr>
<td></td>
<td>For more information about supported UME data sources and change options, see SAP Note <a href="#">718383</a>.</td>
</tr>
</tbody>
</table>
System Landscape Directory

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLD Destination for the System</td>
<td>The System Landscape Directory (SLD) registers the systems and the installed software of your entire system landscape. You can choose between the following options:</td>
</tr>
</tbody>
</table>
|                                     | • Register in existing SLD  
  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. |
|                                     | • No SLD destination  
  Choose this option if you do not want to register the SAP system you are installing in an existing SAP System Landscape Directory (SLD). You then have to configure the SLD destination manually after the installation has finished. |
|                                     | For more information, see Performing Post-Installation Steps for the ABAP Application Server [page 178]                                                                                                      |
| SLD Host                            | The host name of the existing SLD.                                                                                                                                                                          |
| SLD HTTP(S) Port                    | HTTP port of the SAP system based on AS Java on which the System Landscape Directory (SLD) resides. The following naming convention applies:  
  5<Primary_Application_Server_Instance_Number>00.                                                                                           |
|                                     | ❖ Example  
  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.                                             |
| SLD Data Supplier User and password| The existing SLD Data Supplier user and password of the existing SLD                                                                                                                                       |
### 3.5.2 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 database instance.</td>
</tr>
<tr>
<td></td>
<td>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 be done on the ABAP host. Otherwise Database installation procedure with Software Provisioning Manager (the “software provisioning manager”) 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>DATABASE_NAME</td>
<td>The <code>&lt;&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></td>
<td>If your database is a single database, then the <code>DATABASE_NAME</code> equals the <code>SYSTEM_ID</code>.</td>
</tr>
<tr>
<td></td>
<td><strong>MCOD only:</strong> If you want to use an existing database system, enter exactly the Database ID of the existing SAP HANA database. For more information, see Installation of Multiple Components in One Database [page 203].</td>
</tr>
</tbody>
</table>
### Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database schema</td>
<td>The ABAP database schema is named SAP&lt;SCHEMA_ID&gt;. Default value: SAPABAP1. You can either accept this default or enter another value according to your needs.</td>
</tr>
<tr>
<td><strong>→ Recommendation</strong></td>
<td>Do <strong>not</strong> choose a value that contains the &lt;SAPSID&gt; of your system. Keep in mind that you cannot change the schema name retrospectively. Therefore, if you change the &lt;SAPSID&gt; by performing a system rename or a system copy, the schema name always remains the same as the original one you assigned during the installation.</td>
</tr>
<tr>
<td>Virtual Host Name</td>
<td>Virtual host name (network name) of the SAP&lt;SAPSID&gt; cluster group&lt;br&gt;You can assign virtual host names to the SAP HANA database instance by starting the software provisioning manager with the SAPINST_USE_HOSTNAME property. For more information, see Running Software Provisioning Manager [page 137].&lt;br&gt;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 software provisioning manager.&lt;br&gt;You must have already reserved the virtual host name (network name) and its IP address on a DNS server before you run the software provisioning manager. For more information, see Using Virtual Host Names [page 102].</td>
</tr>
<tr>
<td><strong>i Note</strong></td>
<td>Fully qualified host names, IPv4, IPv6 are not accepted as virtual host names.</td>
</tr>
<tr>
<td>Parameters</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Configuration of SAP liveCache with SAP HANA</td>
<td>Select <strong>Install SAP liveCache for SAP System</strong> if you want to configure SAP liveCache for your SAP System. You need the SAP liveCache installation only when at least one of your applications uses it.</td>
</tr>
<tr>
<td></td>
<td>• Select <strong>Use SAP liveCache integrated in SAP HANA</strong> if you want your SAP liveCache in the SAP HANA database instance. To configure it, SAP liveCache integrated in SAP HANA (also called LCAPPS- or liveCache Applications plugin) must be pre-installed in an existing HANA database. For more information about how to install LCAPPS, see SAP Note <a href="http://help.sap.com/hana_platform">2979266</a>. For more information about SAP liveCache on SAP HANA requirements, see the SAP HANA Master Guide at: <a href="http://help.sap.com/hana_platform">http://help.sap.com/hana_platform</a>.</td>
</tr>
<tr>
<td></td>
<td>• Select <strong>Use external SAP liveCache based on SAP MaxDB technology</strong> if you want to run SAP liveCache as a separate SAP MaxDB database instance. This is not supported with S/4 HANA installations. For more information about SAP MaxDB liveCache Technology requirements, see the SAP MaxDB liveCache Technology installation guide at: <a href="https://help.sap.com/viewer/swpm10guides">https://help.sap.com/viewer/swpm10guides</a>.</td>
</tr>
<tr>
<td>Database Monitor User</td>
<td>The database monitor user is named <strong>DBACOCKPIT</strong>. This name cannot be changed.</td>
</tr>
<tr>
<td></td>
<td><strong>DBACOCKPIT</strong> is a dedicated database user to monitor and administer the local database.</td>
</tr>
<tr>
<td></td>
<td>For more information, see <a href="https://help.sap.com/docs/SAP_S4HANA_ON-PREMISE">https://help.sap.com/docs/SAP_S4HANA_ON-PREMISE</a> &gt; Installation Option of Software Provisioning Manager 1.0 &gt; Installation Guides &gt; Standalone Engines and Clients &gt; Software Provisioning Manager 1.0 &gt; SAP MaxDB liveCache Technology &gt; DBA Cockpit for SAP HANA: Authorizations &gt;</td>
</tr>
</tbody>
</table>
### 3.5.3 Additional Parameters when Installing SAP Process Integration 7.5 or SAP Solution Manager 7.2

The parameters in this section are only required if you want to install SAP Process Integration 7.5 or SAP Solution Manager 7.2.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>When Using a Stack XML File:</td>
<td>When Installation Using a Stack XML File [page 43], in addition to the requirements listed in using a stack configuration file [page 61], make sure that the SAP system ID (SAPSID) of the ABAP system must be different from the SAPSID of the Java system.</td>
</tr>
<tr>
<td>SAP System ID <code>&lt;SAPSID&gt;</code></td>
<td></td>
</tr>
<tr>
<td>Communication Port for ABAP</td>
<td>For a secure communication of connected SAP systems to the ABAP stack you have to define the HTTPS port that is to be configured in the application server instance profile. Further post-installation steps [page 181] are required to fully enable HTTPS communication. For more information about HTTPS enablement, see SAP Note 510007. In addition you can configure an HTTP port. However, this is not recommended for productive SAP systems due to security reasons.</td>
</tr>
<tr>
<td>Application Server Gateway Communication Setup</td>
<td>If you are about to install an SAP NetWeaver 7.5 Process Integration system and you intend to run automated configuration using the Central Technical Configuration (CTC) Wizard after the installation, it is strongly recommended that you configure the ABAP communication port for ABAP already during the installation process, because you can only run the CTC Wizard if the ABAP port is either completely configured for HTTPS or optionally for HTTP. For more information, see PI: Configuring the Process Integration System After the Installation in Installation of SAP Systems Based on the Application Server Java of SAP NetWeaver 7.5 and SAP Solution Manager 7.2 SR2 Java on UNIX: &lt;Database&gt;.</td>
</tr>
<tr>
<td>If you want to install the primary application server instance of the Java system on a host different from the host of the primary application server instance of the ABAP system, then you must specify the host of the Java primary application server instance during the Define Parameters phase of the primary application server instance installation of the ABAP system. This is to set up the connection between the ABAP and the Java system.</td>
<td></td>
</tr>
</tbody>
</table>
### 3.5.4 Additional Parameters When Using a Stack XML File

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAP Process Integration (PI) 7.5, SAP Solution Manager 7.2:</strong> SAP System ID <code>&lt;SAPSID&gt;</code></td>
<td>In addition to the requirements listed in SAP System Parameters <a href="#">page 61</a> make sure that the SAP system ID (SAPSID) of the ABAP system must be different from the SAPSID of the Java system.</td>
</tr>
<tr>
<td><strong>Transport Domain</strong></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><strong>Directory with Transport Files</strong></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><strong>Location of SPAM/SAINT Update Archive</strong></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>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Decide whether you want to prepare for the Software Update Manager run at</td>
<td>With the Software Update Manager (SUM), you can apply support packages stacks at the end of the installation.</td>
</tr>
</tbody>
</table>
|   the end of the installation                                           | - Do not start SUM automatically  
- 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 `<Update Directory>/SUM/` directory at the end of the installation.                                                                                                                                                                                                 |
| 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: https://support.sap.com/en/tools/software-logistics-tools/software-update-manager.html  |
| 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 ABAP load. From the language media delivered with your product version or - if already provided by the Maintenance Planner for the respective product - using language archives, 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 XML File (Optional) [page 43].

**Related Information**

Installation Using a Stack XML File [page 43]
3.5.5 Parameters for Additional Components to be Included in the ASCS Instance

You only need to specify the following parameters during the ASCS instance installation if you perform an embedded 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 embedded 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>
<tr>
<td>Install an SAP Web Dispatcher embedded 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> 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:</td>
</tr>
<tr>
<td>Message Server Host</td>
<td>The name of the host on which the message server is located (profile parameter <code>rdisp/mshost</code>)</td>
</tr>
<tr>
<td>Message Server HTTP Port</td>
<td>HTTP port of the message server (profile parameter <code>ms/server_port_&lt;xx&gt;</code>)</td>
</tr>
<tr>
<td>Password for the Internet Communication Management (ICM) user</td>
<td>In order to use the web administration interface for the Internet Communication Manager (ICM) and SAP Web Dispatcher, an administration user <code>webadm</code> is created by the software provisioning manager. You have to assign a password for this user.</td>
</tr>
</tbody>
</table>

**Related Information**

- ASCS Instance with Embedded SAP Web Dispatcher [page 38]
- ASCS Instance with Embedded Gateway [page 40]
3.6 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 software provisioning manager creates during the installation of the SAP system by default on the global host.
  The software provisioning manager 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 129].

More Information

- Required File Systems and Directories [page 91]
- See the SAP Library at:

<table>
<thead>
<tr>
<th>Release</th>
<th>SAP Library Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SAP NetWeaver 7.4</td>
<td><a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></td>
</tr>
<tr>
<td>• SAP NetWeaver 7.5</td>
<td><a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></td>
</tr>
<tr>
<td>• SAP NetWeaver AS for ABAP 7.52</td>
<td><a href="https://help.sap.com/nw752abap">https://help.sap.com/nw752abap</a></td>
</tr>
</tbody>
</table>
3.7 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.

The following diagram shows the essential features of a switchover setup:

Switchover Setup with ERS Instance and ASCS Instance in Different Failover Groups (Overview)
The following diagram shows an example of a switchover setup in more detail:

![Switchover Setup Diagram]

**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

4.1 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 29], 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 IMPLEMENT INSTALLATION AND UPGRADE.

The database instance is remotely installed by Software Provisioning Manager (the “software provisioning manager”) from the primary application server host.

However, if you are installing a standard system on Linux, you can install SAP systems based on Application Server ABAP 7.4 or higher on the same host as the SAP HANA database, without applying additional environment settings. For more information, see SAP Systems Based on Application Server ABAP on One Host with SAP HANA Database - High-Availability Setup Based on SAP HANA System [page 211] and SAP Note 1953429.

1. You make sure that the SAP HANA database is installed on the SAP HANA host [page 83].
2. You decide how to set connectivity data for your SAP HANA database [page 85].
3. You check that the required Creating Operating System Users and Groups [page 86] are created.
4. You operating system set up file systems [page 91] 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 set the environment variable SAPINST_USE_HOSTNAME [page 102]. Alternatively you can specify a virtual host name either in the command to start the software provisioning manager or - after the software provisioning manager has started - in the relevant field on the respective instance screen (see Running Software Provisioning Manager [page 137]).
6. If you want to install a high-availability system, you perform switchover preparations [page 103].
7. If you want to share the transport directory T R A N S from another system, export [page 129] this directory to your installation hosts.
8. You install the SAP front-end software [page 103] on the desktop of the user.
9. If required, you configure host names for the SAP HANA database [page 104].
10. To establish a secure connection to your SAP HANA, follow the instructions in Establishing Secure Connection to the SAP HANA Database [page 104].
11. You check that the required installation media [page 107] are available for each installation host.
12. If you decided to use a generic LDAP directory, you have to create a user for LDAP directory access [page 205].
13. You continue with Installation [page 124].

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 86] are created.
2. You set up file systems [page 91] 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 set the environment variable SAPINST_USE_HOSTNAME [page 102].
   Alternatively you can specify a virtual host name either in the command to start the software provisioning manager or - after the software provisioning manager has started - in the relevant field on the respective instance screen (see Running Software Provisioning Manager [page 137]).
4. If you want to share the transport directory from another system, export [page 129] this directory to your installation hosts.
5. You install the SAP front-end software [page 103] on the desktop of the user.
6. You check the time zones of the ABAP application server and the SAP HANA system [page 106].
7. You check that the required installation media [page 107] are available on each installation host.
8. You continue with Installation [page 124].

4.2 Installing the SAP HANA Database

Make sure that the SAP HANA database has been installed before you start the 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 Implement > Installation and Upgrade.

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 the software provisioning manager. The software provisioning manager 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 48].

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 29], you do not need to install the SAP HANA database beforehand, because it is installed automatically during the installation with Software Provisioning Manager. 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 Database Lifecycle Manager (HDBLCM) 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 32], you must install the SAP HANA database using the SAP HANA Database Lifecycle Manager (HDBLCM) 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 SAP HANA Database Lifecycle Manager (HDBLCM) (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.

Related Information

One-Host Systems on Linux only: Downloading the SAP HANA Server Software [page 118]

### 4.3 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:

```
pxl101:cooadm 14> echo $HDB_USE_IDENT

SYSTEM_GTI
```

