



Installation Guide | PUBLIC

Software Provisioning Manager 1.0 SP43

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# Installation of SAP Systems Based on the Application Server Java of SAP NetWeaver 7.5 and SAP Solution Manager 7.2 SR2 Java : MS SQL Server

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# Document History

## Note

Before you start reading, make sure you have the latest version of this installation guide, which is available at <https://support.sap.com/sitoolset> > System Provisioning > Install a System using Software Provisioning Manager > Installation Option of Software Provisioning Manager 1.0 .

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

Version	Date	Description
4.9	2025-02-10	Updated version for software provisioning manager 1.0 SP43 (SL Toolset 1.0 SP43)
4.8	2024-10-07	Updated version for software provisioning manager 1.0 SP42 (SL Toolset 1.0 SP42)
4.7	2024-05-27	Updated version for software provisioning manager 1.0 SP41 (SL Toolset 1.0 SP41)
4.6	2024-02-12	Updated version for software provisioning manager 1.0 SP40 (SL Toolset 1.0 SP40)
4.5	2023-10-09	Updated version for software provisioning manager 1.0 SP39 (SL Toolset 1.0 SP39) Windows operating systems no longer supported for software provisioning manager 1.0 SP39 and higher, according to SAP Note <a href="#">2998013</a> , have been removed.
4.4.1	2023-10-09	Updated version for software provisioning manager 1.0 SP38 (SL Toolset 1.0 SP38): Last version containing information about no longer supported Windows operating systems according to SAP Note <a href="#">3346502</a> .
4.4	2023-05-26	Updated version for software provisioning manager 1.0 SP38 (SL Toolset 1.0 SP38)
4.3	2023-02-13	Updated version for software provisioning manager 1.0 SP37 (SL Toolset 1.0 SP37)
4.2	2022-10-10	Updated version for software provisioning manager 1.0 SP36 (SL Toolset 1.0 SP36) Operating systems and CPU architectures no longer supported according to SAP Note <a href="#">2998013</a> have been removed.
4.1.1	2022-10-10	Updated version for software provisioning manager 1.0 SP35 (SL Toolset 1.0 SP35): Last version containing information about no longer supported operating systems and CPU architectures according to SAP Note <a href="#">2998013</a> .
4.1	2022-05-24	Updated version for software provisioning manager 1.0 SP35 (SL Toolset 1.0 SP35)
4.0	2022-02-14	Updated version for software provisioning manager 1.0 SP34 (SL Toolset 1.0 SP34)
3.9	2021-10-11	Updated version for software provisioning manager 1.0 SP33 (SL Toolset 1.0 SP33)



Version	Date	Description
3.8	2021-06-21	Updated version for software provisioning manager 1.0 SP32 (SL Toolset 1.0 SP32)
3.7	2021-02-15	Updated version for software provisioning manager 1.0 SP31 (SL Toolset 1.0 SP31)
3.6	2020-10-05	Updated version for software provisioning manager 1.0 SP30 (SL Toolset 1.0 SP30)
3.5	2020-06-08	Updated version for software provisioning manager 1.0 SP29 (SL Toolset 1.0 SP29)
3.4	2020-01-20	Updated version for software provisioning manager 1.0 SP28 (SL Toolset 1.0 SP28)
3.3	2019-09-16	Updated version for software provisioning manager 1.0 SP27 (SL Toolset 1.0 SP27)
3.2	2019-05-27	Updated version for software provisioning manager 1.0 SP26 (SL Toolset 1.0 SP26)
3.1	2019-01-21	Updated version for software provisioning manager 1.0 SP25 (SL Toolset 1.0 SP25)
3.0	2018-09-17	<p>Updated version for software provisioning manager 1.0 SP24 (SL Toolset 1.0 SP24)</p> <ul style="list-style-type: none"> <li>New Features <ul style="list-style-type: none"> <li>Only valid for 'High Availability': HA (Windows) High-availability system on Microsoft Cluster: Option to install the SCS instance distributed to local disks and a file share instead of a shared disk, documented in: <i>High Availability with Microsoft Failover Clustering</i></li> <li>End of 'High Availability': HA (Windows)</li> <li>New Look and Feel of SL-UI with Software Provisioning Manager 1.0 SP24, Patch Level 05, documented in: <i>New Features, Prerequisites for Running the Software Provisioning Manager</i></li> </ul> </li> </ul>
2.9	2018-05-07	<p>Updated version for software provisioning manager 1.0 SP23 (SL Toolset 1.0 SP23)</p> <ul style="list-style-type: none"> <li>New Features: <ul style="list-style-type: none"> <li>New Software Provisioning Manager Option <a href="#">Download Media for a Maintenance Plan</a>, documented in: <i>New Features, Downloading the Media for a Maintenance Planner Transaction</i></li> <li>Option to install the SCS instance with an embedded SAP Web Dispatcher , documented in: <i>New Features, SCS Instance with Embedded SAP Web Dispatcher, Parameters for Additional Components to be Included in the SCS Instance</i></li> </ul> </li> </ul>