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

```
pxl101: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 Software Provisioning Manager [page 137].

- If you want to use virtual host names, you must start the software provisioning manager with the SAPINST_USE_HOSTNAME parameter. For more information, see Running Software Provisioning Manager [page 137].

- 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. This functionality is available for SAP HANA as of SAP NetWeaver 7.4.

  To use this method, you start the installation with the parameter HDB_ABAP_SSFS=YES. For more information, see Running Software Provisioning Manager [page 137].

  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.

---

### 4.4 Creating Operating System Users and Groups

During the installation, the software provisioning manager checks all required accounts (users, groups) and services on the local machine. The software provisioning manager 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 software provisioning manager 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 software provisioning manager 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 software provisioning manager 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 software provisioning manager checks the NIS users, groups, and services using NIS commands. However, the software provisioning manager 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 software provisioning manager and choose **Generic Installation Options** <Database> Preparation <Operating System Users and Groups >. For more information, see Running Software Provisioning Manager [page 137].
- 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, Oracle Solaris**: Make sure that you have set the limits listed below for operating system users root, <sapsid>adm, and your database-specific operating system users. **Linux**: Starting with SUSE Linux Enterprise Server 15, Red Hat Enterprise Linux 8, and Oracle Linux 8, and the respective SAP kernel patch levels, native support for the software suite systemd for Linux is available for SAP systems. If you use Linux with systemd, ignore the following procedures for setting limits.
because there’s no need to change the limits. Make sure that polkit is installed. systemd requires polkit for authorization checks for the <sapsid>adm user. For more information about Linux with systemd, see SAP Note 3139184.

If you are still using a Linux version or an SAP kernel patch that is not released for native systemd support with SAP systems (see 3139184), proceed as follows: Make sure that you have set the limits as outlined below 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 <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).

<table>
<thead>
<tr>
<th>Output</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>cputime</td>
<td>unlimited</td>
</tr>
<tr>
<td>filesize</td>
<td>unlimited</td>
</tr>
<tr>
<td>datasize</td>
<td>unlimited</td>
</tr>
<tr>
<td>stacksize</td>
<td>8192 KB</td>
</tr>
<tr>
<td>coredumpsize</td>
<td>unlimited</td>
</tr>
<tr>
<td>descriptors</td>
<td>8192</td>
</tr>
<tr>
<td>memoryuse</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

- 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 (Kbytes)</td>
<td>unlimited</td>
</tr>
<tr>
<td>Output sh</td>
<td>Output ksh</td>
<td>Properties</td>
</tr>
<tr>
<td>----------</td>
<td>------------</td>
<td>-------------</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.
  - If you use local operating system user accounts instead of central user management (for example, NIS), users <sapsid>adm, sapadm, and the database operating system user must have the same password on all hosts.
  - 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 <sapsid>adm is not critical for recursive changes on permissions. When operating system users are created by the software provisioning manager, 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.
- HP-UX: To prevent terminal query errors in the <sapsid>adm environment, comment out the line `eval 'tset -s -O -m ':?hp'` in the /etc/skel/.login script. For more information, see SAP Note 1038842.

End of 'Platform': HP-UX, Linux, Oracle Solaris
Operating System Users and Groups

The software provisioning manager 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 software provisioning manager has completed. For more information, see Ensuring User Security [page 184].

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 61].

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;sapsid&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;sapsid&gt;adm</td>
</tr>
<tr>
<td>sapinst</td>
<td>root, &lt;sapsid&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>

**Note**

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

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

**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>

### 4.5 Required File Systems and Directories

**Note**

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

### Related Information

- SAP Directories [page 92]
- SAP HANA Database Client Directories [page 98]
- Setting Up File Systems for a High-Availability System [page 98]
4.5.1 SAP Directories

Depending on the installation option you have chosen, the software provisioning manager 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 software provisioning manager 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 software provisioning manager 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 98].

The software provisioning manager prompts you only for the <sapmnt> directory during the installation.

The following figures show the directory structure of SAP systems based on SAP NetWeaver 7.5 and the directory structure of SAP systems based on SAP NetWeaver 7.3 EHP1 to 7.4:

- Directory Structure for an ABAP System Based on SAP NetWeaver 7.5:
  In SAP systems based on SAP NetWeaver 7.5 or higher, all application server instances, including the primary application server instance, are named D<Instance_Number>. 
Directory Structure for a SAP System Based on SAP NetWeaver 7.5 or Higher

• **Directory Structure for an ABAP System Based on SAP NetWeaver 7.3 EHP1 to 7.4:**

In SAP systems based on SAP NetWeaver 7.3 EHP1 to 7.4, the primary application server instance is named `DVEBMGS<Instance_Number>`.
Every new installation of an ABAP standalone system is Unicode (directory `uc` – Unicode).

**Physically Shared Directories (SAP System)**

Physically shared directories reside on the global host and are shared by Network File System (NFS). The software provisioning manager 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, which is the global transport directory. `/<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 software provisioning manager creates the following shared subdirectories in `/<sapmnt>/<SAPSID>`, which is the 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 131]):

- 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`  
The `/usr/sap/trans` directory is physically separated from the server directories. This is to ensure that the ability of the server to run is not affected if the `/usr/sap/trans` directory is full.  
If you want to use an existing transport directory, you have to mount it before you install the relevant application server instance. Otherwise, the software provisioning manager 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 129].

**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.</td>
</tr>
<tr>
<td></td>
<td>For production systems, we recommend to use as much free space as available (at least 2 GB), because the space requirement normally grows dynamically.</td>
</tr>
<tr>
<td></td>
<td>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 software provisioning manager 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 software provisioning manager 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 software provisioning manager 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 7.3 EHP1 to 7.4:
    - The directory of the primary application server instance is called `DVEBMGS<Instance_Number>`.
    - The directory of an additional application server instance is called `D<Instance_Number>`.
  - 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>
<tbody>
<tr>
<td>SAP systems based on SAP NetWeaver 7.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EHP1 to 7.4:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>/usr/sap/&lt;SAPSID&gt;/DVEBMGS&lt;Instance Number&gt;</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAP systems based on SAP NetWeaver 7.5 or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>higher:</td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>/usr/sap/&lt;SAPSID&gt;/D&lt;Instance Number&gt;</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>/usr/sap/&lt;SAPSID&gt;/D&lt;Instance Number&gt;</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td><code>/usr/sap/&lt;SAPSID&gt;/ASCS&lt;Instance Number&gt;</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ABAP central services instance (ASCS instance)</td>
<td>Minimum 2 GB</td>
</tr>
</tbody>
</table>

If you install a high-availability system, you must install an ERS instance for the ASCS instance.
### 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`
4.5.2 SAP HANA Database Client Directories

The SAP HANA database client can be installed in one of the following ways:

- As a Local Client Directory:
  Then the filepath is `/usr/sap/<SAPSID>/hdbclient`

- As a Central Client Directory:
  Then the filepath is `$DIR_CT_RUN/hdbclient`. In this case, sapcpe is enabled for the client software.
  When the instance is restarted, the client is updated automatically.

For the space required, see the table *Hardware Requirements* in the *Hardware and Software Requirements Tables* [page 48].

---

**Note**

If you are installing a standard system on Linux, you can install SAP systems based on Application Server ABAP 7.4 or higher 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/hana](https://help.sap.com/hana).}

4.5.3 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 79] and contact your HA partner.
Context

From the perspective of an SAP application, there are the following types of SAP Directories [page 92]:

- **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 92]):

- SYS/sapmnt/<SAPSID>
- <Instance Type> <Instance Number> – where the name is defined by the type of services and the application server number:
  - SAP systems based on SAP NetWeaver 7.5 or higher: D<Instance Number> – which contains data for the primary application server instance or an additional application server instance
  - SAP systems based on SAP NetWeaver 7.3 EHP1 to 7.4: DVEBMGS<Instance Number> – which contains data for the primary application server instance
  - SAP systems based on SAP NetWeaver 7.3 EHP1 to 7.4: D<Instance Number> – which contains data for 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.
Installation of SAP Systems Based on the Application Server ABAP of SAP NetWeaver 7.3 EHP1 to 7.52 on UNIX: SAP HANA Database

Preparation

File Systems and Disks in an HA Setup
4.6 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 32], you need the virtual host name when you install the ASGS instance in a cluster.

Procedure

Assign the required virtual host names to the instance to be installed by specifying them in one of the following ways:

- By starting the software provisioning manager with the SAPINST_USE_HOSTNAME property. For more information, see Running Software Provisioning Manager [page 137].
- Alternatively by specifying virtual host names in the <Instance Name> Host Name field of the <Instance Name> Instance screen.

For more information, see the Virtual Host Name parameter description in SAP System Parameters [page 61] and SAP Note 962955.
4.7 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 102], you must set the software provisioning manager property SAPINST_USE_HOSTNAME to specify the required virtual host name. You can do this in one of the following ways:

- By starting the software provisioning manager with the SAPINST_USE_HOSTNAME property. For more information, see Running Software Provisioning Manager [page 137].
- Alternatively by specifying virtual host names 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 61].

Procedure

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

i Note

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

4.8 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

4.9 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 software provisioning manager 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:


4.10 Establishing Secure Connection to the SAP HANA Database

You can establish a secure connection to the SAP HANA database.

You can accomplish this in one of the following ways:

- Use the software provisioning manager to configure the SAP system instances to use the Transport Layer Secure (TLS)/Secure Sockets Layer (SSL) protocol to secure connections to the SAP HANA database.
- Configuring your SAP HANA database to force all clients to use a secured connection and to validate all client connection.
Prerequisites

For enabling SAP HANA SSL, at least SAP HANA Client 2.0 SPS04 is required. For more information, see SAP Note 2784500.

Applying Self-signed Certificates while Running the Software Provisioning Manager [page 105]
The software provisioning manager can configure the SAP system instances to use the Transport Layer Secure (TLS)/Secure Sockets Layer (SSL) protocol to secure connections of to the SAP HANA database. Self-signed certificates are generated to setup the secure environment for your system using the SAP Cryptographic Library CommonCryptoLib.

Configuring SAP HANA Encryption Parameters [page 106]
Depending on how you have specified parameter sslEnforce, the software provisioning manager will configure the connection of the SAP system instances to the SAP HANA database.

4.10.1 Applying Self-signed Certificates while Running the Software Provisioning Manager

The software provisioning manager can configure the SAP system instances to use the Transport Layer Secure (TLS)/Secure Sockets Layer (SSL) protocol to secure connections of to the SAP HANA database. Self-signed certificates are generated to setup the secure environment for your system using the SAP Cryptographic Library CommonCryptoLib.

Context

If you want to secure your SAP system database connection to the SAP HANA database, TLS/SSL must be configured on both server and client side.

For more information, see section Configuring Clients for Secure Connections in the documentation SAP HANA Client Interface Programming Reference.

Procedure

On the Database for SAP System screen, select checkbox Connect using SSL and enter the required encryption parameters when requested by the software provisioning manager. For more information, see SAP Note 2891130.
4.10.2 Configuring SAP HANA Encryption Parameters

Depending on how you have specified parameter `sslEnforce`, the software provisioning manager will configure the connection of the SAP system instances to the SAP HANA database.

**Context**

Due to enhanced security standards, you can set up your SAP HANA database using parameter `sslEnforce` in a way that SAP system instances are only allowed to access it using secured and encrypted connections.

For more information, see the information about parameter `sslEnforce` in section *Enforced TLS/SSL for Client Connections* in the SAP HANA Security Guide at: https://help.sap.com/viewer/p/SAP_HANAPLATFORM/Security

**Procedure**

1. Start the SAP HANA Database Studio as described in the SAP HANA Administration Guide at: https://help.sap.com/viewer/p/SAP_HANAPLATFORM/Administration
2. If not yet done, add your SAP HANA database system.
3. Log on as user `SYSTEM`.
4. Choose *Configuration*
5. Filter for the `sslEnforce` parameter and change the value according to your requirements.
   Default is `false`.

4.11 Checking Time Zones

Before you start the software provisioning manager, you need to check time zone settings.

**Context**

Before you start the software provisioning manager, 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`.
4.12 Preparing the Installation Media

This section describes how to prepare the installation media.

Installation media are available as follows:

- The software provisioning manager 1.0 archive containing the software provisioning manager software. You always have to download the latest version of the software provisioning manager 1.0 archive. For more information, see Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 113].

- The media containing the software to be installed. These are the following:
  - Kernel media:
    You can make them available in one of the following ways:
    - Make yourself familiar with current SAP Kernel releases and SAP’s Kernel strategy:
      Central SAP Notes
      2083594 - SAP Kernel Versions and SAP Kernel Patch Levels
      3116151 - SP Stack Kernel Schedule Forecast
      1744209 - SAP Kernel 720, 721 and 722: Versions and Kernel Patch Levels
      1969546 - Release Roadmap for Kernel 74x and 75x
      1802333 - Finding information about regressions in the SAP kernel
      194669 - Downloading SAP kernel patches
      2966761 - Overview of SAP Kernel Correction Archives
      2966621 - Overview of Kernel-Related Software Components
      953653 - Rolling Kernel Switch

      The white paper Update Strategy for the Kernel of the Application Server ABAP in On Premise Landscapes provides SAP recommendations on how to patch the SAP kernel.

      - Download the SAP Kernel Archives (SAR files) from the SAP Software Download Center - this is the recommended way. For more information, see Downloading SAP Kernel Archives (Archive-Based Installation) [page 115].

      If you are performing an Installation Using a Stack XML File [page 43], you can directly download the artefacts (SAR archives) as specified in the Maintenance Plan.

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.
• Use the physical installation media as part of the installation package.
  For more information, see Media Required for the Installation - Listed by SAP System Instance [page 108].
• Download the complete kernel media from the SAP Software Download Center.
  For more information, see Downloading Complete Installation Media [page 121].
• RDBMS and export media.
  You can make them available in one of the following ways:
  • Use the physical installation media as part of the installation package.
  • Download the complete kernel media from the SAP Software Download Center.
  For detailed information about how to obtain these media, see Media Required for the Installation - Listed by SAP System Instance [page 108].

Media Required for the Installation - Listed by SAP System Instance [page 108]

This section provides a list of the media required for the installation, listed by SAP system instance to be installed.

4.12.1 Media Required for the Installation - Listed by SAP System Instance

This section provides a list of the media required for the installation, listed by SAP system instance to be installed.

The digital signature of installation media is checked automatically by the software provisioning manager during the Define Parameters phase while the Media Browser screens are processed (see also Running Software Provisioning Manager [page 137]). The software provisioning manager only accepts media whose digital signature has been checked.

For more information about which kernel version to use, see the following information sources::

Central SAP Notes

2083594 - SAP Kernel Versions and SAP Kernel Patch Levels
3116151 - SP Stack Kernel Schedule Forecast
1744209 - SAP Kernel 720, 721 and 722: Versions and Kernel Patch Levels
1969546 - Release Roadmap for Kernel 74x and 75x
1802333 - Finding information about regressions in the SAP kernel
19466 - Downloading SAP kernel patches
2966761 - Overview of SAP Kernel Correction Archives
2966621 - Overview of Kernel-Related Software Components
953653 - Rolling Kernel Switch

The white paper Update Strategy for the Kernel of the Application Server ABAP in On Premise Landscapes provides SAP recommendations on how to patch the SAP kernel.

In addition, check the Product Availability Matrix at: http://support.sap.com/pam.
For more information about release and roadmap information for the SAP Kernel versions, and how this relates to SAP system support packages - including important notes on downward compatibility and release dates - see the central SAP Kernel notes:

Proceed as follows to make the media available:

1. Identify the required media for your installation [page 29] as listed below.

<table>
<thead>
<tr>
<th>SAP Instance Installation</th>
<th>Required Software Packages from Installation Media</th>
</tr>
</thead>
</table>
| ABAP Central services instance (ASCS instance) | - Software Provisioning Manager 1.0 archive  
- UC or NUC Kernel (folder K_<Version>_N or U_<OS>) where U means Unicode and N means non-Unicode. |

**i Note**

Every new installation of an SAP system is Unicode. You can only use the non-Unicode kernel if you perform the system copy for a non-Unicode SAP system that has been upgraded to the current release.

<table>
<thead>
<tr>
<th>Database instance</th>
<th>Required Software Packages from Installation Media</th>
</tr>
</thead>
</table>
|                   | - Software Provisioning Manager 1.0 archive  
- UC or NUC Kernel (folder K_<Version>_N or U_<OS>) where U means Unicode and N means non-Unicode. |

**i Note**

Every new installation of an SAP system is Unicode. You can only use the non-Unicode kernel if you perform the system copy for a non-Unicode SAP system that has been upgraded to the current release.

- Database client software
  For enabling SAP HANA SSL, at least SAP HANA Client 2.0 SPS04 is required. For more information, see SAP Note 2784500.

- **Optional, standard systems on Linux only**: Database software
  If you are installing a standard system on Linux and you want to install an SAP system based on Application Server ABAP 7.4 or higher on the same host as the SAP HANA database, you must make also the SAP HANA database software available on the installation host, as described in One-Host Systems on Linux only: Downloading the SAP HANA Server Software [page 118].

- Installation Export (folders EXP*)

**i Note**

If you want to use SAP liveCache on SAP HANA, you must install the LCAPP package on the database server. For more information, see the SAP MaxDB Administration Guide at https://help.sap.com/maxdb and SAP Note 2979266.
<table>
<thead>
<tr>
<th>SAP Instance Installation</th>
<th>Required Software Packages from Installation Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enqueue Replication Server</td>
<td>• Software Provisioning Manager 1.0 archive</td>
</tr>
<tr>
<td></td>
<td>• UC or NUC Kernel (folder K_&lt;Version&gt;<em>&lt;N or U&gt;</em>&lt;OS&gt;) where U means Unicode and N means non-Unicode.</td>
</tr>
<tr>
<td></td>
<td><strong>i Note</strong></td>
</tr>
<tr>
<td></td>
<td>Every new installation of an SAP system is Unicode. You can only use the non-Unicode kernel if you perform the system copy for a non-Unicode SAP system that has been upgraded to the current release.</td>
</tr>
<tr>
<td>Primary application server instance</td>
<td>• Software Provisioning Manager 1.0 archive</td>
</tr>
<tr>
<td></td>
<td>• UC or NUC Kernel (folder K_&lt;Version&gt;<em>&lt;N or U&gt;</em>&lt;OS&gt;) where U means Unicode and N means non-Unicode.</td>
</tr>
<tr>
<td></td>
<td><strong>i Note</strong></td>
</tr>
<tr>
<td></td>
<td>Every new installation of an SAP system is Unicode. You can only use the non-Unicode kernel if you perform the system copy for a non-Unicode SAP system that has been upgraded to the current release.</td>
</tr>
<tr>
<td></td>
<td>• Installation Export (folders EXP*)</td>
</tr>
<tr>
<td></td>
<td>• SAP SCM only: SAP MaxDB liveCache</td>
</tr>
<tr>
<td></td>
<td><strong>i Note</strong></td>
</tr>
<tr>
<td></td>
<td>If you want to use SAP liveCache on SAP HANA, you must install the LCAPPS package on the database server. For more information, see the SAP MaxDB Administration Guide at <a href="https://help.sap.com/maxdb">https://help.sap.com/maxdb</a> and SAP Note 2979266.</td>
</tr>
<tr>
<td></td>
<td>• Database Client Software</td>
</tr>
</tbody>
</table>
### SAP Instance Installation

<table>
<thead>
<tr>
<th>Additional application server instance</th>
<th>Required Software Packages from Installation Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Software Provisioning Manager 1.0 archive</td>
<td></td>
</tr>
<tr>
<td>• UC or NUC Kernel (folder K_&lt;Version&gt;<em>&lt;N or U&gt;</em>&lt;OS&gt;) where U means Unicode and N means non-Unicode.</td>
<td></td>
</tr>
</tbody>
</table>

**Note**

If you install an additional application server instance in an existing non-Unicode system, the additional application server instance is created automatically as a non-Unicode instance. The software provisioning manager checks whether a non-Unicode system exists and chooses the right executables for the system type.

- **SAP SCM only:** SAP MaxDB liveCache

**Note**

If you want to use SAP liveCache on SAP HANA, you must install the LCAPPS package on the database server. For more information, see the SAP MaxDB Administration Guide at [https://help.sap.com/maxdb](https://help.sap.com/maxdb)

- Database Client Software

### SAP Host Agent (Separate Installation Only)

<table>
<thead>
<tr>
<th>SAP Instance Installation</th>
<th>Required Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP Host Agent (separate installation only)</td>
<td>• Software provisioning manager 1.0 archive</td>
</tr>
<tr>
<td></td>
<td>• UC Kernel (folder K_&lt;Version&gt;<em>U</em>&lt;OS&gt;) where U means Unicode.</td>
</tr>
</tbody>
</table>

2. Make the installation media available on each installation host as follows:

1. Download and unpack the latest version of Software Provisioning Manager as described in [Downloading and Extracting the Software Provisioning Manager 1.0 Archive](page 113).

2. Use the SAP HANA database client revision matching your HANA database. You can find the correct database client here:
   
   From here download and extract the correct file IMDB_CLIENT100_*_.SAR.

**Note**

If you are unable to download the SAP HANA database client revision matching your HANA database from SAP Service Marketplace or if the version there is no more recent than that on the installation medium, you can use the version of the database client from the installation medium.

3. Make the kernel media available.

   You can do this in one of the following ways:
   - Download the dedicated kernel archives - this is the recommended way.
For more information, see Downloading SAP Kernel Archives (Archive-Based Installation) [page 115].

**Note**

If you are using a Stack XML file (see Installation Using a Stack XML File [page 43]), you have the installation media defined when generating the Landscape Plan. The media link provided in the Landscape Plan guides you to the location in the SAP Software Download Center at https://launchpad.support.sap.com/#/softwarecenter where you can download the installation media required for your SAP product, operating system and database.

Using the software provisioning manager, you can also directly download the artefacts (SAR archives) as specified in the Maintenance Plan. For more information, see Downloading Software Packages for a Maintenance Planner Transaction [page 119].

- Use the physical kernel medium from the installation package.
  You can do this in one of the following ways:
  - Copy the required media folders directly to the installation hosts.
  - Mount the media on a central media server that can be accessed from the installation hosts.

**Caution**

If you copy the media to disk, make sure that the paths to the destination location of the copied media do not contain any blanks.

- Download the kernel medium from the Software Download Center.
  For more information, see Downloading Complete Installation Media [page 121].

**Note**

Even if you use the complete kernel media, the software provisioning manager 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 at the end of this section.

For example: The software provisioning manager 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 have to download the required PL from https://launchpad.support.sap.com/#/softwarecenter following the instructions in Downloading SAP Kernel Archives (Archive-Based Installation) [page 115].

**Note**

If you perform an additional application server installation, kernel archives - such as `SAPEXE<Version>.SAR`, `SAPEXEDB<Version>.SAR`, `IGSEXEB<Version>.SAR`, `igshelper<version>.sar` - are only prompted if they cannot be retrieved from the primary application server instance or the ASCS instance of the existing SAP system.

4. Make the RDBMS and export media available.
   You can do this in one of the following ways:
   - Copy the required media folders directly to the installation hosts.
   - Mount the media on a central media server that can be accessed from the installation hosts.
3. If you want to perform target system installation in the context of a heterogeneous system copy you need a migration key. You can generate it at https://support.sap.com/migrationkey.

Related Information

Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 113]
Downloading SAP Kernel Archives (Archive-Based Installation) [page 115]
Downloading Software Packages for a Maintenance Planner Transaction [page 119]
Downloading Complete Installation Media [page 121]

4.12.1.1 Downloading and Extracting the Software Provisioning Manager 1.0 Archive

You must always download and extract the software provisioning manager 1.0 archive from the SAP Software Download Center because you must use the latest version.

Prerequisites

• Make sure that you are logged on as a user with root authorizations, and that the download directory has at least the permissions 755.
• Make sure that you use the latest version of the SAPCAR tool when manually extracting the software provisioning manager archive. You need 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.

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

Proceed as follows to get the latest version of the SAPCAR tool:
1. Go to https://launchpad.support.sap.com/#/softwarecenter SUPPORT PACKAGES & PATCHES By Category SAP TECHNOLOGY COMPONENTS SAPCAR.
2. Select the SAPCAR for your operating system and download it to an empty directory.
3. Even if you have the latest SAPCAR already available, we strongly recommend that you verify its digital signature anyway, unless you downloaded it directly from https://launchpad.support.sap.com/#/
softwarecenter/ yourself. You can do this by verifying the checksum of the downloaded SAPCAR tool:

1. Depending on what operating system you are using, compute a hash of the downloaded SAPCAR tool, using the SHA-256 algorithm used by SAP.
2. Now verify the digital signature of the downloaded SAPCAR tool by comparing the hash with the checksum (generated by SAP using the SHA-256 algorithm) from the Content Info button in the Related Info column on the right-hand side of the place where you downloaded the SAPCAR tool.
3. To improve usability, we recommend that you rename the executable to sapcar.

For more information about SAPCAR, see SAP Note 212876/.

Context

An up-to-date version of the load tools - such as R3load, R3szchk, R3ldctl, SAPuptool - which were available so far only in the SAPEXEDB_<...>.SAR archive of the kernel media, has now been made available in the software provisioning manager archive (software provisioning manager10SP<Support Package Number>_<Version Number>.SAR), in a sub-archive named LOADTOOLS.SAR, located in the COMMON/LOADTOOLS folder. For an installation using kernel version 7.40 or higher, the load tools from the software provisioning manager10SP<Support Package Number>_<Version Number>.SAR are used automatically instead of the loadtools available in the SAPEXEDB_<...>.SAR archive of the kernel media. There is no action required from your side, the software provisioning manager uses the relevant loadtools automatically once you run it from the extracted software provisioning manager10SP<Support Package Number>_<Version Number>.SAR archive. For more information, see SAP Note 2472835/.

Procedure

1. Download the latest version of the Software Provisioning Manager 1.0 archive SWPM10SP<Support Package Number>_<Version Number>.SAR from:

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

2. Using the latest version of SAPCAR, you can verify the digital signature of the downloaded SWPM10SP<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_<4..>sar -R <target directory>
      4. Download the Certificate Revocation List from https://tcs.mysap.com/crl/crlbag.p7s and move it to the same directory.
b. Verify the digital signature of the downloaded 
SWPM10SP<Support_Package_Number>_<Version_Number>.SAR archive by executing the following command:

```bash
 PATH_TO_SAPCAR = /<Path to SAPCAR>
 CRL_FILE = file name of revocation list

PATH_TO_SAPCAR/SAPCAR -tvVf <Path to Download Directory>/
SWPM10SP<Support_Package_Number>_<Version_Number>.SAR -crl CRL_FILE
```

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

```bash
 PATH_TO_SAPCAR = /<Path to SAPCAR>
 SOURCE_DIR = <Path to Download Directory>/
 TARGET_DIR = <Path to Unpack Directory>

PATH_TO_SAPCAR/sapcar -xvf SOURCE_DIR/
SWPM10SP<Support_Package_Number>_<Version_Number>.SAR -R TARGET_DIR
```

- **Note**
  - Check SAP Notes 2178665 and 1680045 whether additional information is available.

- **Caution**
  - Make sure that all users have at least read permissions for the directory to which you unpack the Software Provisioning Manager archive.

  - 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.

### 4.12.1.2 Downloading SAP Kernel Archives (Archive-Based Installation)

Instead of downloading the complete SAP kernel media, we recommend that you download the SAP kernel archives specifically required for your installation option. During the installation, you can either specify the path to each archive separately, or provide the path to a download basket with all downloaded archives.

- **Note**
  - If you are performing an installation using a Stack XML file, you can use the service Downloading Software Packages for a Maintenance Planner Transaction [page 119].

**Context**

The digital signature of installation archives is checked automatically by the software provisioning manager [page 137] during the Define Parameters phase while processing the Software Package Browser screens. The software provisioning manager only accepts archives whose digital signature has been checked. After scanning the archives and verifying the digital 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.

**Procedure**

1. Download and unpack the latest version of software provisioning manager as described in Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 113].
2. Make yourself familiar with current SAP Kernel releases and SAP’s Kernel strategy:

   Central SAP Notes

   - 2083594 - SAP Kernel Versions and SAP Kernel Patch Levels
   - 3116151 - SP Stack Kernel Schedule Forecast
   - 1744209 - SAP Kernel 720, 721 and 722: Versions and Kernel Patch Levels
   - 1969546 - Release Roadmap for Kernel 74x and 75x
   - 1802333 - Finding information about regressions in the SAP kernel
   - 19466 - Downloading SAP kernel patches
   - 2966761 - Overview of SAP Kernel Correction Archives
   - 2966621 - Overview of Kernel-Related Software Components
   - 953653 - Rolling Kernel Switch

   The white paper Update Strategy for the Kernel of the Application Server ABAP in On Premise Landscapes provides SAP recommendations on how to patch the SAP kernel.

3. To get all downloadable software component archives required for your SAP product, go to https://launchpad.support.sap.com/#/softwarecenter:

   SUPPORT PACKAGES & PATCHES
   By Category

   You can also search for dedicated software component archives by choosing:

   SUPPORT PACKAGES & PATCHES  By Downloads  Search

4. Choose the required software component, release, and technical stack:

   - 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

   - If you want to install SAP BW/4HANA [Release], choose:
     SAP NetWeaver and complementary products
     SAP BW/4HANA
     SAP BW/4HANA [Release]
     SAP BW/4HANA SERVER

   - If you want to install SAP NetWeaver AS for ABAP 7.52, choose:
     SAP NetWeaver and complementary products
     NW AS ABAP INNOVATION PKG
     NW AS ABAP 7.52
• If you want to install SAP NetWeaver AS for ABAP 7.51 innovation package, choose SAP NetWeaver and complementary products NW AS ABAP INNOVATION PKG NW AS ABAP 7.51 INNOVATION PKG

• If you want to install AS ABAP FOR OOEM, choose SAP NetWeaver and complementary products SAP NETWEAVER ABAP FOR OOEM

• If you want to install the ABAP part of an SAP Process Integration 7.5 system, choose SAP NetWeaver and complementary products SAP NetWeaver <Release> Application Server ABAP

• If you want to install an SAP NetWeaver ABAP system, choose SAP NetWeaver <Release> [For releases lower than 7.5: Entry by Component] Application Server ABAP

• If you want to install an SAP Business Suite system based on SAP NetWeaver, choose SAP Application Components <SAP CRM | SAP ERP | SAP SCM | SAP SRM> <Release> Entry by Component <ABAP Product Instance>

5. Choose the required package:

**i Note**

If you perform an additional application server installation, kernel archives - such as SAPEXE<Version>.SAR, SAPEXEDB<Version>.SAR, IGSEXE<Version>.SAR, igshelper<version>.sar - are only prompted if they cannot be retrieved from the primary application server instance or the ASCS instance of the existing SAP system.

**Caution**

• Make sure that you always use the highest available patch level unless special patch levels are specified for the relevant package in SAP Note 1680045.

• 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 64-BIT UNICODE, then SAPEXEDB<Version>.SAR must also be of version 64-BIT UNICODE.

• 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>

• igsexe<Version>.sar
  SAP IGS <Version> <Operating System>
  You require the igshelper<Version>.sar.
  Choose SAP IGS HELPER # OS independent

• SAPHOSTAGENT<Version>.SAR
**SAP HOST AGENT 7.22** <Operating System>

→ Recommendation
It is highly recommended that you always choose the highest SP version of the SAPHOSTAGENT<SP-version>.SAR archive.

**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. If you want to install an SAP system based on SAP NetWeaver 7.3 EHP1 - that is you have to use SAP kernel 7.22 - download the latest patch level of SAPCRYPTOLIB<Version>.SAR from the following path:

   https://launchpad.support.sap.com/#/softwarecenter Support Packages and Patches By Category Additional Components SAPCRYPTOLIB COMMONCRYPTOLIB<Version> <Operating System>

7. Make the RDBMS and the export media available - either by using physical media as described in Media Required for the Installation - Listed by SAP System Instance [page 108] or by downloading them as described in Downloading Complete Installation Media [page 121].

Related Information

Downloading Software Packages for a Maintenance Planner Transaction [page 119]

**4.12.1.3 One-Host Systems on Linux only: Downloading the SAP HANA Server Software**

If you want to install your SAP system on the same host as the SAP HANA database, you must provide the SAP HANA server software on this host.

Procedure

1. Download the most recent version of the SAP HANA software from the SAP Software Download Center to a single download directory on the local host:

The software is available as a multispansning archive in file format rar.

2. See SAP Note 886535 for more information on how to unpack multispansning archives.
3. Copy or mount the media to make them available on the target host.

### 4.12.1.4 Downloading Software Packages for a Maintenance Planner Transaction

The software provisioning manager is now enabled to download all software packages that have been defined in a Maintenance Planner Transaction.

**i 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 XML 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 software provisioning manager as described in Running Software Provisioning Manager [page 137].
3. On the Welcome screen, choose_Generic Options > Download Software Packages for Maintenance Planner Transaction_.
4. Follow the instructions on the software provisioning manager screens.

The software provisioning manager 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 XML 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 software provisioning manager using a Stack XML file, the Maintenance Planner Transaction ID is only displayed.

• Your S-User ID 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 XML 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 XML 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 software provisioning manager 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 the software provisioning manager - corresponding to the archives listed in section Downloading SAP Kernel Archives (Archive-Based Installation) [page 115] - and for applying the required kernel and support packages using Software Update Manager (SUM) after the installation has completed.

SAP BW/4HANA 1.0 SR1 only: RDBMS and export media are not covered by this feature. You have to provide them either as physical media or download them from the SAP Software Center as described in Downloading Complete Installation Media [page 121].

4.12.1.5 Downloading Complete Installation Media

This section describes how you can download complete media from the SAP Software Download Center.

Procedure

1. Download and unpack the latest version of Software Provisioning Manager as described in Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 113].
2. Create a download directory on the host where you want to run the software provisioning manager.
3. You identify the required media as listed in Media Required for the Installation - Listed by SAP System Instance [page 108].
4. Identify all download objects that belong to one medium according to one of the following:

   • **Note**
     Installation media might be split into several files. In this case, you have to reassemble the required files after the download.

   • **Download path or location:**
     • To download the complete kernel media, go to https://launchpad.support.sap.com/#/softwarecenter/SUPPORT PACKAGES & PATCHES By Category ADDITIONAL COMPONENTS SAP KERNEL SAP KERNEL 64-BIT UNICODE SAP KERNEL <Version> 64-BIT UNICODE <Select your OS>.
     - Select #DATABASE INDEPENDENT to download the database-independent parts of the kernel.
     - Select <Your DB> to download the database-independent parts of the kernel.
You can only download complete kernel media for kernel release 7.22, which can only be used for provisioning of SAP products based on SAP NetWeaver 7.3 EHP1. For all remaining SAP products, you have to download kernel media from https://launchpad.support.sap.com/#/softwarecenter as described in Downloading SAP Kernel Archives (Archive-Based Installation) [page 115].

To download the remaining media required for your SAP product, you can use one of the following navigation paths:

- https://launchpad.support.sap.com/#/softwarecenter
  - INSTALLATIONS & UPGRADES
    - By Category
      - SAP NETWEAVER AND COMPLEMENTARY PRODUCTS
      - <Product>
    - <Product Release>

- https://launchpad.support.sap.com/#/softwarecenter
  - INSTALLATIONS & UPGRADES
    - By Alphabetical Index (A-Z)
      - <First Letter of Product>
      - <Product>
      - <Product Release>

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

<Kernelpart>_<Sequence Number>-<Material Number>

Example

SAPEXEDB_1110-80002623.SAR
Kernel Part II (753) (*)
SAPEXEDB_1111-80002623.SAR
Kernel Part II (753) (*)
SAPEXEDB_1112-80002623.SAR
Kernel Part II (753) (*)

Example

SAPEXE_1110-80002623.SAR
Kernel Part I (753) (*)
SAPEXE_1111-80002623.SAR
Kernel Part I (753) (*)
SAPEXE_1112-80002623.SAR
Kernel Part I (753) (*)

Title
All objects that are part of an installation medium have the same title, such as

<Solution><Media_Name><OS> or <Database>RDBMS<OS> for database media.

5. Download the objects to the download directory.
6. 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.

⚠️ **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.
5 Installation

5.1 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.

**i 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 Implement Installation and Upgrade. The contents of the database instance are remotely installed by the software provisioning manager from the primary application server host.

However, if you are installing a standard system on Linux, you can install SAP systems based on Application Server ABAP 7.4 or higher on the same host as the SAP HANA database, without applying additional environment settings. For more information, see SAP Systems Based on Application Server ABAP on One Host with SAP HANA Database - High-Availability Setup Based on SAP HANA System [page 211] and SAP Note 1953429.

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 133] and run the software provisioning manager [page 137] 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 159].
Distributed System

1. If you want to share the transport directory `trans` from another system, you have to mount [page 129] 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 133] and run the software provisioning manager [page 137] to install the ABAP central services instance (ASCS instance).

   **Note**
   
   If you want to install an ASCS instance with embedded SAP Web Dispatcher [page 38] or with embedded SAP Gateway [page 40] 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 131] 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 131] in `<sapmnt>/<SAPSID>` that you exported from the SAP global host.

   2. You check the prerequisites [page 133] and run the software provisioning manager [page 137] 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 129] this directory.

4. You continue with **Post-Installation** [page 159].

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

### High-Availability System

#### i Note

The following procedure is only an example. In this example, we use only one primary cluster node, host A, and one standby cluster node, host B. However, for your production system, we recommend that you have more than one standby node.

1. You make sure that you have already prepared the standby node, host B. 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 103] and *Setting Up File Systems for a High Availability System* [page 98].

2. If you want to share the transport directory `trans` from another system, you have to mount [page 129] 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).

3. You set up the switchover cluster infrastructure as follows:
   1. You check the prerequisites [page 133] and Running Software Provisioning Manager [page 137] to install the ABAP central services instance (ASCS instance) on the primary cluster node. Use a virtual host name host A [page 102].

#### i Note

If you want to install an ASCS instance with embedded SAP Web Dispatcher [page 38] or with embedded SAP Gateway [page 40] 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 host check the prerequisites [page 133] and run the software provisioning manager [page 137] to install the ERS instance for the ASCS instance on the primary cluster node, host A. Use a virtual host name [page 102].

3. You export global directories [page 131] in <sapmnt>/<SAPSID> to the database host and to the primary application server instance host.

4. You prepare the standby cluster node, host B, making sure that it meets the hardware and software requirements [page 46] and it has all the necessary file systems [page 98], mount points, and (if required) Network File System (NFS).

5. You set up the user environment on the standby node, host B:
   • You use the same user and group IDs, and OS specific files (such as etc/services) as on the primary node.
   • You create the home directories of users and copy all files from the home directory of the primary node.

   For more information about the required operating system users and groups, see Creating Operating System Users [page 86].

6. You configure the switchover software and test that switchover functions correctly to all standby nodes in the cluster.

7. You repeat the following steps until you have finished installing the ERS instance on all nodes in the cluster:
   1. You perform the switchover to a node where you want to install the ERS instance for the ASCS instance.
   2. You check the prerequisites [page 133] and run the software provisioning manager [page 137] to install the ERS instance for the ASCS instance on the standby node, host B.

4. We recommend you to install additional application server (AS) instances to create redundancy. The AS instances are not a SPOF. Therefore, do not include these instances in the cluster.

5. You continue with Post-Installation [page 159].

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

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 131] in `<sapmnt>/<SAPSID>` that you exported from the SAP system host.
   2. You check the prerequisites [page 133] and run the software provisioning manager [page 137] to install the additional application server instance.
3. You continue with Post-Installation [page 159].

### 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 129] 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 131] in `<sapmnt>/<SAPSID>` that you exported from the SAP global host.
   2. You **check the prerequisites** [page 133] and **run the software provisioning manager** [page 137] to install the additional application server instance.
   3. If you want to use the shared transport directory `trans` from another system, also **mount** [page 129] this directory.
4. You continue with **Post-Installation** [page 159].

**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 129] 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 131] in `<sapmnt>/<SAPSID>` that you exported from the SAP global host.
   2. You **check the prerequisites** [page 133] and **run the software provisioning manager** [page 137] 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 129] this directory.
4. You continue with **Post-Installation** [page 159].

**5.2 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 Library at:

<table>
<thead>
<tr>
<th>Release</th>
<th>SAP Library Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SAP NetWeaver 7.3 including Enhancement Package 1</td>
<td>[Application Help &gt; Function-Oriented View &gt; Application Server &gt; Application Server ABAP &gt; Administration of Application Server ABAP &gt; Change and Transport System &gt; Change and Transport System - Overview &gt; Basics of the Change and Transport System &gt; Transport Management System - Concept]</td>
</tr>
<tr>
<td>• SAP NetWeaver 7.4</td>
<td><a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></td>
</tr>
<tr>
<td>• SAP NetWeaver 7.5</td>
<td><a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></td>
</tr>
<tr>
<td>• SAP NetWeaver Application Server for ABAP 7.51 innovation package</td>
<td><a href="https://help.sap.com/nw751abap">https://help.sap.com/nw751abap</a></td>
</tr>
<tr>
<td>• SAP NetWeaver AS for ABAP 7.52</td>
<td><a href="http://help.sap.com/nw752abap">http://help.sap.com/nw752abap</a></td>
</tr>
</tbody>
</table>

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**

   i **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.
5.3 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:
• **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 211].

**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>/exe
<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>/exe
<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.

---

**Related Information**

- Exporting and Mounting Directories via NFS for Linux [page 209]
- Exporting and Mounting Directories via NFS for AIX [page 207]
- Exporting and Mounting Directories via NFS for Oracle Solaris [page 209]
- Exporting and Mounting Directories via NFS for HP-UX [page 208]
5.4 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 59].

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 183].

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 183].

5.5 Prerequisites for Running Software Provisioning Manager

Make sure you fulfil the following prerequisites before running the software provisioning manager.

• For the SL-UI, 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-UI:
    • 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-UI 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-UI.

⚠️ Caution

The software provisioning manager uses a self-signed certificate, which is used temporarily only while the software provisioning manager is running. This certificate is not trusted by the browser unless it is imported manually by the user running the software provisioning manager. This behavior is intentionally designed in this way because - unlike ordinary public web servers - the software provisioning manager has different usage patterns. You must configure your browser to trust the self-issued certificate of the software provisioning manager after carefully performing the "thumbprint" verification described in Running Software Provisioning Manager [page 137]. For more information about adding trusted certificates, see the documentation of your browser.

For more information about the SL-UI, see Useful Information about Software Provisioning Manager [page 145].

• 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 software provisioning manager. While running the software provisioning manager, this setting is then also added to the environment of the `<sapsid>adm` user.

ℹ️ 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.

• The software provisioning manager uses shell scripts to obtain the environment for user `<sapsid>adm`.
  • If user `<sapsid>adm` does not yet exist, a working `/bin/csh` must be available on the host where you run the software provisioning manager. For more information about recommended login shells, see SAP Note 202227.
  • If `<sapsid>` already exists and uses `csh`, before you start the software provisioning manager, execute the following command as user `<sapsid>` to make sure that the `csh` scripts are up-to-date, depending on your UNIX OS platform:
    ```bash
    /bin/csh -c "source /home/<sapsid>/cshrc;env" or /bin/csh -c "source /home/<sapsid>/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 700 MB of free space in the installation directory for each installation option. In addition, you need 700 MB free space for the software provisioning manager executables. If you cannot provide 700 MB free space in the temporary directory, you can set one of the environment variables `TEMP`, `TMP`, or `TMPDIR` to another directory with 700 MB free space for the software provisioning manager 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 Software Provisioning Manager [page 145].
Some tools such as jsplitter may create files while the software provisioning manager is running. The required free space in the /tmp directory depends on the amount of databases which you intend to unload.

- Make sure that umask is set to 022 for the user with root permissions that you want to use for running the software provisioning manager.
  
  As the user with root permissions that you want to use for running the software provisioning manager, 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
  
  **Linux:** On Linux, starting with SLES 15, RHEL 8 and Oracle Linux 8, and respective recent SAP kernel patch levels, there is native integration into systemd. In this case, limits for operating system users root, <sapsid>adm, and your database-specific operating system users do not need to be set any longer. Make sure that polkit is installed. systemd requires polkit for authorization checks for the <sapsid>adm user. For older Linux versions and SAP kernel patch levels, however, you must still set these limits. For more information about how to proceed for older Linux versions, see the following instructions. For more information about Linux with systemd and the relevant SAP kernel patch levels, see SAP Note 3139184.

  **HP-UX, Oracle-Solaris, Linux (versions lower than SLES 15, RHEL 8 and Oracle Linux 8 or lower SAP kernel patch levels):** 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 [page 86] and Running Software Provisioning Manager [page 137]).

**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:

  The following table lists example output taken from SUSE Linux Enterprise Server 15 (x86_64).

<table>
<thead>
<tr>
<th>Output</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>cputime</td>
<td>unlimited</td>
</tr>
<tr>
<td>filesize</td>
<td>unlimited</td>
</tr>
<tr>
<td>datasize</td>
<td>unlimited</td>
</tr>
<tr>
<td>stacksize</td>
<td>8192 KB</td>
</tr>
<tr>
<td>coredumpsize</td>
<td>unlimited</td>
</tr>
</tbody>
</table>
• Using `sh` or `ksh` shell, the output of command `ulimit -a` needs to be at least as follows:

<table>
<thead>
<tr>
<th>Property</th>
<th>sh</th>
<th>ksh</th>
</tr>
</thead>
<tbody>
<tr>
<td>cpu time (seconds)</td>
<td>unlimited</td>
<td>unlimited</td>
</tr>
<tr>
<td>file size (blocks)</td>
<td>unlimited</td>
<td>unlimited</td>
</tr>
<tr>
<td>data seg size (kbytes)</td>
<td>unlimited</td>
<td>unlimited</td>
</tr>
<tr>
<td>stack size (kbytes)</td>
<td>8192 KB</td>
<td>unlimited</td>
</tr>
<tr>
<td>core file size (blocks)</td>
<td>unlimited</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>unlimited</td>
<td>unlimited</td>
</tr>
</tbody>
</table>

**Example**

The following table lists example output taken from SUSE Linux Enterprise Server 15 (x86_64).

**Example**


**Example**

Port 4237 is used by default as HTTPS port for communication between the software provisioning manager and the SL-UI.
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 software provisioning manager 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 System Provisioning Using an Input Parameter File [page 147] which describes an improved procedure using `inifile.params`.

### 5.6 Running Software Provisioning Manager

This section describes how to run the software provisioning manager.

#### Prerequisites

For more information, see Prerequisites for Running Software Provisioning Manager [page 133].

#### Context

The software provisioning manager has a web browser-based GUI named “SL-UI of the software provisioning manager” - “SL-UI” for short.

This procedure describes an installation where you run the software provisioning manager and use the SL-UI, that is you can control the processing of the software provisioning manager from a browser running on any device.

For more information about the SL-UI, see Useful Information about Software Provisioning Manager [page 145].

#### 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 software provisioning manager has not set any environment variables for a different SAP system or database.
If your security policy requires that the person running the software provisioning manager 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 media available.

For more information, see Preparing the Installation Media [page 107].

Even if you use the complete SAP kernel media, the software provisioning manager 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.

Recommendation

Make the installation media available locally. For example: The software provisioning manager might require a certain PL. For example, if you use Network File System (NFS), reading from media mounted with NFS might fail.

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

Only valid for 'Platform': Oracle Solaris

End of 'Platform': Oracle Solaris

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

   `<Path_To_Unpack_Directory>/sapinst`

   Note

   If you are using a Stack XML file (see Installation Using a Stack XML File [page 43]), you must call the sapinst executable with command line parameter SAPINST_STACK_XML=<Absolute_Path_To_Stack_XML_File>:

   `/<Path_To_Unpack_Directory>/sapinst
    SAPINST_STACK_XML=<Absolute_Path_To_Stack_XML_File>`

   Note

   If you need to assign virtual host names to the instance to be installed, and it is not possible to do this (for example, for database instances) by specifying it as an input parameter on the `<Instance Name>`
Instance screen, you can assign a virtual host name by starting the software provisioning manager with the `SAPINST_USE_HOSTNAME` property:

```
<Path_To_Unpack_Directory>/sapinst SAPINST_USE_HOSTNAME=<Virtual_Host_Name>
```

For more information, see Virtual Host Name in SAP System Parameters [page 61].

**i 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 software provisioning manager 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) – only available for SAP NetWeaver 7.4 and higher:
  ```
  /<Path_To_Unpack_Directory>/sapinst HDB_ABAP_SSFS=YES
  ```

For more information, see Setting Connectivity Data for the SAP HANA Database [page 85].

**i Note**

If you are running a system copy with parallel export/import using the Migration Monitor and started the export with command line option `SUPPORT_DECLUSTERING=false`, you must start the software provisioning manager for the installation of the target database instance with command line option `SUPPORT_DECLUSTERING=true` for the import during the target system installation.

For more information, see the system copy guides for Product Release “SAP NetWeaver 7.X-based” at https://help.sap.com/viewer/swpm10guides System Copy Option of Software Provisioning Manager 1.0 System Copy Guides - Software Provisioning Manager 1.0 or http://support.sap.com/sltoolset System Provisioning System Provisioning Scenarios Copy a System using Software Provisioning Manager System Copy Guides - Software Provisioning Manager 1.0

4. The software provisioning manager now starts and waits for the connection with the SL-UI.

You can find the URL you require to access the SL-UI at the bottom of the shell from which you are running the software provisioning manager.

```
... 
Open your browser and paste the following URL address to access the GUI

https://<hostname>:4237/sapinst/docs/index.html

Logon users: [users]

... 
```

**i Note**

If the host specified by `<hostname>` cannot be reached due to a special network configuration, proceed as follows:
1. Terminate the software provisioning manager as described in Useful Information about Software Provisioning Manager [page 145].
2. Restart the software provisioning manager 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 Software Provisioning Manager [page 133]) installed on the host where you run the software provisioning manager, 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 software provisioning manager.

Proceed as follows to get the certificate fingerprint or thumbprint from the server certificate printed in the software provisioning manager console:

1. Go to the sapinst_exe.xxxxxx.xxxx directory in the temporary directory to which the software provisioning manager 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-UI opens in the browser by displaying the Welcome screen.

5. On the Welcome screen, choose the required option:
   - Perform preparations
     Go to Generic Options <Database> Preparations and choose the required task.
     To install SAP Host Agent separately, choose Generic Options <Database> Preparations SAP Host Agent.
   - Install an SAP system:
     - To install an SAP system based on SAP NetWeaver AS ABAP from scratch, choose <Product> <Database> Installation Application Server ABAP <System_Variant>.
     - To install the application server ABAP for an SAP Process Integration system based on SAP NetWeaver 7.5 from scratch, choose SAP NetWeaver 7.5 <Database> Installation Application Server ABAP for SAP Process Integration <System_Variant>.
To install the application server ABAP for an SAP Solution Manager 7.2 system from scratch, choose SAP Solution Manager 7.2 <Support_Release> <Application Server ABAP> <Database> Installation > Application Server ABAP > <System Variant>.

To install an SAP system based on SAP NetWeaver AS ABAP as target system of a system copy, choose <Product> <Database> System Copy > Target System > <System_Variant> Based on AS ABAP.

To install the application server ABAP for an SAP Process Integration system based on SAP NetWeaver 7.5 as target system of a system copy, choose SAP Solution Manager 7.2 <Support_Release> <Database> System Copy > Target System > <System_Variant> Based on AS ABAP.

To install the application server ABAP for an SAP Solution Manager 7.2 system as target system of a system copy, choose SAP Solution Manager 7.2 <Support_Release> <Database> System Copy > Target System > <System_Variant> Based on AS ABAP.

To install an additional SAP system instance, go to <Product> <Database> Additional SAP System Instances > Additional Application Server Instance.

Perform other tasks or install additional components. Go to <Product> <Database> and choose the required task.

6. Choose Next.

**i Note**

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

7. Follow the instructions on the software provisioning manager screens and enter the required parameters.

**i 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.

**i Note**

If you want to install an ASCS instance with embedded SAP Web Dispatcher [page 38] or with embedded SAP Gateway [page 40] 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.

**i Note**

If you are performing the target system installation in the context of a system copy with parallel export/import using the Migration Monitor and the target database is declustered - that is you started the software provisioning manager for the target database instance installation with command line option...
**SUPPORT_DECLUSTERING=true** as described above - add the following load options parameter in the SAP System Advanced Load Configuration screen:

```
-datacodepage <datacodepage_of_source_system>
```

The advanced screen for load configuration only appears if you run the software provisioning manager in Custom parameter mode. You can check the parameter within the import_monitor_cmd.properties file located in the installation directory, in the loadArgs entry.

For more information, see the system copy guides at [http://support.sap.com/sltoolset](http://support.sap.com/sltoolset) System Provisioning > System Copy Option > Guide for Systems Based on SAP NetWeaver 7.1 & Higher.

⚠️ Caution

The digital signature of installation media and installation archives is checked automatically during the Define Parameters phase while processing the Media Browser and - if you perform an archive-based installation - the Software Package Browser screens.

Note that this automatic check is only committed once and not repeated if you modify artifacts such as SAR archives or files on the media after the initial check has been done. This means that - if you modify artefacts later on either during the remaining Define Parameters phase or later on during the Execute Service phase - the digital signature is not checked again.

For more information, see SAP Note 2393060.

After you have entered all requested input parameters, the software provisioning manager displays the Parameter Summary screen. This screen shows both the parameters that you entered and those that the software provisioning manager set by default. If required, you can revise the parameters before starting the installation.

If you are installing a standard system on Linux, and want to install your SAP system based on Application Server ABAP 7.4 or higher 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 SAP HANA database instance will be installed.

⚠️ 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 software provisioning manager starts the installation and displays the progress of the installation. When the installation has finished, the software provisioning manager 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 61]. 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

During the installation of an Application Server ABAP for **SAP Process Integration 7.5** or **SAP Solution Manager 7.2**, the following is automatically accomplished by the software provisioning manager:

- The Java users for the Application Server Java for SAP Process Integration or SAP Solution Manager are created, which you have to install once the installation of the Application Server ABAP for SAP Process Integration or SAP Solution Manager is complete.
- The Application Server ABAP for SAP Process Integration or SAP Solution Manager is prepared for connection to the Application Server Java for SAP Process Integration or SAP Solution Manager.

For details on these users, see the *Preparing an External ABAP System as Source for User Data* chapter of the *Installation of SAP Systems Based on the Application Server Java of SAP NetWeaver 7.5 and SAP Solution Manager 7.2 SR2 Java on <OS>: <DB>* documentation, which you must use anyway to install the Application Server Java for SAP Process Integration 7.5 or SAP Solution Manager 7.2 after you have installed the Application Server ABAP.

If you are performing an *Installation Using a Stack XML File* [page 43], the Software Update Manager (SUM) is started by the software provisioning manager at the end of the installation process. A browser window opens with a link to UI of the SUM that is already running. Follow the instructions on the SUM dialogs and in the SUM Guide at https://support.sap.com/sltoolset System Maintenance.

9. If required, delete directories with the name `sapinst_exe.xxxxxx.xxxx` after the software provisioning manager 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 software provisioning manager 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.
12. For security reasons, we recommend that you delete the `.sapinst` directory within the home directory of the user with which you ran the software provisioning manager:

```bash
<User_Home>/.sapinst/
```

13. The software provisioning manager 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 software provisioning manager log files in the `sapinst_instdir` directory. For more information, see Useful Information about Software Provisioning Manager [page 145].

### 5.7 Additional Information about Software Provisioning Manager

The following sections provide additional information about the software provisioning manager.

- **Useful Information about Software Provisioning Manager** [page 145]
  - This section contains some useful technical background information about the software provisioning manager and the software provisioning manager's SL-UI.

- **System Provisioning Using an Input Parameter File** [page 147]
  - Provisioning with software provisioning manager, for example installation, of SAP systems in unattended mode with an input parameter file.

- **Restarting Interrupted Processing of Software Provisioning Manager** [page 152]
  - Here you find information about how to restart the software provisioning manager if its processing has been interrupted.

- **Entries in the Services File Created by Software Provisioning Manager** [page 155]

- **Troubleshooting with Software Provisioning Manager** [page 156]
  - This section tells you how to proceed when errors occur while the software provisioning manager is running.

- **Using the Step State Editor (SAP Support Experts Only)** [page 157]
  - This section describes how to use the Step State Editor available in the software provisioning manager.
5.7.1 Useful Information about Software Provisioning Manager

This section contains some useful technical background information about the software provisioning manager and the software provisioning manager’s SL-UI.

• The software provisioning manager has a framework named “SAPinst”. For more information about the current SAPinst Framework version and its features, see SAP Note 3207613 (SAPinst Framework 753 Central Note).

• The software provisioning manager has the web browser-based “SL-UI of the software provisioning manager” - “SL-UI” for short. The SL-UI 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 the web browser.

As of version 1.0 SP24 Patch Level (PL) 5, the software provisioning manager comes with a new look and feel of the SL-UI. For more information, see https://blogs.sap.com/2018/11/10/new-look-for-software-provisioning-manager/.

The SL-UI 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-UI the software provisioning manager provides a pre-generated URL at the bottom of the shell from which you are running the software provisioning manager. If you have a supported web browser installed on the host where you run the software provisioning manager, you can start the SL-UI directly from this URL. Otherwise, open a web browser supported by the SL-UI on any device and run the URL from there.

For more information about supported web browsers see Prerequisites for Running Software Provisioning Manager [page 133].

If you need to run the SL-UI in accessibility mode, apply the standard accessibility functions of your web browser.

• As soon as you have started the sapinst executable, the software provisioning manager 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 software provisioning manager.

After you have reached the Welcome screen and selected the relevant software provisioning manager option for the SAP system or instance to be installed, the software provisioning manager creates a directory sapinst_instdir where it keeps its log files, and which is located directly below the temporary directory. The software provisioning manager 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 software provisioning manager 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 software provisioning manager.
### Shell Used

<table>
<thead>
<tr>
<th>Shell Used</th>
<th>Command</th>
</tr>
</thead>
</table>
| Bourne shell (sh)| `TEMP=<Directory>`
|                  | `export TEMP`            |
| C shell (csh)    | `setenv TEMP <Directory>`|
| Korn shell (ksh)| `export TEMP=<Directory>`|

⚠️ **Caution**

Make sure that the installation directory is not mounted with NFS, or there might be problems when the Java Virtual Machine is started.

The software provisioning manager records its progress in the `keydb.xml` file located in the `sapinst_instdir` directory. Therefore, if required, you can continue with the software provisioning manager from any point of failure, without having to repeat the already completed steps and without having to reenter the already processed input parameters. For security reasons, a variable encryption key is generated as soon as the `sapinst_instdir` directory is created by the software provisioning manager. This key is used to encrypt the values written to the `keydb.xml` file.

👉 **Recommendation**

We recommend that you keep all installation directories until the system is completely and correctly installed.

- The software provisioning manager extracts itself to the temporary directory. These executables are deleted again after the software provisioning manager has stopped running. Directories called `sapinst_exe.xxxxxx.xxxx` sometimes remain in the temporary directory after the software provisioning manager 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 software provisioning manager, which might be useful if an error occurs.

⚠️ **Caution**

If the software provisioning manager cannot find a temporary directory, the installation terminates with the error FCO-00058.

- To see a list of all available software provisioning manager properties (command line options) and related documentation, start the software provisioning manager as described above with command line parameter `-p`:

  ```
  ./sapinst -p
  ```

- If you want to perform the installation in unattended mode, see *System Provisioning Using an Input Parameter File [page 147]* which describes an improved procedure using `inifile.params`.

- If required, stop the software provisioning manager by choosing the **Cancel** button.

ℹ️ **Note**

If you need to terminate the software provisioning manager, press `Ctrl` + `[`.
5.7.2 System Provisioning Using an Input Parameter File

Provisioning with software provisioning manager, for example installation, of SAP systems in unattended mode with an input parameter file.

Prerequisites

Provisioning of SAP systems can also be done in unattended mode without the user interface of software provisioning manager. This means that, after inserting the required parameters into a parameter-file and running the sapinst executable by providing the path to this parameter-file, the installation will run in the background and no further user interaction is required.

Context

This section describes the steps that you need to execute in addition to the procedure described in this guide, when running software provisioning manager in unattended mode using an input parameter file.

Since the new Web-based SL-UI (see Useful Information about Software Provisioning Manager [page 145]) was introduced in 2017 there are two ways to run the unattended mode: "observer mode" and "non-observer mode".

Observer Mode

If you are running an installation in unattended mode but you are sitting in front of the screen, you might want to check the progress from time to time. In this case the "observer mode" makes sense.

Start the installation as described below in the Solution section, using the following parameters:

```
SAPINST_INPUT_PARAMETERS_URL=<path_to_your_parameterfile>
SAPINST_EXECUTE_PRODUCT_ID=<product-id for the installation>
SAPINST_SKIP_DIALOGS=true
```

The software provisioning manager will start the installation in the background AND start a Web Dispatcher and provide an URL to access the SL-UI. The user who has started the installation can now connect to the URL and observe the progress of the installation, for example to look at the logfiles in the Web browser. However, all parameters will be taken from the input parameter file and can not be changed in the Web browser.

Non-Observer Mode

Choose that mode if you want to run a “scripted” or by other means automated scenario, for example overnight. In that case it is crucial that the process is started without a Web Dispatcher and therefore without the software provisioning manager's SL-UI. Otherwise, the automation could be stuck if software provisioning manager encounters a situation that requires user interaction.

Start the installation as described below in the Solution section, using the following parameters (use the same parameters like for Observer Mode, but provide `SAPINST_START_GUISERVER=false` in addition):

```
SAPINST_INPUT_PARAMETERS_URL=<path_to_your_parameterfile>
SAPINST_EXECUTE_PRODUCT_ID=<product-id for the installation>
```
SAPINST_SKIP_DIALOGS=true
SAPINST_START_GUISERVER=false

This will start the installation but this time **NO** Web Dispatcher will be started and no URL to access the SL-UI will be provided either. So the user cannot follow the processing of the installation in a Web browser and the installation will run completely in the background.

If the process runs into an error, the software provisioning manager will abort and you have to check for the reason in the log files.

**Restrictions**

In exceptional cases, parameters prompted or displayed in the Software Provisioning Manager UI are not maintainable in the input parameter file. If one of those parameters, that are only available in the UI mode of the Software Provisioning Manager, is needed for your unattended installations, you should create a ticket in the best fitting component below BC-INS to get the issue analyzed.

**Must Know about the Input Parameter File**

- The input parameter file only contains values that you entered in the software provisioning manager’s SL-UI.
- With the SAPinst 749.0.69 or by other means patch we provide a better encryption of passwords in software provisioning manager files:
  
  If the input parameter file has parameters which are encrypted with Des25 encryption, the instkey.pkey file available in the installation directory contains the key for the encryption. The instkey.pkey file must be always located in the same directory as the input parameter file and is used to decrypt the values of the encrypted parameters. If you need to copy an input parameter file to another directory, you must also copy the instkey.pkey file to this directory.
- Not explicitly set parameters are documented as comments in the generated input parameter file.
- Each parameter has got a documentation assigned as a comment on top.

> **Example**

Example for a parameter that is not used and therefore commented out:

```bash
# Specify whether software provisioning manager is to drop the schema if it exists. <= Documentation
# HDB_Schema_Check_Dialogs.dropSchema = false
```

> **Example**

Example for a parameter that is used:

```bash
# The name of the database schema. <= Documentation
HDB_Schema_Check_Dialogs.schemaName = SAPABAP2
```

- You have to manually provide the media information, using the following convention:

```bash
SAPINST.CD.PACKAGE.<unique_media_name>=<location>
```

- For each media location you must **manually** insert a dedicated line in your input parameter file. The software provisioning manager does not automatically take over the media locations you entered while processing the Media Browser dialog.
- For `<media_name>` you can choose any value, but the `<location>` must be unique.
• To find out the required media entries, open the summary.html file which you can find in the installation directory and go to the Dialog "Media" section.
• Make sure that you enter the full paths to all required media, relative paths are not sufficient.

**Example**

Example on UNIX:

```
SAPINST.CD PACKAGE KERNEL = /mnt/KERNEL
SAPINST.CD PACKAGE LOAD = /mnt/LOAD
SAPINST.CD PACKAGE RDBMS = /mnt/RDBMS
```

**Example**

Example on Windows:

```
SAPINST.CD PACKAGE KERNEL = C:\sapdvds\KERNEL
SAPINST.CD PACKAGE LOAD = C:\sapdvds\LOAD
SAPINST.CD PACKAGE RDBMS = C:\sapdvds\RDBMS
```

• If one media contains several subfolders, you can specify it in one of the following ways:

**Example**

The SAP Export DVDs/media:

```
Installation Master /usr/local/TESI/SWPM/slinst_d_stream/
IM OS400 PPC64
Installation Export NW73 (folder EXP1) /sapmnt/mediaserver2/
arch04_6/51042309/DATA_UNITS/EXP1
Installation Export NW73 (folder EXP3) /sapmnt/mediaserver2/
arch04_6/51042309/DATA_UNITS/EXP3
Installation Export NW73 (folder EXP2) /sapmnt/mediaserver2/
arch04_6/51042309/DATA_UNITS/EXP2
```

• By specifying each subfolder:

```
SAPINST.CD PACKAGE ExportNW73EXP1=/sapmnt/mediaserver2/
arch04_6/51042309/DATA_UNITS/EXP1
SAPINST.CD PACKAGE ExportNW73EXP2=/sapmnt/mediaserver2/
arch04_6/51042309/DATA_UNITS/EXP3
SAPINST.CD PACKAGE ExportNW73EXP3=/sapmnt/mediaserver2/
arch04_6/51042309/DATA_UNITS/EXP3
```

• By specifying only the root-folder:

```
SAPINST.CD PACKAGE ExportNW73=/sapmnt/mediaserver2/arch04_6/51042309
```

• **Restriction:** Currently you can only specify complete media, not paths to single files like *.SAR archives.
• When performing a system copy, you need to add one additional media path:

```
SAPINST.CD PACKAGE MIGRATION1 = <full path to ABAP Export media>
```
• **Caution:**
  If you want to use archives for your installation, you must copy all files that are to be used to a single directory. In the input parameter file you must specify this directory as a download basket, using the `archives.downloadBasket` parameter.
  Make sure that there is only one version of the same archive in the directory, for example `SAPEXE_<Version>.SAR`

**Procedure**

1. You plan and prepare the run as described in [Planning](page 42) and [Preparation](page 82).
2. Create your input parameter file as follows:
   1. Start software provisioning manager as described in [Running Software Provisioning Manager](page 137).
   2. Choose the option you want to run, and follow the instructions on the screens by entering all parameter values.
   3. Stop after the **Parameter Summary** screen has been displayed.
   4. Find the input parameter file named “inifile.params” in the installation directory.
      • In the same directory, you will also find the `instkey.pkey` file with the keys for the encrypted parameters. For more information, see [Must Know about the Input Parameter File](above).
      • In the same directory, you will also find the `summary.html` file with the required media locations. For more information, see [Must Know about the Input Parameter File](above).
   5. If required, you can rename the “inifile.params” file as you wish.
3. Adjust the values of the input parameter file as follows:
   1. Edit your input parameter file and modify the parameters according to your needs.
   2. Add required media or archives information line by line.
4. Identify the Product-ID:
   • To start in unattended mode, you need to know the component ID for the option that are required for your provisioning scenario.
     Proceed as follows:
     1. Open the `sapinst_dev.log` in the installation directory.
     2. Check for the “product-id”

   ❖ **Example**
   ```
   product-id=NW_ABAP_ASCS:NW750.ADA.ABAP
   ```
   • Alternatively, you can check the header of the generated input parameter file.

   ❖ **Example**
   ```
   product id 'NW_ABAP_ASCS:NW750.ADA.ABAP'
   ```
5. Run the software provisioning manager [page 137] with the parameters required for unattended mode:
   • Make sure that the `instkey.pkey` file with the keys for the encrypted parameters is available in the same directory as the input parameter file. Otherwise the encrypted parameters cannot be decrypted. For more information, see [Must Know about the Input Parameter File](above).
In observer mode: Start the sapinst executable from an empty directory with the following parameters:

```
SAPINST_INPUT_PARAMETERS_URL=<path_to_your_parameterfile>
SAPINST_EXECUTE_PRODUCT_ID=<product-id for the installation>
SAPINST_SKIP_DIALOOGS=true
```

In non-observer mode: Start the sapinst executable from an empty directory with the following parameters:

```
SAPINST_INPUT_PARAMETERS_URL=<path_to_your_parameterfile>
SAPINST_EXECUTE_PRODUCT_ID=<product-id for the installation>
SAPINST_SKIP_DIALOOGS=true
SAPINST_START_GUISERVER=false
```

6. After software provisioning manager has completed, perform follow-up activities as described in Post-Installation [page 159].

**Related Information**

- SAP Note 2230669 Provisioning with software provisioning manager - for example installation - of SAP systems in unattended mode with an input parameter file.
- SAP Note 2849054 Software Update Manager Automation with software provisioning manager.
- SAP Note 2742212 Unattended installation fails with "Empty directory name is not allowed." message.
- SAP Note 2626837 'isUnicode': Radio group contains an invalid value ''. Valid values are: false|true|.
- SAP Note 2669183 ASCS installation failure with Software Provisioning Manager unattended mode (Non-Observer mode).
- SAP Note 2482103 Installation with Software Provisioning Manager in unattended mode using input parameter file fails.
- SAP Note 2974889 Installation with Software Provisioning Manager in unattended mode fails in step getDBInfo due to missing parameters.

Installation of SAP Systems Based on the Application Server ABAP of SAP NetWeaver 7.3 EHP1 to 7.52 on UNIX: SAP HANA Database
5.7.3 Restarting Interrupted Processing of Software Provisioning Manager

Here you find information about how to restart the software provisioning manager if its processing has been interrupted.

Context

The processing of the software provisioning manager might be interrupted for one of the following reasons:

- An error occurred during the Define Parameters or Execute phase:
  The software provisioning manager 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 software provisioning manager by choosing Cancel in the SL-UI.

⚠️ 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 software provisioning manager retries the installation from the point of failure without repeating any of the previous steps.  
  This is possible because the software provisioning manager records its 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 software provisioning manager displays the same dialog box again. |
| Stop    | The software provisioning manager stops the installation, closing the dialog box and the software provisioning manager’s SL-UI.  
  The software provisioning manager records its progress in the keydb.xml file.  
  Therefore, you can continue with the software provisioning manager from the point of failure without repeating any of the previous steps. See the procedure below. |
| Continue| The software provisioning manager continues the installation from the current point. |
| View Log| Access installation log files. |
You can also terminate the software provisioning manager 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 Software Provisioning Manager* [page 137].
2. Make sure that the installation media are still available.
   
   For more information, see *Preparing the Installation Media* [page 107].

   → **Recommendation**

   Make the installation media 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 media 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 media are still available.

   For more information, see *Preparing the Installation Media* [page 107].

   → **Recommendation**

   Make the installation media 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 media 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 software provisioning manager from the directory to which you unpacked the Software Provisioning Manager archive by executing the following command:

   `<Path_To_Unpack_Directory>/sapinst`

5. The software provisioning manager is restarting.
You can find the URL you require to access the SL-UI at the bottom of the shell from which you are running the software provisioning manager.

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

### i Note

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

1. Terminate the software provisioning manager as described in Useful Information about Software Provisioning Manager [page 145].
2. Restart the software provisioning manager 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 Software Provisioning Manager [page 133]) installed on the host where you run the software provisioning manager, 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 software provisioning manager.

Proceed as follows to get the certificate fingerprint or thumbprint from the server certificate printed in the software provisioning manager console:

1. Go to the `sapinst_exe.xxxxx.xxxx` directory in the temporary directory to which the software provisioning manager has extracted itself:
   ```
   <User_Home>/sapinst/
   ```
2. 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.

3. Accept the warning to inform your browser that it can trust this site, even if the certificate could not be verified.

The SL-UI 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**:

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform a new run</td>
<td>The software provisioning manager does not continue the interrupted installation option. Instead, it moves the content of the old software provisioning manager directory and all software provisioning manager-specific files to a backup directory. Afterwards, you can no longer continue the old option.</td>
</tr>
<tr>
<td></td>
<td>The following naming convention is used for the backup directory:</td>
</tr>
<tr>
<td></td>
<td><code>log_&lt;Day&gt;_&lt;Month&gt;_&lt;Year&gt;_&lt;Hours&gt;_&lt;Minutes&gt;_&lt;Seconds&gt;</code></td>
</tr>
<tr>
<td></td>
<td>❖ <strong>Example</strong></td>
</tr>
<tr>
<td></td>
<td><code>log_01_Oct_2016_13_47_56</code></td>
</tr>
<tr>
<td></td>
<td>❖ <strong>Note</strong></td>
</tr>
<tr>
<td></td>
<td>All actions taken by the installation before you stopped it (such as creating directories or users) are not revoked.</td>
</tr>
<tr>
<td></td>
<td>❖ <strong>Caution</strong></td>
</tr>
<tr>
<td></td>
<td>The software provisioning manager 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.</td>
</tr>
<tr>
<td>Continue with the existing one</td>
<td>The software provisioning manager continues the interrupted installation from the point of failure.</td>
</tr>
</tbody>
</table>

### 5.7.4 Entries in the Services File Created by Software Provisioning Manager

After the installation has finished successfully, the software provisioning manager 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)
5.7.5 Troubleshooting with Software Provisioning Manager

This section tells you how to proceed when errors occur while the software provisioning manager is running.

Context

If an error occurs, the software provisioning manager:

• Stops processing
• Displays a dialog informing you about the error

Procedure

1. Check SAP Note SAP Note 3207613 (SAPinst Framework 753 Central Note) for known software provisioning manager 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 software provisioning manager 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 software provisioning manager 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 software provisioning manager.

   For more information, see Useful Information about Software Provisioning Manager [page 145].
To check the log and trace files of the software provisioning manager’s SL-UI for errors, go to the directory `<User_Home>/.sapinst/`.

Then continue by choosing Retry.

If required, abort the software provisioning manager by choosing Cancel in the tool menu and restart the software provisioning manager. For more information, see Restarting Interrupted Processing of Software Provisioning Manager [page 152].

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.

### 5.7.6 Using the Step State Editor (SAP Support Experts Only)

This section describes how to use the Step State Editor available in the software provisioning manager.

**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 software provisioning manager meets the requirements listed in Prerequisites for Running Software Provisioning Manager [page 133].

#### Procedure

1. Start the software provisioning manager from the command line as described in Running Software Provisioning Manager [page 137] with the additional command line parameter `SAPINST_SET_STEPSTATE=true`

2. Follow the instructions on the software provisioning manager 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 software provisioning manager during the Execute Service phase. By default all steps are in an initial state. Underneath each step, you see the assigned software provisioning manager 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 software provisioning manager to pause.
- Mark the checkbox in front of the Skip option of the steps which you want the software provisioning manager 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 software provisioning manager 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 software provisioning manager.

5. Continue until you have run through all the steps of the *Execute Service* phase of the software provisioning manager.
6 Post-Installation

6.1 Post-Installation Checklist

This section includes the post-installation steps that you have to perform for the following:

**Note**

**SAP systems based on SAP NetWeaver 7.4:**

You can automate some of these post-installation steps by running task list `SAP_BASIS_SETUP_INITIAL_CONFIG` in the ABAP task manager for lifecycle management automation (transaction STCO1). For more information, see *SAP NetWeaver 7.4 and Higher: Performing Automated Initial Setup (Optional)* [page 162].

The sections describing these steps are marked with a corresponding note at the beginning.

- 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 176]. 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 the software provisioning manager from the primary application server host.

However, *and higher on Linux* you can install SAP systems based on SAP NetWeaver 7.4 or higher on the same host as the SAP HANA database - that is as a standard system [page 29] - without applying additional environment settings. For more information, see SAP Note 1953429.

1. You check and if necessary modify the settings for the operating system users for your SAP system if they were created by the software provisioning manager.
   For more information, see *Creating Operating System Users and Groups* [page 86].
2. You check whether you can log on to the Application Server ABAP [page 161].

3. **SAP systems based on SAP NetWeaver 7.4 and higher only**: You perform the automated initial setup [page 162].

   - **Note**
     This step is optional.

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 164].

5. You install the SAP license [page 165].

6. If you have installed a high-availability system, you set up the licenses for high availability [page 166].

7. You configure the remote connection to SAP support [page 167].

8. You enable the Note Assistant to apply note corrections [page 168].

9. You configure the documentation provided on the SAP Help Portal [page 168].

10. You perform the consistency check [page 170].

11. You configure the Transport Management System [page 172].

12. For production systems it is highly recommended that you connect the system to SAP Solution Manager [page 173].

13. Run software provisioning manager option **Check and Adjust ABAP System** to apply necessary configuration steps.

14. You apply the latest kernel and Support Packages [page 176].

15. You perform post-installation steps for the application server ABAP [page 178].

16. If you installed a high-availability system based on SAP NetWeaver AS for ABAP 7.52, you can decide whether you want to switch to the new standalone enqueue server 2 and enqueue replicator 2 [page 180].

17. If you installed the ABAP part of an SAP Solution Manager 7.2 or SAP Process Integration 7.5 system, enable HTTPS communication with the Java part of the system.

   For more information, see SAP Solution Manager 7.2, SAP Process Integration 7.5 only: Enabling HTTPS Communication for ABAP [page 181].

18. If required, you install additional languages and perform language transport [page 182].

19. You configure the user management [page 183].

   - **Note**
     This section does not apply for SAP Process Integration 7.5 and SAP Solution Manager, because for them the user management with an external ABAP system is mandatory. For SAP Process Integration 7.5 and SAP Solution Manager you have to perform special configuration steps which are described in the guide you have to use for the installation of the Java stack.

20. You ensure user security [page 184].

21. You perform the client copy [page 187].

22. You install or upgrade SAP HANA studio [page 189].

23. You back up the SAP HANA database [page 189].

24. **SAP systems based on SAP NetWeaver 7.4 and higher only**: If required, you change the keys for the secure storage [page 189].

25. You perform a full installation backup [page 192].

26. If you chose to install an embedded SAP Web Dispatcher within the ASCS instance, you log on to the SAP Web Dispatcher Management Console [page 194]

27. If you chose to install an embedded SAP Web Dispatcher within the ASCS instance, you configure the SAP Web Dispatcher [page 195]
28. If you chose to install an embedded Gateway within the ASCS instance, you configure the SAP Gateway [page 196].

29. You check the Master Guide - called “Installation Guide” for SAP S/4HANA - for your SAP Business Suite application, SAP Solution Manager system (section Implementation Sequence) or SAP NetWeaver application (section Configuration of Systems and Follow-Up Activities) for additional implementation and configuration steps, such as language installation, monitoring, work processes, transports, SAP license, printers, system logs, and connectivity to system landscape directory (SLD).

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 software provisioning manager. For more information, see Creating Operating System Users and Groups [page 86].

2. You check whether you can log on to the Application Server ABAP [page 161].

3. You configure the documentation provided on the SAP Help Portal [page 168].

4. You ensure user security [page 184].

5. You perform a full installation backup [page 192].

6.2 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 Program SAP Front End SAPlogon](image)
   - **SAP GUI for Java:**
     Enter the following command from the GUI installation directory:
     
     `grilogon`

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**.

### 6.3  SAP NetWeaver 7.4 and Higher: Performing Automated Initial Setup (Optional)

After the installation of a new SAP system you have to configure the system to enable its usage. For example, you have to install an SAP license, create logon groups, and configure the Transport Management System (TMS) and security settings. If your SAP system is based on SAP NetWeaver 7.4 and higher, you can profit from an automated initial setup which executes these steps automatically.

### Prerequisites

Note that the best point in time when you perform automated initial setup depends on the following:

- If you have run the installation using a Stack XML file (also called “up-to-date installation”), we recommend that you proceed as follows:
  1. Perform the **complete** installation and update process - that is the installation with Software Provisioning Manager and the update with Software Update Manager.
  2. Perform the automated initial setup.
     By running first the update and then the automated initial setup, you can profit from latest features and fixes in the initial setup configuration content.
Background: As of Software Logistics Toolset 1.0 SPS12, the installation procedure with Software Provisioning Manager 1.0 SP07 and higher also includes basic configuration activities, such as initial basic configuration of transport management, which are a prerequisite for the subsequent maintenance process. In previous SP versions of Software Logistics Toolset 1.0, this prerequisite had to be fulfilled by running automated initial setup before the update process.

- If you have not run the installation using a Stack XML file (also called “up-to-date installation”), we recommend that you proceed as follows:
  1. Run automated initial setup directly after the installation, using the automation content provided with the system load.
  2. Apply the Support Packages to benefit from the already performed initial configuration – for example, using the already configured Transport Management System.
  3. Consider running the automated initial setup a second time, especially if you want to benefit from the latest improvements and fixes offered by the updated automation content provided by the applied Support Package.

For more information about automated initial setup, see the SAP Community Network at https://wiki.scn.sap.com/wiki/display/SL/Automated+Initial+Setup+of+ABAP-Based+Systems.

Procedure

1. Start the ABAP Task Manager by calling transaction STC01.
2. Choose task list SAP_BASIS_SETUP_INITIAL_CONFIG.
3. Select the tasks you want to get executed.
   - For this, the task list offers sophisticated online documentation of the comprised activities.
4. Choose Execute.
   - You are guided through the configuration steps where you can enter the required values.

Related Information

Installation Using a Stack XML File [page 43]
Installing the SAP License [page 165]
Configuring the Remote Connection to SAP Support [page 167]
Configuring the Change and Transport System [page 172]
Applying the Latest Kernel and Support Package Stacks [page 176]
Performing Post-Installation Steps for the ABAP Application Server [page 178]
Performing the Consistency Check [page 170]
6.4 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.

### 6.5 Installing the SAP License

You must install a **permanent** SAP license. When you install your SAP system, a **temporary** license is automatically installed.

**Note**

SAP systems based on SAP NetWeaver 7.4 or higher only:

You can automate this step by running task list *SAP_BASIS_SETUP_INITIAL_CONFIG* in the ABAP task manager for lifecycle management automation (transaction STC01). For more information, see SAP NetWeaver 7.4 and Higher: Performing Automated Initial Setup (Optional) [page 162].

**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 Library at:
6.6  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 165] 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/

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.

6.7 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.

i Note

SAP systems based on SAP NetWeaver 7.4 or higher only:

You can automate this step by running task list SAP_BASIS_SETUP_INITIAL_CONFIG in the ABAP task manager for lifecycle management automation (transaction STC01). For more information, see SAP NetWeaver 7.4 and Higher: Performing Automated Initial Setup (Optional) [page 162].

For more information, see SAP Support Portal at https://support.sap.com/remote-support.html.
6.8 Enabling Note Assistant to Apply Note Corrections

Use the Note Assistant to implement note corrections in your ABAP system.

Context


Procedure

1. Follow the instructions in SAP Note 2836302 for enabling the Note Assistant for TCI and digitally signed SAP Notes.
2. Apply important SAP Notes for SAP_BASIS as described in SAP Note 1668882.

6.9 Configuring Documentation Provided on the SAP Help Portal

In transaction SR13, you can configure the settings of your backend system to point to documentation that is provided on the SAP Help Portal.

Context

You can configure your backend system to access documentation that is provided on the SAP Help Portal.

Prerequisites

- The documentation you want to access must be available on the SAP Help Portal.
- The users who access the documentation must have access to the Internet.
- You can configure an ABAP system to connect to only one combination of product and version.

If you cannot fulfill one or more of these prerequisites, you must install the documentation in your local system landscape using the download packages or media provided.
Procedure

2. Select the tab PlainHtmlHttp.
3. Choose New Entries.

⚠️ Caution

You have to create entries for both documentation and XML documentation areas for each platform you are using and each language in which you want to provide documentation.

You must use the exact combination of uppercase and lowercase characters specified in the product and version.

To find the correct entry for the Path field, see the list of products and versions attached to SAP Note 2652009.

4. To create entries for the documentation area, enter the following values:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value to be entered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variant</td>
<td>Enter a name for the variant.</td>
</tr>
<tr>
<td>Platform</td>
<td>Select the platform relevant for your implementation from the list of available platforms, for example, WN32.</td>
</tr>
<tr>
<td>Area</td>
<td>Select Documentation from the list; this will display as IWBHELP in the table.</td>
</tr>
<tr>
<td>Path</td>
<td>&lt;product/version&gt;</td>
</tr>
</tbody>
</table>

To find the correct entry for the Path field, see the list of products and versions attached to SAP Note 2652009.

| Language | Select the language you need from the list. |

5. To create entries for the XML documentation area, enter the following values:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value to be entered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variant</td>
<td>Enter a name for the variant (any name).</td>
</tr>
<tr>
<td>Platform</td>
<td>Select the platform relevant for your implementation from the list of available platforms, for example, WN32.</td>
</tr>
<tr>
<td>Area</td>
<td>Select XML Documentation from the list; this will display as XML_DOCU in the table.</td>
</tr>
<tr>
<td>Name</td>
<td>Value to be entered</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Path</td>
<td><code>&lt;product/version&gt;</code></td>
</tr>
<tr>
<td></td>
<td>To find the correct entry for the Path field, see the list of products and versions attached to SAP Note 2652009.</td>
</tr>
<tr>
<td>Language</td>
<td>Select the language you need from the list.</td>
</tr>
</tbody>
</table>

6. Repeat steps 4 and 5 for each relevant platform and language.
7. Select one entry as the default language for each platform and area.
8. Save your entries.

Results

You have configured the settings to point to documentation that is provided on the SAP Help Portal.

Related Information

Installation of SAP Library
SAP Note 2149786
SAP Note 2652009

6.10 Performing the Consistency Check

We recommend that you check the consistency of the newly installed SAP ABAP system.

<i>Note</i>

**SAP systems based on SAP NetWeaver 7.4 or higher only:**

You can automate this step by running task list `SAP_BASIS_SETUP_INITIAL_CONFIG` in the ABAP task manager for lifecycle management automation (transaction SIC01). For more information, see SAP NetWeaver 7.4 and Higher: Performing Automated Initial Setup (Optional) [page 162].

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 240].
You have logged on to the SAP system [page 161].

**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 initial consistency check determines whether:
  - 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 ➔.
6.11 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).

**i Note**

**SAP systems based on SAP NetWeaver 7.4 or higher only:**

You can automate this step by running task list `SAP_BASIS_SETUP_INITIAL_CONFIG` in the ABAP task manager for lifecycle management automation (transaction STC01). For more information, see SAP NetWeaver 7.4 and Higher: Performing Automated Initial Setup (Optional) [page 162].

**i Note**

`SAP_BASIS_SETUP_INITIAL_CONFIG` only covers the configuration of TMS as single system.

**i Note**

If you are using a Stack XML file (see Installation Using a Stack XML File [page 43]) and chose **Run TMS Configuration (for Single System)** during the installation, you have already completed this step and and skip this section.

**Context**

**Procedure**

1. Call transaction STMS in the ABAP system to configure the domain controller in the Transport Management System (TMS).
2. In addition, you must configure the system change options.

For more information, see the SAP Library at:

<table>
<thead>
<tr>
<th>SAP Release and SAP Library Quick Link</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver Application Server for ABAP 7.51 innovation package <a href="https://help.sap.com/nw751abap">https://help.sap.com/nw751abap</a></td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver AS for ABAP 7.52 <a href="https://help.sap.com/nw752abap">https://help.sap.com/nw752abap</a></td>
<td></td>
</tr>
</tbody>
</table>

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

6.12 Connecting the System to SAP Solution Manager

Here you find information about how to connect your newly installed SAP system to the SAP Solution Manager in your system landscape.

**Note**

You can skip this section if your newly installed SAP system is itself a SAP Solution Manager system.
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 7.2:
     http://help.sap.com/solutionmanager Version 7.2 SPS <No> Application Help (English)
     Technical Infrastructures Landscape Management Database (LMDB) Setting Up the Landscape Management Infrastructure Importing Landscape Data, CIM Model, and CR Content

   - If your SAP Solution Manager release is 7.1:
     http://help.sap.com/solutionmanager Version 7.1 SPS <No> Application Help (English)
     SAP Solution Manager Operations Managing System Landscape Information Managing Technical System Information Register Technical Systems Automatically by Data Suppliers

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. Alternatively, systems can send information directly to the LMDB in SAP Solution Manager, without an SLD, as described in http://help.sap.com/solutionmanager Version 7.2 SPS <No> Application Help (English) Technical Infrastructures Landscape Management Database (LMDB) Setting Up the Landscape Management Infrastructure Importing Landscape Data, CIM Model, and CR Content


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.
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 7.2:
  
  http://help.sap.com/solutionmanager> Version 7.2 SPS <No> Application Help (English)
  
  Technical Infrastructures Landscape Management Database (LMDB) Setting Up the Landscape Management Infrastructure Importing Landscape Data, CIM Model, and CR Content Synchronization with an SLD

- If your SAP Solution Manager release is 7.1:
  
  http://help.sap.com/solutionmanager> Version 7.1 SPS <No> Application Help (English) SAP Solution Manager Operations Managing System Landscape Information Setting Up the Landscape Management Infrastructure Connecting LMDB to System Landscape Directory (SLD)

Related Information

Setting Up the Landscape Management Infrastructure Importing Landscape Data, CIM Model, and CR Content Synchronization with an SLD Managing Technical System Information Handling Technical Systems' Data - System Landscape Directory
6.13 Running Software Provisioning Manager Option “Check and Adjust ABAP System”

Run software provisioning manager option *Check and Adjust ABAP System* to apply some necessary configuration steps.

**Procedure**

1. Start the software provisioning manager as described in Running Software Provisioning Manager [page 137].
2. On the Welcome screen, choose software provisioning manager option [Generic Options > SAP HANA Database > Check and Adjust ABAP System](#).

   Follow the instructions on the software provisioning manager screens and enter the parameters for the ABAP system to be checked and adjusted.

   On the *Check Adjust SAP System* screen, select the required option:

   • **HDI_CHECK_ENABLE**
     If your SAP system is based on SAP NetWeaver AS for ABAP 7.52, running this option applies some necessary configuration for the HANA Deployment Infrastructure (HDI) content. If you do not run this option, updating the ABAP system using transaction SPAM might fail.

   • **REPAIR_PRIVILEGES**
     With this option you can recreate the privileges for the ABAP schema user.

6.14 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.

**i Note**

If you are using a Stack XML file (see *Installation Using a Stack XML File* [page 43]), you already downloaded the stack.xml file and the delta archives. If you then already called the Software Update Manager (SUM) from the software provisioning manager 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 SAP Kernel versions, and how this relates to SAP system support packages - including important notes on downward compatibility and release dates - see the central SAP Kernel notes:

Central SAP Notes

2083594 - SAP Kernel Versions and SAP Kernel Patch Levels
3116151 - SP Stack Kernel Schedule Forecast
1744209 - SAP Kernel 720, 721 and 722: Versions and Kernel Patch Levels
1969546 - Release Roadmap for Kernel 74x and 75x
1802333 - Finding information about regressions in the SAP kernel
19466 - Downloading SAP kernel patches
2966761 - Overview of SAP Kernel Correction Archives
2966621 - Overview of Kernel-Related Software Components
953653 - Rolling Kernel Switch

The white paper Update Strategy for the Kernel of the Application Server ABAP in On Premise Landscapes provides SAP recommendations on how to patch the SAP kernel.

i Note

If you have installed an SAP Solution Manager 7.2 system, you must apply at least Support Package Stack (SPS) 01. You cannot use SAP Solution Manager 7.2 with SPS 00.

Procedure

• Download and apply the latest Kernel and Support Package stacks using the Software Update Manager (SUM) as described in the Software Update Manager documentation at: https://support.sap.com/en/tools/software-logistics-tools/software-update-manager.html

• 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 19466.
  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
6.15 Performing Post-Installation Steps for the ABAP Application Server

This section describes the post-installation steps you have to perform for the ABAP application server.

### Note

**SAP systems based on SAP NetWeaver 7.4 or higher only:**

You can automate this step by running task list `SAP_BASIS_SETUP_INITIAL_CONFIG` in the ABAP task manager for lifecycle management automation (transaction STC01). For more information, see [SAP NetWeaver 7.4 and Higher: Performing Automated Initial Setup (Optional)](page 162).

### Prerequisites

You have logged on to the ABAP application server as described in [Logging On to the Application Server](page 161).

### Context

You have to perform the following post-installation steps for the ABAP application server:

- Upload and set system profiles using transaction RZ10
- Configure the number of work processes
- Create logon and RFC server groups using transactions SMLG and RZ12
- Create operation modes using transaction RZ04
- Schedule standard jobs using transaction SM36
- Configuration of SLD data supplier using transaction RZ70
- Perform load generation using transaction SGEN

For more information, see the appropriate sections below.
Procedure

- **Upload and Set System Profiles using Transaction RZ10**

  You upload system profiles, such as default profile and instance profile, from the file system into the database of the target system using transaction RZ10.

  For more information about how to maintain SAP system profiles, see the SAP Library at:

  SAP Release and SAP Library Quick Link

<table>
<thead>
<tr>
<th>SAP Release and SAP Library Path</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.3 including Enhancement Package 1</td>
<td>Application Help ▶ Function-Oriented View ▶</td>
</tr>
<tr>
<td>SAP NetWeaver 7.4</td>
<td>Application Server ▶ Application Server ABAP ▶</td>
</tr>
<tr>
<td>SAP NetWeaver 7.5</td>
<td>Administration of Application Server ABAP ▶</td>
</tr>
<tr>
<td>SAP NetWeaver Application Server for ABAP 7.51 innovation package</td>
<td></td>
</tr>
<tr>
<td>SAP NetWeaver AS for ABAP 7.52</td>
<td></td>
</tr>
<tr>
<td>SAP NetWeaver AS for ABAP 7.52</td>
<td></td>
</tr>
</tbody>
</table>

- **Configure the number of work processes**

  SAP systems are installed with a minimum number of work processes. This is only an initial configuration to get you started after the installation. It is not detailed enough for a production system because the optimal number of each type of work process depends on the system resources and on the number of users working in each SAP system application. For more information about how many work processes to configure and how to set the number, see SAP Note 39412.

- **Create Logon and RFC Server Groups using Transactions SMLG and RZ12**

  You create the following:

  - Logon groups using transaction SMLG
  - RFC server groups using transaction RZ12

  Specify the following:

  - Name of the logon or RFC server group
  - Instance name (application server)
  - Group type attributes are optional

  If required, you create the RFC server group `parallel_generators`.

- **Create Operation Modes using Transaction RZ04**

  You check for existing operation modes and - if required - create a new operation mode using transaction RZ04.

  Specify the following:

  - Name of the operation mode
  - Short description
• Optional: monitoring properties variant
Select the corresponding checkbox to assign the operation mode to the following:
• Time table (assignment only from 0-24 h)
• Current application server instance

• Schedule Standard Jobs using Transaction SM36
You schedule SAP standard jobs using transaction SM36.
If a standard job is already scheduled, it is kept. Only missing jobs are scheduled.

• Configure the SLD Data Supplier using Transaction RZ70
  a. Make sure that the SLD and the SLD bridge (the receiving thread of the SLD, which runs on a Java EE engine) are running.
  b. Configure the System Landscape Directory (SLD) data supplier with default settings, using transaction RZ70.

SLD configuration is a prerequisite for the connection of an SAP system to SAP Solution Manager.
For more information, see Connecting the System to SAP Solution Manager [page 173]

• Perform Load Generation using Transaction SGEN
You generate the ABAP loads using transaction SGEN. ABAP loads are platform-dependent programs that are generated during runtime and stored in database tables. Using transaction SGEN you can generate ABAP loads of a number of programs, function groups, classes, and so on.
Choose one of the following generation modes:
• Generate All Objects
  All existing objects of all software components are generated synchronously. Job RSPARGENER8M starts the generation directly after all ABAP objects have been prepared for generation and have been stored in table GENSETC. Be aware that this is a time-consuming process.

  i Note
  Make sure that you have sufficient space available on your database. The generation of all existing objects requires around 2 - 9 GB of free space.

• Prepare All Objects for Generation
  All objects to be generated are prepared for generation and stored in table GENSETM. You can start the generation of these objects later with transaction SGEN. Choose this strategy if object generation is to be done outside the configuration task due to performance issues.

6.16 Systems Based on SAP NetWeaver AS for ABAP 7.52 only: Switching to Standalone Enqueue Server 2 and Enqueue Replicator 2

If you installed a high-availability SAP system based on SAP NetWeaver AS for ABAP 7.52, you can switch to “Standalone Enqueue Server 2” and “Enqueue Replicator 2”.

When installing an SAP system based on SAP NetWeaver AS for ABAP 7.52 or lower, Software Provisioning Manager 1.0 installs the ASCS instance with the classic “Standalone Enqueue Server” and the ERS instance
with the classic “Enqueue Replication Server” by default. However, if you installed an SAP system based on SAP NetWeaver AS for ABAP 7.52, you can switch to “Standalone Enqueue Server 2” and “Enqueue Replicator 2.”


Related Information

High-Availability System [page 32]

6.17 SAP Solution Manager 7.2, SAP Process Integration 7.5 only: Enabling HTTPS Communication for ABAP

For secure communication between the SAP systems connected to the ABAP stack, further post-installation steps are required to fully enable HTTPS communication.

Prerequisites

- You have installed the application server ABAP for an SAP Solution Manager 7.2 or SAP Process Integration 7.5.
- You entered the HTTPS port that is to be configured in the application server instance profile when processing the Communication Port for ABAP screen. For more information, see Additional Parameters when Installing SAP Process Integration 7.5 or SAP Solution Manager 7.2.

Procedure

Proceed as described in the SAP Note 510007.

Related Information

Additional Parameters when Installing SAP Process Integration 7.5 or SAP Solution Manager 7.2 [page 74]
6.18 Installing Additional Languages and Performing Language Transport

This section describes how to install and transport additional languages.

**i Note**

You do not have to perform these steps or at least some of these steps if you are using a Stack XML file (see *Installation Using a Stack XML File [page 43]*) 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.

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 Library at:

<table>
<thead>
<tr>
<th>SAP Release and SAP Library Quick Link</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SAP NetWeaver 7.3 including Enhancement Package 1 <a href="http://help.sap.com/nw731">http://help.sap.com/nw731</a></td>
<td>▶ Application Help ▶ Function-Oriented View ▶ Solution</td>
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<td></td>
</tr>
</tbody>
</table>

### 6.19 Configuring the User Management

After the installation has completed, configure the user management of your SAP system.

**i Note**

For SAP Process Integration 7.5 and SAP Solution Manager configuring the user management with an external ABAP system is mandatory. For more information, see *Preparing an External ABAP System as Source for User Data* in the Java installation guide for your operating system and database. For SAP Process Integration 7.5 and SAP Solution Manager go to **PI 7.5: Configuring the Process Integration System After the Installation** respectively **Configuring an SAP Solution Manager System** in the Java installation guide for your operating system and database.

**Context**

For Solution Manager and Process Integration 7.5, your UME has been configured with the ABAP part of the system during the target system installation. For other SAP system products this configuration is optional. For more information, see *Preparing an External ABAP System as Source for User Data* in the Java installation guide for your operating system and database.
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 Library at:

<table>
<thead>
<tr>
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</tr>
<tr>
<td><a href="https://help.sap.com/nw75">https://help.sap.com/nw75</a></td>
<td></td>
</tr>
<tr>
<td>SAP NetWeaver Application Server for ABAP 7.51 innovation package</td>
<td></td>
</tr>
<tr>
<td><a href="https://help.sap.com/nw751abap">https://help.sap.com/nw751abap</a></td>
<td></td>
</tr>
<tr>
<td>SAP NetWeaver AS for ABAP 7.52</td>
<td></td>
</tr>
<tr>
<td><a href="https://help.sap.com/nw752abap">https://help.sap.com/nw752abap</a></td>
<td></td>
</tr>
</tbody>
</table>

6.20 Ensuring User Security

You need to ensure the security of the users that the software provisioning manager 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 software provisioning manager by default assigned the master password [page 61] to all users created during the installation unless you specified other passwords.

- Recommendation

  The Master Password feature can be used as a simple method to obtain customer-specific passwords for all newly created users. A basic security rule is not to have identical passwords for different users. Following this rule, we strongly recommend individualizing the values of these passwords after the installation is complete.

- 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)
A 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/

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 software provisioning manager had completed. For more information, see Operating System Users in SAP System Parameters [page 61].

<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>
</table>
| Operating system user      | sapadm | SAP Host Agent administrator is the user for central monitoring services.  
You do not need to change the password of this user after the installation.  
This user is for administration purposes only.  You are not able to log on as sapadm as this user is locked. |
### 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.

<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 at least SAP system clients 000, 001, and 066.</td>
</tr>
<tr>
<td></td>
<td>DDIC</td>
<td>User exists in at least SAP system clients 000 and 001.</td>
</tr>
<tr>
<td></td>
<td>EARLYWATCH</td>
<td>User exists in at least SAP system client 066.</td>
</tr>
</tbody>
</table>

**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.

#### Application Server Java Administrator

<table>
<thead>
<tr>
<th>User</th>
<th>User Name</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>J2EE_ADMIN</td>
<td>The name that you gave this user during the installation or the default name J2EE_ADMIN (see SAP System Parameters [page 61])</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This user exists in at least clients 000 and 001 of the ABAP system and in the User Management Engine (UME) of the Java system. It has administrative permissions for user management.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The password of this user is stored in secure storage. Therefore, whenever you change the password of the administrator password, you must also change the password in secure storage.</td>
</tr>
</tbody>
</table>

**Recommendation**

We recommend that you use strong password and auditing policies for this user.
### User Information

<table>
<thead>
<tr>
<th>User</th>
<th>User Name</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Server Java Guest</td>
<td>The name that you gave this user during the installation or the default name <code>J2EE_GUEST</code> (see [SAP System Parameters](page 61))</td>
<td>This user exists in at least clients 000 and 001 of the ABAP system and in the User Management Engine (UME) of the Java system. It is used for anonymous access.</td>
</tr>
</tbody>
</table>

**i Note**

This user has only been created if you have installed the application server ABAP for an SAP Process Integration (PI) 7.5 system or for an SAP Solution Manager 7.2 system.

| Communication user for Application Server Java | The name that you gave this user during the installation or the default name `SAPJSF` (see [SAP System Parameters](page 61)) | This user exists in at least clients 000 and 001 of the ABAP system and in the User Management Engine (UME) of the Java system. It is used for a remote function call (RFC) between the ABAP system and the Java system. |

**i Note**

This user has only been created if you have installed the application server ABAP for an SAP Process Integration (PI) 7.5 system or for an SAP Solution Manager 7.2 system.

---

### 6.21 Performing the Client Copy

To get a production client, you have to perform a copy of the SAP reference client.

**Context**

The software provisioning manager creates three ABAP clients during the installation, client 000, client 001, and client 066.

**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.
Use client 000 as source client for the client copy.

**i Note**

**SAP SCM:** If you want to mark the client 001 as **not** relevant for liveCache, run report `/SAPAPO/OM_NON_LC_RELEVANT_CLT` or `/SLCA_NON_LC_RELEVANT_CLIENT` using transaction SE38.

---

**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 SCCCL 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 Library at:

**SAP Release and SAP Library Quick Link**

- SAP NetWeaver 7.3 including Enhancement Package 1
- SAP NetWeaver 7.4
- SAP NetWeaver 7.5
- SAP NetWeaver Application Server for ABAP 7.51 innovation package
  [https://help.sap.com/nw751abap](https://help.sap.com/nw751abap)
- SAP NetWeaver AS for ABAP 7.52
  [https://help.sap.com/nw752abap](https://help.sap.com/nw752abap)

**SAP Library Path (Continued)**

- Application Help ➤ Function-Oriented View ➤ Application Server ➤ Application Server ABAP ➤ Administration of Application Server ABAP ➤ Change and Transport System ➤ BC = Client Copy and Transport
6.22 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.

6.23 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:

https://help.sap.com/viewer/p/SAP_HANA_PLATFORM → Administration

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:

https://help.sap.com/viewer/product/SAP_HANA_COCKPIT/ → Administration

i Note

Make sure that you perform a “Complete Data Backup”.

6.24 SAP Systems Based on SAP NetWeaver 7.4 and Higher: 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 Library at:

<table>
<thead>
<tr>
<th>SAP Release and SAP Library Quick Link</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></td>
<td></td>
</tr>
<tr>
<td>SAP NetWeaver 7.5</td>
<td></td>
</tr>
<tr>
<td><a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></td>
<td></td>
</tr>
<tr>
<td>SAP NetWeaver Application Server for ABAP 7.51 innovation package</td>
<td></td>
</tr>
<tr>
<td><a href="https://help.sap.com/nw751abap">https://help.sap.com/nw751abap</a></td>
<td></td>
</tr>
<tr>
<td>SAP NetWeaver AS for ABAP 7.52</td>
<td></td>
</tr>
<tr>
<td><a href="https://help.sap.com/nw752abap">https://help.sap.com/nw752abap</a></td>
<td></td>
</tr>
</tbody>
</table>

• For the secure storage in the database, the key change is described in the SAP Library at:

<table>
<thead>
<tr>
<th>SAP Release and SAP Library Quick Link</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></td>
<td></td>
</tr>
<tr>
<td>SAP NetWeaver 7.5</td>
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</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>SAP NetWeaver Application Server for ABAP 7.51 innovation package</td>
<td></td>
</tr>
<tr>
<td><a href="https://help.sap.com/nw751abap">https://help.sap.com/nw751abap</a></td>
<td></td>
</tr>
<tr>
<td>SAP NetWeaver AS for ABAP 7.52</td>
<td></td>
</tr>
<tr>
<td><a href="https://help.sap.com/nw752abap">https://help.sap.com/nw752abap</a></td>
<td></td>
</tr>
</tbody>
</table>

**More Information**

See also the entry *Individual Encryption Key for the Secure Storage* in table *SAP System Parameters* in *SAP System Parameters [page 61]*.
6.25 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:

   ```
   [memorymanager]
   global_allocation_limit = <your HANA sizing result>
   ```

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.
6.26 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.

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 240].

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:
     \[
     \text{tar} -cf - <file\_system> | \text{compress} -c > <tape\_device>
     \]
   - Saving to the file system:
     \[
     \text{tar} -cf - <file\_system> | \text{compress} -c > ARCHIVENAME.tar.Z
     \]
Restoring Your Backup

If required, you can restore the data that you previously backed up.

⚠️ Caution

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 -
     ```

Only valid for 'Platform': Linux

i Note

Linux only: If you want to restore the data from a GNU tar archive, you have to execute the following command:

```
 tar -xzvf <ARCHIVENAME>.tgz
```
6.27 Logging on to the SAP Web Dispatcher Management Console

This section describes how to log on to the SAP Web Dispatcher.

Context

**Note**

This step is only required if you chose to install an embedded 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**
   
   ```
   ```
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 on how to change passwords of existing users using the Admin Handler, see the SAP Library at:

<table>
<thead>
<tr>
<th>SAP Release and SAP Library Quicklink</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SAP NetWeaver 7.3 including Enhancement Package 1 <a href="http://help.sap.com/nw731">http://help.sap.com/nw731</a></td>
<td>Application Help &gt; Function-Oriented View &gt; Application Server &gt; Application Server Infrastructure &gt; Components of SAP NetWeaver Application Server &gt; SAP Web Dispatcher &gt; Administration of the SAP Web Dispatcher &gt; Area menu Section &quot;HTTP Handler&quot;</td>
</tr>
<tr>
<td>• SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver Application Server for ABAP 7.51 innovation package <a href="http://help.sap.com/nw751abap">http://help.sap.com/nw751abap</a></td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver AS for ABAP 7.52 <a href="http://help.sap.com/nw752abap">http://help.sap.com/nw752abap</a></td>
<td></td>
</tr>
</tbody>
</table>

Related Information

ASCS Instance with Embedded SAP Web Dispatcher [page 38]

6.28 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 embedded SAP Web Dispatcher instance within the ASCS instance.

You can find the configuration information in the SAP Library at:
Related Information

ASCS Instance with Embedded SAP Web Dispatcher [page 38]

6.29 Gateway Configuration

You have to configure the gateway to be able to use it.

i Note
This step is only relevant if you installed a gateway embedded in the ASCS instance. For more information, see ASCS Instance with Embedded Gateway [page 40].

You can find all relevant configuration information in the gateway documentation in the SAP Library at:

<table>
<thead>
<tr>
<th>SAP Release and SAP Library Quicklink</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Application Help ➤ Function-Oriented View ➤ Application Server ➤ Application Server Infrastructure ➤ Components of SAP NetWeaver Application Server ➤ SAP Web Dispatcher</td>
</tr>
<tr>
<td>• SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
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<td></td>
</tr>
</tbody>
</table>
SAP Release and SAP Library Quicklink

- SAP NetWeaver 7.4
  http://help.sap.com/nw74
- SAP NetWeaver 7.5
  http://help.sap.com/nw75
- SAP NetWeaver Application Server for ABAP 7.51 innovation package
  https://help.sap.com/nw751abap
- SAP NetWeaver AS for ABAP 7.52
  https://help.sap.com/nw752abap

SAP Library Path (Continued)

- Application Help
- SAP NetWeaver Library: Function-Oriented View
- Application Server
- Application Server Infrastructure
- Components of SAP NetWeaver Application Server
- Gateway

Related Information

ASCS Instance with Embedded Gateway [page 40]
7 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.

7.1 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.

⚠️ Caution

SAP recommends that you no longer use the LDAP configuration options provided by the software provisioning manager, because current security guidelines make it unsafe to run SAP applications on a domain controller. Instead, SAP recommends that you follow the instructions in SAP Note 3251648 to enable LDAP directory service integration of your SAP system with Active 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.

ℹ️ 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 Library at:

**SAP Release and SAP Library Quick Link**

<table>
<thead>
<tr>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SAP NetWeaver 7.3 including Enhancement Package  1  <a href="http://help.sap.com/nw731">http://help.sap.com/nw731</a></td>
</tr>
<tr>
<td>• SAP NetWeaver 7.4  <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></td>
</tr>
<tr>
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</tr>
<tr>
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</tr>
</tbody>
</table>

**Prerequisites**

You can only configure the SAP system for Active Directory services or other LDAP directories if these are already available on the network. 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. 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>
</tbody>
</table>
### Operating System

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Required Software</th>
</tr>
</thead>
<tbody>
<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](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:

```ini
[Address]
Mode=LDAPdirectory
LDAPserver=
LDAPnode=
LDAPoptions=
```

Distinguish the following cases:

- If you use an Active Directory, you must set `LDAPoptions="DirType=NT5ADS"`. For more information, see the SAP system profile parameter ldap/options.
You must specify the directory servers (for example, `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 `dsclient`).

For more information, see the SAP system profile parameter `ldap/servers`.

- For other directory services, you can use `LDAPnode` to specify the distinguished name of the SAP root node. For more information, see the SAP system profile parameter `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 Library at:

<table>
<thead>
<tr>
<th>SAP Release and SAP Library Quick Link</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SAP NetWeaver 7.3 including Enhancement Package 1</td>
<td><a href="http://help.sap.com/nw731">Application Help ➤ Function-Oriented View ➤ Solution Life Cycle Management ➤ SAP Management Console</a></td>
</tr>
<tr>
<td>• SAP NetWeaver 7.4</td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver 7.5</td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver Application Server for ABAP 7.51 innovation package</td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver AS for ABAP 7.52</td>
<td></td>
</tr>
</tbody>
</table>

### 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 software provisioning manager to automatically:

  - **Caution**

    SAP recommends that you no longer use the LDAP configuration options provided by the software provisioning manager, because current security guidelines make it unsafe to run SAP applications on a domain controller. Instead, SAP recommends that you follow the instructions in SAP Note [3251648](https://help.sap.com/nw731) to enable LDAP directory service integration of your SAP system with Active Directory.

  - 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 software provisioning manager 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 software provisioning manager on Windows, see the documentation [Installation of SAP Systems Based on the Application Server ABAP of SAP NetWeaver 7.3 EHP1 to 7.52 on UNIX: SAP HANA Database](https://help.sap.com/docs/SOFTWARE_PROVISIONING_MGR_10/159a36e76fe84e54a703f846b08ae1f6/c8ed60927fa4e5988200b153ac63d1.html).

- **i Note**

  You have to configure the directory server only one time. Then all SAP systems that need to register in this directory server 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 software provisioning manager 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 software provisioning manager [page 137] once for your system and choose:

⚠️ Caution
SAP recommends that you no longer use the LDAP configuration options provided by the software provisioning manager, because current security guidelines make it unsafe to run SAP applications on a domain controller. Instead, SAP recommends that you follow the instructions in SAP Note 3251648 to enable LDAP directory service integration of your SAP system with Active Directory.

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.

7.2 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.
• 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.

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 and 1681092.

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.
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](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.

### 7.3 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.

⚠️ **Caution**

SAP recommends that you no longer use the LDAP configuration options provided by the software provisioning manager, because current security guidelines make it unsafe to run SAP applications on a domain controller. Instead, SAP recommends that you follow the instructions in SAP Note [3251648](http://support.sap.com/remoteconnection) to enable LDAP directory service integration of your SAP system with Active 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 198].

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
``` 

7.4 Exporting and Mounting Directories via NFS

Related Information

Exporting and Mounting Directories via NFS for Linux [page 209]
Exporting and Mounting Directories via NFS for AIX [page 207]
Exporting and Mounting Directories via NFS for Oracle Solaris [page 209]
Exporting and Mounting Directories via NFS for HP-UX [page 208]
7.4.1 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:
     
     ```
     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:
     
     ```
     vi /etc/exports
     ```
  c. Read the /etc/exports file and export all the directories listed:
     
     ```
     exportfs -a
     ```
  d. Confirm the exported directory listed:
     
     ```
     showmount -e
     ```
  e. Confirm the nfs client name and directory list:
     
     ```
     showmount -a
     ```
- Mounting the NFS filesystem on the client:
  a. Verify if the NFS server has exported the directory.
     
     ```
     showmount -e <server_name>
     ```
  b. Create the mounting directory if not already exist.
     
     ```
     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

7.4.2 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.
7.4.3 Exporting and Mounting Directories via NFS for Linux

To export directories via NFS, perform the following steps.

Context

The following procedure assumes that the central instance host is the NFS server.

Procedure

- To export and mount directories via NFS, consult the documentation of your Linux vendor.

7.4.4 Exporting and Mounting Directories via NFS for 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:

```bash
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.

```
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:
7.5 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

7.6 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 based on Application Server ABAP 7.4 or higher on the same host as the SAP HANA database as a high-availability setup with system replication. This approach is described in this section.

For more information about SAP HANA system replication, see section Availability and Scalability in the SAP HANA Administration Guide for SAP HANA Platform guide at https://help.sap.com/hana_platform

As of SAP HANA 2.0 SPS04, see the SAP HANA System Replication guide at https://help.sap.com/hana_platform

  ➤ Operate ➤ Administration

Overview [page 212]
Prerequisites [page 214]
Preparation [page 214]
Installation of SAP HANA [page 215]
Installation of the AS ABAP System [page 219]
Post-Installation Configuration [page 232]
Failover for Disaster Recovery [page 235]
Additional Information [page 238]
7.6.1 Overview

7.6.1.1 Installation Sequence

Context

You need to perform the following main steps to complete the installation:

Procedure

1. Check the Prerequisites [page 214].
2. Do the required Preparation [page 214] 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 215]
      2. Install the SAP HANA database instance on the secondary host (host B).
         For more information, see Installation of SAP HANA [page 215]
      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 218]
      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 219]
   Result [page 218]
   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 219]
      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 219]
      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 219]
4. Install the primary application server (PAS) instance on the primary host (host A).
   Fore more information, see Installation of the AS ABAP System [page 219]

4. Perform post-installation steps
   a. Back up the new SAP HANA database installation
      Fore more information, see Backing Up the SAP HANA Database [page 229]
   b. Disable autostart of the Enqueue Replication Server
      Fore more information, see Disabling Autostart of Enqueue Replication Server [page 230]
   c. Adapt the hdbuserstore
      Fore more information, see Adapting hdbuserstore [page 230]

5. Perform the post-installation configuration of the system:
   a. Configure SAP HANA system replication.
      Fore more information, see Enabling SAP HANA System Replication [page 233]
   b. Configure memory settings on SAP HANA and AS ABAP.
      Fore more information, see Configuring Memory Settings [page 234]
   c. Install the required Diagnostics Agents.
      Fore more information, see Diagnostics Agent Installation [page 235]

7.6.1.2 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 236]
2. Perform takeover of the SAP HANA database.
For more information, see Performing Takeover of the SAP HANA Database [page 237]

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 237]

Related Information

Failover for Disaster Recovery [page 235]

7.6.2 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.

7.6.2.1 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:
  - AS ABAP – see Hardware and Software Requirements [page 46]
- 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/hana
- Operating systems supported by SAP HANA are listed in SAP Note 2235581.

7.6.3 Preparation
7.6.3.1 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 131]

7.6.3.2 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:**
  - `<DA_sid>adm` (diagnostics agent), `<ABAP_sid>adm` (ABAP system), `<DB_sid>adm` (HANA database)
  - sapadm (SAP host agent)

**Related Information**

Creating Operating System Users and Groups [page 86]

7.6.4 Installation of SAP HANA

You need to install the SAP HANA database using the SAP HANAdatabase lifecycle manager (HDBLCM) 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](https://help.sap.com/hana)
For more information about required configuration steps, see section *Availability and Scalability* in the SAP HANA Administration Guide for SAP HANA Platform at https://help.sap.com/hana_platform ➔ Operate ➔ Administration.

As of SAP HANA 2.0 SPS04, see the SAP HANA System Replication guide at https://help.sap.com/hana_platform ➔ Operate ➔ Administration.

---

**Note**

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.

**Caution**

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.

---

### Prerequisites

To install the SAP HANA database beforehand, proceed as described in this section.

- To install the SAP HANA database beforehand, proceed as described in this section.
- Installing SAP HANA [page 217]
- Binding Virtual Host Names [page 218]
- Result [page 218]

---

#### 7.6.4.1 Prerequisites

To install the SAP HANA database beforehand, proceed as described in this section.

- You use the SAP HANA database lifecycle manager (HDBLCM) tool (hdblcm or the GUI version hdblcmgui) to install SAP HANA. In this documentation we use hdblcm.
- You must run the SAP HANA database lifecycle manager (HDBLCM) (hdblcm or hdblcmgui) as root user from the following directory where you downloaded [page 118] 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
  - <>/DATA_UNITS/HDB_LCM_LINUX_PPC64
7.6.4.2 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.
7.6.4.3 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 hadrbhan -netmask 255.255.252.0
```

7.6.4.4 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.

![Diagram showing Host A (PRIMARY), Shared File System, and Host B (SECONDARY)](image)

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 219]
Checking the SAP Host Agent [page 238]

7.6.5 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 software provisioning manager [page 137] 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 software provisioning manager [page 137] 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 software provisioning manager 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 software provisioning manager [page 137] 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.
7.6.5.1 Preparation

Mounting the Shared File Systems to Directories [page 220]
Binding the Virtual Host Names [page 221]
Reviewing the Installation Parameters [page 222]
Preparing the Installation Media [page 222]
   Download and set up the installation media, making sure you always use the current version.

7.6.5.1.1 Mounting the Shared File Systems to Directories

Context

On host A and on host B, do the following:

Procedure

1. Create the following directories:
   
   \texttt{mkdir -p /usr/sap/<SAPSID>}
   \texttt{mkdir -p /sapmnt/<SAPSID>}

2. Mount the shared file systems to these directories:
   
   \texttt{mount <hostname>:<export name / path>/usr/sap/<SAPSID>}
   \texttt{mount <hostname>:<export name / path>/sapmnt/<SAPSID>}

Related Information

Exporting and Mounting Global Directories [page 131]
7.6.5.1.2 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 hadrciamg -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
7.6.5.1.3 Reviewing the Installation Parameters

Procedure

During the installation, the software provisioning manager prompts you for several parameters. To review these before starting the installation, see Basic Installation Parameters [page 60].

Related Information

Basic Installation Parameters [page 60]

7.6.5.1.4 Preparing the Installation Media

Download and set up the installation media, making sure you always use the current version.

Context

This comprises:

- The SWPM10<...>.SAR archive, containing the software provisioning manager, which you can get from Download Software Provisioning Manager.
- The installation media of SAP BW/4 HANA, or SAP S/4HANA, or SAP Business Suite.

Procedure

Proceed as described in Preparing the Installation Media [page 107].

Related Information

Preparing the Installation Media [page 107]
7.6.5.2 Installation

1. Prerequisites [page 223]
2. Installing the ASCS Instance on Host A [page 223]
3. Installing the ERS Instance on Host B [page 225]
4. Installing the Contents of the Database Instance from Host B to Host A [page 226]
5. Installing the Primary Application Server Instance on Host A [page 227]

7.6.5.2.1 Prerequisites

- You use the software provisioning manager to install the various instances comprising the system SAP Business Suite.
- You check that you meet the prerequisites described in Prerequisites for Running Software Provisioning Manager [page 133].
- You use the installation options for a High-Availability System in the software provisioning manager, as described below.

Parent topic: Installation [page 223]

Next task: Installing the ASCS Instance on Host A [page 223]

7.6.5.2.2 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. Start the software provisioning manager as described in Running Software Provisioning Manager [page 137].

   *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 software provisioning manager with the `SAPINST_USE_HOSTNAME` property:

   `./sapinst SAPINST_USE_HOSTNAME=<virtual host name of ASCS instance>`
For example, if your virtual host name is `hadrcsamg`, enter the following command: `.sapinst
SAPINST_USE_HOSTNAME=hadrcsamg`

b. On the Welcome screen, choose the option:

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 software provisioning manager, entering the parameters you defined.

⚠️ **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.

⚠️ **Caution**

If you did not start the software provisioning manager 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 Start.

Results

The software provisioning manager starts the installation and displays the progress of the installation. When the installation has finished, the software provisioning manager shows the message:

Execution of `<Option_Name>` has completed.

Task overview: Installation [page 223]

Previous: Prerequisites [page 223]

Next task: Installing the ERS Instance on Host B [page 225]

Related Information

Reviewing the Installation Parameters [page 222]
Running Software Provisioning Manager [page 137]
7.6.5.2.3 Installing the ERS Instance on Host B

Procedure

1. Log on to host B as the 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. Start the software provisioning manager as described in Running Software Provisioning Manager [page 137].
   b. On the Welcome screen, choose the option:
      |  <your SAP Business Suite scenario>  ➔  SAP HANA Database  ➔  Installation  ➔  Application Server ABAP  ➔  High-Availability System  ➔  Enqueue Replication Server Instance |
   c. Choose Next.
   d. Follow the instructions in the software provisioning manager, 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.
      The software provisioning manager starts the installation and displays the progress of the installation. When the installation has finished, the software provisioning manager 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
7.6.5.2.4 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. Start the software provisioning manager as described in Running Software Provisioning Manager [page 137].
   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 software provisioning manager, entering the parameters you defined.
△ Caution

When the software provisioning manager 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.

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 software provisioning manager starts the installation and displays the progress of the installation. When the installation has finished, the software provisioning manager shows the message:

Execution of <Option_Name> has completed.

Task overview: Installation [page 223]

Previous task: Installing the ERS Instance on Host B [page 225]

Next task: Installing the Primary Application Server Instance on Host A [page 227]

Related Information

Reviewing the Installation Parameters [page 222]
Running Software Provisioning Manager [page 137]

7.6.5.2.5 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. Start the software provisioning manager as described in Running Software Provisioning Manager [page 137].

**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 software provisioning manager with the `SAPINST_USE_HOSTNAME` property:

```
./sapinst SAPINST_USE_HOSTNAME=<virtual host name for PAS instance>
```

For example, if your virtual host name is `hadrciamg`, enter the following command:

```
./sapinst SAPINST_USE_HOSTNAME=hadrciamg
```

b. On the Welcome screen, choose the option:

```plaintext
<your SAP Business Suite scenario> ➤ SAP HANA Database ➤ Installation ➤ Application Server ABAP ➤ High-Availability System ➤ Primary Application Server Instance
```

c. Choose Next.

d. Follow the instructions in the software provisioning manager, 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 software provisioning manager 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 software provisioning manager starts the installation and displays the progress of the installation. When the installation has finished, the software provisioning manager shows the message:

`Execution of <Option_Name> has completed.`

**Task overview:** Installation [page 223]

**Previous task:** Installing the Contents of the Database Instance from Host B to Host A [page 226]
Related Information

Reviewing the Installation Parameters [page 222]
Running Software Provisioning Manager [page 137]

7.6.5.3 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 229]
  We recommend that you back up the SAP HANA database after the installation has completed.
- Disabling Autostart of Enqueue Replication Server [page 230]
- Adapting hdbuserstore [page 230]

Related Information

Checking Replication of the Lock Table [page 239]

7.6.5.3.1 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:

https://help.sap.com/viewer/p/SAP_HANA_PLATFORM ➔ Administration ➔ Administration

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:

https://help.sap.com/viewer/product/SAP_HANA_COCKPIT/ ➔ Administration ➔ Administration

i Note

Make sure that you perform a “Complete Data Backup”.

Installation of SAP Systems Based on the Application Server ABAP of SAP NetWeaver 7.3 EHP1 to 7.52 on UNIX: SAP HANA Database

Additional Information
7.6.5.3.2 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>
```

7.6.5.3.3 Adapting hdbuserstore

Context

On host A and B, the software provisioning manager 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:
7.6.5.4 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:

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:
  - <ABAP SID> = ASCS01 (virtual host: hadrcsamg)
  - <ABAP SID> = ERS11 (virtual host: hadreramg)
  - <ABAP SID> = DVEBMGS10 (virtual host: hadrciamg)
- `<HANA SID>` = HAN (instance HDB00) running on physical hosts:
  - <HANA SID> = hdsnhar17
  - <HANA SID> = hdsnara02

For more information on how to start and stop SAP instances, see Starting and Stopping SAP System Instances [page 240].
7.6.6 Post-Installation Configuration

Configuration of SAP HANA System Replication [page 232]

Configuring Memory Settings [page 234]
You have to make sure that the SAP system and the SAP HANA database do not compete for memory resources.

Diagnostics Agent Installation [page 235]

7.6.6.1 Configuration of SAP HANA System Replication

Enabling SAP HANA System Replication [page 233]

Registering the Secondary SAP HANA System for Replication [page 233]
7.6.6.1 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 ➤ Next*.
3. Enter the *Primary System Logical Name* and choose *Finish*.

7.6.6.1.2 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 ➤ Start the secondary system after registration ➤ Finish*.
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 239)
7.6.6.2  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 \texttt{PHYS\_MEMSIZE} and you configure the values for the SAP HANA database with \texttt{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:
      
      \texttt{/usr/sap/<DB\_SID>/SYS/global/hdb/custom/config/global.ini}
      
      It must look as follows:
      
      \begin{verbatim}
      [memorymanager]
      global_allocation_limit = <your HANA sizing result>
      \end{verbatim}
   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 \texttt{PHYS\_MEMSIZE} to a value suitable for your host size.
7.6.6.3 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 - Software Provisioning Manager Versions
• http://wiki.scn.sap.com/wiki/display/SMSETUP/Diagnostics+Agent+and+HA+Support
• Diagnostics Agent installation guides at https://help.sap.com/viewer/swpm10guides System Provisioning Install a System using Software Provisioning Manager Installation Guides - Standalone Engines and Clients Software Provisioning Manager 1.0 Diagnostics Agent

7.6.7 Failover for Disaster Recovery

You perform the procedures below if host A fails so that the system can resume operation on host B.

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 236]
Performing Takeover of the SAP HANA Database [page 237]
Registering and Starting Failed Instance Services and Instances from Host A on Host B [page 237]
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:

\[ /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr hadrciamg -netmask 255.255.252.0 \]

\[ /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr hadrcsamg -netmask 255.255.252.0 \]

\[ /usr/sap/hostctrl/exe/saphostctrl -function AddIpAddress -ifName eth0 -addr hadrdbhan -netmask 255.255.252.0 \]
7.6.7.2 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:

```sh
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**.

7.6.7.3 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:

   ```sh
   LD_LIBRARY_PATH=/usr/sap/<SAPSID>/ASCS<number of ASCS instance>/exe:$LD_LIBRARY_PATH; export LD_LIBRARY_PATH;
   /usr/sap/<SAPSID>/ASCS<number of ASCS instance>/exe/sapstartsrv pf=/usr/sap/<SAPSID>/SYS/profile/<SAPSID>_ASCS<number of ASCS instance>._<virtual host name of ASCS instance> -D -u <sapsid>adm
   
   LD_LIBRARY_PATH=/usr/sap/<SAPSID>/DVEBMGS<number of PAS instance>/exe:$LD_LIBRARY_PATH; export 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

7.6.8 Additional Information

Checking the SAP Host Agent [page 238]
Checking Replication of the Lock Table [page 239]
Checking SAP HANA System Replication [page 239]

7.6.8.1 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.

7.6.8.2 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 \(<\text{sid}>\)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

7.6.8.3 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 \(\rightarrow\) Landscape \(\rightarrow\) System Replication.

   The entry in the column \(\text{REPLICATION\_STATUS}\) for each host is as follows if SAP HANA system replication is functioning correctly:

   ACTIVE
7.7 Installing the SAP Host Agent Separately

The SAP Host Agent is installed automatically during the installation of new SAP instances with SAP kernel 7.20 or higher (embedded installation). If you need to install the SAP Host Agent separately, use the documentation Installation of SAP Host Agent on UNIX - Using Software Provisioning Manager 1.0 at:

https://support.sap.com/sltoolset  ➤  System Provisioning  ➤  Install a System using Software Provisioning Manager  ➤  Installation Option of Software Provisioning Manager 1.0 SP <Current Version>  ➤  Installation Guides - Standalone Engines and Clients  ➤  SAP Host Agent

7.8 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 240]
- Using commands [page 244].

7.8.1 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.
i Note

If your Web browser no longer supports Java applet technology, you can configure the SAP MC to run locally on your PC. For more information, see section Configuring SAP MC locally in SAP Note 1014480.

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 Library at:

<table>
<thead>
<tr>
<th>SAP Release and SAP Library Quick Link</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SAP NetWeaver 7.3 including Enhancement Package 1</td>
<td>Application Help ➤ Function-Oriented View ➤ Solution Life Cycle Management ➤ SAP Management Console</td>
</tr>
<tr>
<td>• SAP NetWeaver 7.4</td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver 7.5</td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver Application Server for ABAP 7.51</td>
<td></td>
</tr>
<tr>
<td>innovation package</td>
<td></td>
</tr>
<tr>
<td><a href="https://help.sap.com/nw751abap">https://help.sap.com/nw751abap</a></td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver AS for ABAP 7.52</td>
<td></td>
</tr>
<tr>
<td><a href="https://help.sap.com/nw752abap">https://help.sap.com/nw752abap</a></td>
<td></td>
</tr>
</tbody>
</table>

• 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 Library at:

<table>
<thead>
<tr>
<th>Release SAP Library Quick Link</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• SAP NetWeaver 7.4</td>
<td></td>
</tr>
<tr>
<td><img src="https://help.sap.com/nw74" alt="http://help.sap.com/nw74" /></td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver 7.5</td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver Application Server for ABAP 7.51 innovation package</td>
<td></td>
</tr>
<tr>
<td>• SAP NetWeaver AS for ABAP 7.52</td>
<td></td>
</tr>
<tr>
<td><img src="https://help.sap.com/nw752abap" alt="https://help.sap.com/nw752abap" /></td>
<td></td>
</tr>
</tbody>
</table>

**Note**

**Linux only:** If your server runs on a Linux distribution using systemd version 234 or later, it’s technically possible that you use systemd commands on operating system level to start and stop SAP systems. However, we recommend that you **do not** use these systemd commands. For example, using systemd to restart or stop the systemd unit will not only stop the start service, but the entire related SAP instance with time limits for the processes to shut down. This might end in unexpected results. To start and stop SAP instances, we recommend that you use the SAP Management Console, as outlined here, or the `sapcontrol` commands (see also Starting and Stopping SAP System Instances Using Commands [page 244]). For more information about systemd, see SAP Note 3139184.

**End of ‘Platform’: Linux**

### Procedure

- **Starting the Web-Based SAP Management Console**
  1. Start a Web browser and enter the following URL:
     ![http://<Host_Name>:5<Instance_Number>13](https://help.sap.com/nw731)

    **Example**

    If the instance number is 53 and the host name is `saphost06`, you enter the following URL:

    ![http://saphost06:55313](https://help.sap.com/nw731)

    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[VEBMGS]<Instance_Number>`.

**i Note**
In SAP systems based on SAP NetWeaver 7.5 or higher, the primary application server instance is named `D<Instance_Number>`.

In SAP systems based on SAP NetWeaver 7.4 or lower, the primary application server instance is named `DVEBMGS<Instance_Number>`.

4. Start additional application server instances `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 **Stop** from the context menu.
2. In the **Stop SAP System(s)** dialog box, choose the required options.
3. Choose **OK**.
   The SAP MC stops 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.

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 D<Instance_Number>, if there are any.
2. Stop the primary application server instance D[VEBMGS]<Instance_Number>.

i Note

In SAP systems based on SAP NetWeaver 7.5 or higher, the primary application server instance is named D<Instance_Number>.

In SAP systems based on SAP NetWeaver 7.4 or lower, the primary application server instance is named DVEBMGS<Instance_Number>.

3. Stop the ABAP central services instance ASCS<Instance_Number>.
4. Stop the database instance.

7.8.2 Starting and Stopping SAP System Instances Using Commands

Prerequisites

You are logged on to the SAP system host as user <sapsid>adm.

Context

i Note

The startsap and stopsap commands are deprecated. SAP recommends that you do not use them any longer. For more information, see SAP Notes 1763593 and 809477.

Only valid for 'Platform': Linux

Linux only: If your server runs on a Linux distribution using systemd version 234 or later, it’s technically possible that you use systemd commands on operating system level to start and stop SAP systems. However, we recommend that you do not use these systemd commands. For example, using systemd to restart or stop the systemd unit will not only stop the start service, but the entire related SAP instance with time limits for the processes to shut down. This might end in unexpected results. To start and stop SAP instances, we recommend that you use the sapcontrol commands or the SAP Management Console.
This section only lists the basic commands how to start or stop an SAP system. You can find a detailed list of all SAPControl options and features in the command line help, which you can call as follows:

```
/usr/sap/<SAPSID>/<INSTANCE><NUMBER>/exe/sapcontrol --help
```

### Example

```
/usr/sap/GB1/D00/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

\(<\text{Instance\_Number}>\) can be the number of any instance of the SAP system):

```
/usr/sap/<SAPSID>/<INSTANCE><NUMBER>/exe/sapcontrol -nr \(<\text{instance\_number}>\)
-flatfunction StartSystem
```

**Example**

```
/usr/sap/GB1/D00/exe/sapcontrol -nr 01 -function StartSystem
```

**Starting an SAP System Instance**

You can start an SAP system instance by executing the following commands from the command line:

```
/usr/sap/<SAPSID>/<INSTANCE><NUMBER>/exe/sapcontrol -nr \(<\text{instance\_number}>\)
-host <remote\_host> -user <sapsid>adm <password> -function Start
```

**Example**

```
Starting an instance with <instance\_number> 02: /usr/sap/GB1/D00/exe/sapcontrol -nr 02 -function Start
```

For remote instances, the syntax is slightly different, because you also have to apply the `--host` and `--user` parameters:

```
/usr/sap/<SAPSID>/<INSTANCE><NUMBER>/exe/sapcontrol -nr \(<\text{instance\_number}>\)
-host <remote\_host> -user <sapsid>adm <password> -function Start
```

**Example**

```
Starting a remote instance with <instance\_number> 02: /usr/sap/GB1/D00/exe/
spcontrol -nr 02 -host myremotehost -user gbladm -function Start
```

### Stopping an SAP System or Instance

- **Stop the SAP System**

```
/usr/sap/<SAPSID>/<INSTANCE><NUMBER>/exe/sapcontrol -nr \(<\text{instance\_number}>\)
-flatfunction StopSystem
```

**Example**

```
/usr/sap/GB1/D00/exe/sapcontrol -nr 01 -function StopSystem
```

**Stop the SAP System Instance**

```
/usr/sap/<SAPSID>/<INSTANCE><NUMBER>/exe/sapcontrol -nr \(<\text{instance\_number}>\)
-host <remote\_host> -user <sapsid>adm <password> -function Stop
```

**Example**

```
Starting a remote instance with <instance\_number> 02: /usr/sap/GB1/D00/exe/
spcontrol -nr 02 -host myremotehost -user gbladm -function Stop
```
• 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):

```
/usr/sap/<SAPSID>/<INSTANCE><NUMBER>/exe/sapcontrol -nr <instance_number> -function StopSystem
```

**Example**

```
/usr/sap/GB1/D00/exe/sapcontrol -nr 01 -function StopSystem
```

• Stopping an SAP System Instance
You can stop an SAP system instance by executing the following commands from the command line:

```
/usr/sap/<SAPSID>/<INSTANCE><NUMBER>/exe/sapcontrol -nr <instance_number> -function Stop
```

**Example**

Stopping an instance with <instance_number> 02:

```
/usr/sap/GB1/D00/exe/sapcontrol -nr 02 -function Stop
```

For remote instances, the syntax is slightly different, because you also have to apply the -host and -user parameters:

```
/usr/sap/<SAPSID>/<INSTANCE><NUMBER>/exe/sapcontrol -nr <instance_number> -host <remote host> -user <sapsid>adm <password> -function Stop
```

**Example**

Stopping a remote instance with <instance_number> 02:

```
/usr/sap/GB1/D00/exe/sapcontrol -nr 02 -host myremotehost -user gb1adm -function Stop
```

**Note**
The database is not stopped by these commands. You have to stop the database using database-specific tools or commands.

• 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):

```
/usr/sap/<SAPSID>/<INSTANCE><NUMBER>/exe/sapcontrol -nr <instance_number> -host <remote host> -user <sapsid>adm <password> -function GetSystemInstanceList
```

**Example**

```
/usr/sap/GB1/D00/exe/sapcontrol -nr 02 -host myremotehost -user gb1adm -function GetSystemInstanceList
```

• With the following command you get a list of instance processes and their status:

```
/usr/sap/<SAPSID>/<INSTANCE><NUMBER>/exe/sapcontrol -nr <instance_number> -host <remote host> -user <sapsid>adm <password> -function GetProcessList
```

Installation of SAP Systems Based on the Application Server ABAP of SAP NetWeaver 7.3 EHP1 to 7.52 on UNIX: SAP HANA Database

Additional Information
Example

```
/usr/sap/GB1/D00/exe/sapcontrol -nr 02 -host myremotehost -user gbladm -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.

### 7.9 Uninstalling an SAP System or Single Instances

This section describes how to uninstall a complete SAP system or single SAP instances with the *Uninstall* option of the software provisioning manager.

**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 software provisioning manager. 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 software provisioning manager as described in Running Software Provisioning Manager [page 137].

2. On the Welcome screen, choose:

   GENERIC INSTALLATION OPTIONS > DATABASE > UNINSTALL > UNINSTALL SAP SYSTEMS OR SINGLE INSTANCES

3. Follow the instructions on the software provisioning manager screens to delete a complete SAP system or single instances.

   ![Note](image)

   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 software provisioning manager.

<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 software provisioning manager 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 software provisioning manager to delete the required instances locally on each of the hosts belonging to the SAP system in the following sequence:

⚠️ Caution
Only select checkbox **Uninstall all instances of the SAP system from this host** when removing the last remaining instance of the SAP system. Otherwise the contents of mounted global directories under `/<sapmnt>/<SAPSID>/` such as instance profiles and kernel executables, are also deleted.

1. Additional application server instances, if there are any
2. Primary application server instance
3. Database instance
   Do not delete the SAP HANA database instance. However, you can delete the database clients and the database users on the SAP application servers.
4. ABAP Central services instance (ASCS)

ℹ️ Note
To delete system directories mounted from an NFS server, you have to run the software provisioning manager on the NFS server.

Additional application server

If you want to delete additional application server instances of an existing SAP system, you have to run the software provisioning manager 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.
7.10 Switching to Native systemd Support for sapstartsrv

This topic is only valid for ‘Platform’: Linux

Learn how you can switch from the SysV init mode to native systemd support in SAP systems running on Linux.

Prerequisites

Make sure polkit is installed. The software suite systemd requires polkit for authorization checks for the <sapsid>adm user.

Context

An SAP system is not directly managed by the operating system init system, but you start and stop an SAP system using the SAP startup framework. The sapstartsrv daemon provides an external interface for clients to initiate different tasks, like start/stop of the system or more complex operations related to high availability solutions.

For previous kernel versions and older Linux releases, sapstartsrv used the SysV init system, which, in combination with systemd, results in the systemd compatibility mode as its technical basis in Linux operation systems.

Starting with SUSE Linux Enterprise Server 15, Red Hat Enterprise Linux 8, and Oracle Linux 8, and the respective SAP kernel patch levels, native support for the software suite systemd for Linux is available for SAP systems. When you install SAP systems using software provisioning manager, native systemd support is automatically activated. Existing SAP systems, however, are not automatically switched to native systemd support, but you can perform the switch manually.

Procedure

1. In SAP Note 3139184, check whether systemd is supported for your kernel version and Linux distribution and operating system version.

2. If you want to switch from systemd compatibility mode to native systemd support for sapstartsrv, follow the steps in SAP Note 3115048.

End of ‘Platform’: Linux
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