Version	Date	Description
2.8	2018-01-15	<p>Updated version for Software Provisioning Manager 1.0 SP22 (SL Toolset 1.0 SP22)</p> <ul style="list-style-type: none"> <li>• New Features: <ul style="list-style-type: none"> <li>• Digital signature check for installation archives, documented in: <i>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</i></li> <li>• Software provisioning manager Log Files Improvements, documented in: <i>New Features, Useful Information about the Software Provisioning Manager, Troubleshooting with the Software Provisioning Manager</i></li> <li>• Enabling IPv6, documented in: <i>New Features, Prerequisites for Running the Software Provisioning Manager</i></li> </ul> </li> <li>• <i>New Features</i> section restructured: As of SP22, a dedicated subsection for each new SP has been created. New features below SP22 remain in a common table.</li> <li>• 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: <ul style="list-style-type: none"> <li>• The following sections which were explicitly related to Java SDT GUI were completely removed from this documentation: <i>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</i> (general accessibility information was moved to <i>Useful Information About the Software Provisioning Manager</i>).</li> <li>• The Java SDT GUI-specific information was removed from the common software provisioning manager sections: <i>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</i></li> </ul> </li> <li>• New section <i>Using the Step State Editor (SAP Support Experts Only)</i> was added to section <i>Additional Information About the Software Provisioning Manager</i></li> <li>• Option to install the SCS instance with an embedded SAP Web Dispatcher , documented in: <i>New Features, SCS Instance with Embedded SAP Web Dispatcher, Additional Parameters for an SAP Web Dispatcher Installation Embedded in the SCS Instance (Optional)</i></li> </ul>

#### Note

This feature was retroactively released on 2018-02-12.



Version	Date	Description
2.7	2017-09-11	<p>Updated version for software provisioning manager 1.0 SP21 (SL Toolset 1.0 SP21)</p> <ul style="list-style-type: none"> <li>New Features: <ul style="list-style-type: none"> <li>Media Signature Check, documented in: <i>New Features, Running the Software Provisioning Manager, Preparing the Installation Media</i> . This feature implies that section <i>Creating Kernel Archives from an Existing SAP System</i> has been deleted from this documentation because the related option in the software provisioning manager had to be removed.</li> <li>Download Media for a Maintenance Plan, documented in: <i>New Features, Downloading Media for a Maintenance Plan</i></li> <li>SAP Host Agent Upgrade , documented in: <i>New Features, SAP System Parameters, Downloading SAP Kernel Archives (Archive-Based Installation)</i></li> </ul> </li> </ul>
2.6	2017-05-22	<p>Updated version for software provisioning manager 1.0 SP20 (SL Toolset 1.0 SP20)</p> <ul style="list-style-type: none"> <li>New Features: <ul style="list-style-type: none"> <li>New SAPUI5-based graphical user interface (GUI) "SL-UI", documented in: <i>Prerequisites for Running the Software Provisioning Manager, Running the Software Provisioning Manager, Useful Information About the Software Provisioning Manager</i></li> </ul> </li> </ul>
2.5	2017-02-06	Updated version for software provisioning manager 1.0 SP19 (SL Toolset 1.0 SP19)
2.4	2016-10-10	Updated version for software provisioning manager 1.0 SP18 (SL Toolset 1.0 SP18)
2.3	2016-06-06	<p>Updated version for software provisioning manager 1.0 SP17 (SL Toolset 1.0 SP17):</p> <ul style="list-style-type: none"> <li>New Features: <ul style="list-style-type: none"> <li>" Archive-Based Installation", documented in: <ul style="list-style-type: none"> <li><a href="#">New Features [page 18]</a></li> <li><a href="#">Preparing the Installation Media [page 72]</a>  <a href="#">Downloading Specific Installation Archives (Archive-Based Installation)</a> </li> </ul> </li> </ul> </li> </ul>
2.2	2016-02-15	Updated version
2.1	2015-10-12	Updated version
2.0	2015-09-14	Updated version
1.9	2015-04-27	Updated version
1.8	2014-11-24	Updated version
1.7	2014-07-07	Updated version
1.6	2014-03-17	Updated version
1.5	2013-10-28	Updated version

<b>Version</b>	<b>Date</b>	<b>Description</b>
1.4	2013-07-15	Updated version
1.3	2013-04-02	Updated version
1.2	2012-12-17	Updated version
1.1	2012-09-25	Updated version
1.0	2012-08-06	Initial version

# 1 About this Document

This installation guide describes how to install an SAP system based on the application server **Java** of and SAP Solution Manager 7.2 SR2 Java, using the installation tool software provisioning manager 1.0 SP43 (“software provisioning manager” for short), which is part of SL Toolset 1.0 SP43.

This guide covers the SAP system products and releases listed in [SAP Products Based on SAP NetWeaver 7.5 and SAP Solution Manager 7.2 SR2 Java Supported for Installation Using Software Provisioning Manager 1.0](#) [page 12].

## 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](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 16] before you continue with this installation guide.

### [SAP Products Based on SAP NetWeaver 7.5 and SAP Solution Manager 7.2 SR2 Java Supported for Installation Using Software Provisioning Manager 1.0](#) [page 12]

Here you can find a list of the SAP products based on SAP NetWeaver 7.5 Java and SAP Solution Manager 7.2 SR2 Java that are supported for installation using Software Provisioning Manager 1.0, on the specific operating system and database combination described in this guide.

### [Naming Conventions](#) [page 13]

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

### [Constraints](#) [page 14]

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

### [Before You Start](#) [page 16]

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

### [SAP Notes for the Installation](#) [page 17]

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

### [New Features](#) [page 18]

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

# 1.1 SAP Products Based on SAP NetWeaver 7.5 and SAP Solution Manager 7.2 SR2 Java Supported for Installation Using Software Provisioning Manager 1.0

Here you can find a list of the SAP products based on SAP NetWeaver 7.5 Java and SAP Solution Manager 7.2 SR2 Java that are supported for installation using Software Provisioning Manager 1.0, on the specific operating system and database combination described in this guide.

SAP Product	Based on the following SAP NetWeaver Release
SAP Business Suite 7i 2016: <ul style="list-style-type: none"> <li>EHP4 for SAP CRM 7.0 Java</li> <li>EHP8 for SAP ERP 6.0 Java</li> <li>EHP4 for SAP SRM 7.0 Java</li> </ul>	SAP NetWeaver 7.5 <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p><b>Note</b></p> <p>For implementing <b>SAP Business Suite systems based on the Application Server Java of SAP NetWeaver 7.5</b> you have to run an <a href="#">Installation Using a Stack XML File [page 31]</a> since the installation options for these product releases are no longer available on the <i>Welcome</i> screen of Software Provisioning Manager 1.0.</p> </div>
SAP Business Suite 7i 2013 Support Release 2: <ul style="list-style-type: none"> <li>EHP3 for SAP CRM 7.0 Java Support Release 2 (<b>exception:</b> SAP CRM Application Server Java not supported on SAP NetWeaver 7.5)</li> <li>EHP7 for SAP ERP 6.0 Java Support Release 2 (<b>exception:</b> SAP XECO not supported on SAP NetWeaver 7.5)</li> <li>EHP3 for SAP SRM 7.0 Java Support Release 2</li> </ul>	SAP NetWeaver 7.5 <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p><b>Note</b></p> <p>For implementing <b>SAP Business Suite systems based on the Application Server Java of SAP NetWeaver 7.5</b> you have to run an <a href="#">Installation Using a Stack XML File [page 31]</a> since the installation options for these product releases are no longer available on the <i>Welcome</i> screen of Software Provisioning Manager 1.0.</p> </div>
SAP Business Suite 7i 2011 Java: <ul style="list-style-type: none"> <li>EHP2 for SAP CRM 7.0 Java (<b>exception:</b> SAP CRM Application Server Java not supported on SAP NetWeaver 7.5)</li> <li>EHP6 for SAP ERP 6.0 Java (<b>exception:</b> SAP XECO not supported on SAP NetWeaver 7.5)</li> <li>EHP2 for SAP SRM 7.0 Java</li> </ul>	SAP NetWeaver 7.5 <div style="border: 1px solid #ccc; padding: 5px; margin-top: 10px;"> <p><b>Note</b></p> <p>For implementing <b>SAP Business Suite systems based on the Application Server Java of SAP NetWeaver 7.5</b> you have to run an <a href="#">Installation Using a Stack XML File [page 31]</a> since the installation options for these product releases are no longer available on the <i>Welcome</i> screen of Software Provisioning Manager 1.0.</p> </div>

SAP Product	Based on the following SAP NetWeaver Release
<p>SAP Business Suite 7i 2010 Java:</p> <ul style="list-style-type: none"> <li>EHP1 for SAP CRM 7.0 Java (<b>exception:</b> SAP CRM Application Server Java not supported on SAP NetWeaver 7.5)</li> <li>EHP5 for SAP ERP 6.0 Java (<b>exception:</b> SAP XECO not supported on SAP NetWeaver 7.5)</li> </ul>	<p>SAP NetWeaver 7.5</p> <div data-bbox="826 427 1382 656" style="border: 1px solid #ccc; padding: 5px;"> <p><b>Note</b></p> <p>For implementing <b>SAP Business Suite systems based on the Application Server Java of SAP NetWeaver 7.5</b> you have to run an <a href="#">Installation Using a Stack XML File [page 31]</a> since the installation options for these product releases are no longer available on the <i>Welcome</i> screen of Software Provisioning Manager 1.0.</p> </div>
<p>SAP Business Suite 7 Java:</p> <ul style="list-style-type: none"> <li>SAP CRM 7.0 Java (<b>exception:</b> SAP CRM Application Server Java not supported on SAP NetWeaver 7.5)</li> <li>EHP4 for SAP ERP 6.0 Java (<b>exception:</b> SAP XECO not supported on SAP NetWeaver 7.5)</li> </ul>	<p>SAP NetWeaver 7.5</p> <div data-bbox="826 768 1382 996" style="border: 1px solid #ccc; padding: 5px;"> <p><b>Note</b></p> <p>For implementing <b>SAP Business Suite systems based on the Application Server Java of SAP NetWeaver 7.5</b> you have to run an <a href="#">Installation Using a Stack XML File [page 31]</a> since the installation options for these product releases are no longer available on the <i>Welcome</i> screen of Software Provisioning Manager 1.0.</p> </div>
<p>SAP NetWeaver 7.5</p> <div data-bbox="204 1104 785 1373" style="border: 1px solid #ccc; padding: 5px;"> <p><b>Note</b></p> <p>SAP NetWeaver 7.5 Java is also contained in the following optional standalone units:</p> <ul style="list-style-type: none"> <li>Advanced Adapter Engine</li> <li>Advanced Adapter Engine Extended (AEX)</li> <li>Process Orchestration</li> </ul> </div>	<p>SAP NetWeaver 7.5</p>
<p>SAP Solution Manager 7.2 Support Release 2</p>	<p>SAP NetWeaver 7.5</p>

## 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 \[page 72\]](#).  
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.exe`
- Names of command line parameters, for example `SAPINST_STACK_XML`
- “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 \[page 18\]](#).
- “SAP system” refers to SAP system based on the application server of SAP NetWeaver 7.4 (**SAP Solution Manager 7.2 SR2 only**) / SAP NetWeaver 7.5.
- “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.
- **Profiling for High Availability**

Only valid for 'High Availability': HA (Windows)

The profile bars with the wording *Only valid for: HA (Windows)* – for example, as in this section – refer to content that is only valid if you are installing a high-availability (HA) system with Microsoft Failover Clustering. The Windows Server Failover Clustering feature was previously called Microsoft Cluster Service (MSCS). For practical reasons we are continuing to use the abbreviation MSCS in the profile bars and in some sections of this guide.

End of 'High Availability': HA (Windows)

## 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 Windows operating system versions [2998013](#) 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 Windows 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 SP39 and higher will still run on the deprecated Windows 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 Windows Server 2012 (R2) ends October 31th, 2023.*

See SAP note 2998013." If you run into an issue, you must use the "frozen" software provisioning manager 1.0 SP38 software and the related installation guide. For more information, see SAP Note 3346502.

- Effective immediately, the software provisioning manager no longer supports the deprecated operating system versions 2998013 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 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 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 Windows Server 2008 (R2) ends January 14th, 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 AS Java 7.10 to 7.40 SR2

### Note

SAP products based on SAP NetWeaver AS Java 7.10 to 7.40 SR2 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 (SWPM10RMS30\_<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> >> <Release> > *Installation and Upgrade*.
- 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 \[page 12\]](#) 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**.
- Options to install additional SAP system instances for **SAP Solution Manager 7.2 Java Support Release 1:**  
Use these options only for SAP Solution Manager 7.2 Java lower than SP09.  
For SAP Solution Manager 7.2 Java SP09 or higher, use the options of SAP NetWeaver 7.5 Java.  
For more information, see [Running Software Provisioning Manager \[page 91\]](#).

## 1.4 Before You Start

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

The “Master Guide” 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” 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:

Document	Internet Address
<i>Master Guide – SAP NetWeaver 7.5</i>	<a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a> ▶▶ <i>Installation and Upgrade</i> ▶
<i>Master Guide – SAP Solution Manager 7.2</i>	<a href="http://help.sap.com/solutionmanager">http://help.sap.com/solutionmanager</a> ▶▶ <i>7.2 &lt;SP&gt;</i> ▶ <i>Installation and Upgrade</i> ▶
<i>Master Guide SAP Supply Chain Management 7.0 &lt;Including SAP Enhancement Package &lt;Number&gt; Powered by SAP NetWeaver</i>	<a href="http://help.sap.com/scm">http://help.sap.com/scm</a> ▶▶ <i>&lt;Release&gt;</i> ▶ <i>Installation and Upgrade</i> ▶
<i>Master Guide (Including Upgrade Information) - SAP Customer Relationship Management 7.0 &lt;Including SAP Enhancement Package &lt;Number&gt;</i>	<a href="http://help.sap.com/crm">http://help.sap.com/crm</a> ▶▶ <i>&lt;Release&gt;</i> ▶ <i>Installation and Upgrade</i> ▶
<i>Master Guide (Including Upgrade Information) - SAP Supplier Relationship Management 7.0 &lt;Including SAP Enhancement Package &lt;Number&gt;</i>	<a href="http://help.sap.com/srm">http://help.sap.com/srm</a> ▶▶ <i>&lt;Release&gt;</i> ▶ <i>Installation and Upgrade</i> ▶



Document	Internet Address
Master Guide - SAP Enhancement Package <Number> for SAP ERP 6.0	<a href="http://help.sap.com/erp">http://help.sap.com/erp</a> ▶▶ <Release> ▶ Installation and Upgrade ▶

## 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

SAP Note Number	Title	Description
<a href="#">1680045</a>	Release Note for software provisioning manager 1.0	software provisioning manager 1.0 with installation and system copy for SAP NetWeaver-based systems
<a href="#">1710950</a>	Inst. SAP Systems Based on SAP NetWeaver 7.1 and higher: Windows	Windows-specific information about the SAP system installation and corrections to this documentation
<a href="#">1710994</a>	Inst. SAP Systems Based on SAP NetWeaver 7.1 and higher: SQL Server	SQL Server-specific information about the SAP system installation and corrections to this documentation
<a href="#">2384179</a>	Planned support of Windows Server 2016 for SAP products	Windows Server 2016-specific information for the SAP system installation
<a href="#">2751450</a>	SAP Systems on Windows Server 2019	Windows Server 2019-specific information for the SAP system installation
<a href="#">3143497</a>	SAP Systems on Windows Server 2022	Windows Server 2022-specific information for the SAP system installation
<a href="#">737368</a>	Hardware requirements of Java Development Infrastructure	Information on the hardware requirements for Java Development Infrastructure, which depends on the size of your development team
<a href="#">73606</a>	Supported Languages and Code Pages	Information on possible languages and language combinations in SAP systems

SAP Note Number	Title	Description
<a href="#">1067221</a>	Composite SAP Note for heterogeneous installation	This SAP Note and its related SAP Notes describe the released operating system and database combinations for heterogeneous SAP systems landscapes.
<a href="#">886535</a>	Downloading multispanning archives	Downloading multispanning archives
<a href="#">1553465</a>	Installation requirements for SAP kernels on Windows (C++ runtime environment, VCredist versions)	Information about VCredist version

## 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](https://help.sap.com) for your SAP product at <https://help.sap.com> > <Search your SAP Product> > <Select your SAP Product Version> > [What's New](#) >

Feature	Description	Availability
Certificate revocation list (CRL) required for SAPinst framework	Due to security requirements, a certificate revocation list (CRL) is required for the SAPinst framework of software provisioning manager. For more information, see SAP Note <a href="#">3207613</a> and <a href="#">Prerequisites for Running Software Provisioning Manager [page 90]</a> .	Software provisioning manager 1.0 SP42 (SL Toolset 1.0 SP42)
Separate SAP Globalhost	During the installation of an SAP system distributed over several hosts, you can now specify that the SAP Global directories are installed on a host different from the SCS instance host. For more information, see SAP Note <a href="#">3349121</a> .	software provisioning manager 1.0 SP39 (SL Toolset 1.0 SP39)
New SAPinst Framework Version 753	The SAPinst framework patch level has been upgraded from version 749 (SAP Note <a href="#">2393060</a> <i>SAPinst Framework 749 Central Note</i> ) to 753. For more information, see SAP Note <a href="#">3207613</a> <i>SAPinst Framework 753 Central Note</i> .	software provisioning manager 1.0 SP36 (SL Toolset 1.0 SP36)
Installation requirements for SAP kernels on Windows (C++ runtime environment, VCredist versions)	Manual subsequent installation of the VCredist files by customers may be required during the installation of SAP kernels that are based on specific versions. For more information, see <a href="#">Requirements for the SAP System Hosts [page 36]</a> .	software provisioning manager 1.0 SP34 (SL Toolset 1.0 SP34)
Switch from 7.21_EXT Kernel to 7.22_EXT Kernel	Kernel 7.21 has reached end of maintenance. In addition, some issues have been fixed with the new 7.22_EXT kernel media.	software provisioning manager 1.0 SP31 (SL Toolset 1.0 SP31)

Feature	Description	Availability
New Look and Feel of SL-UI	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> .	software provisioning manager 1.0 SP24, PL05 (SL Toolset 1.0 SP24)
High-availability system on Microsoft Cluster: Option to install the ASCS instance in a file share on a local disk.	As an alternative to the “classic” way to install the SCS instance on a shared disk, you can now choose to install the SCS instance in a file share on a local disk. For more information, see <a href="#">High Availability with Microsoft Failover Clustering [page 165]</a> .	software provisioning manager 1.0 SP24 (SL Toolset 1.0 SP24)
New software provisioning manager Option <i>Download Software Packages for Maintenance Planner Transaction</i>	If you perform an installation using a Stack XML file, you can now download media according to a Maintenance Plan. For more information, see <a href="#">Installation Using a Stack XML File [page 31]</a> , <a href="#">Downloading Software Packages for a Maintenance Planner Transaction [page 81]</a> , 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> .	software provisioning manager 1.0 SP23 (SL Toolset 1.0 SP23)
Option to install an SCS instance with embedded SAP Web Dispatcher	You can now install an SAP Web Dispatcher in an SCS instance. You can choose this option while running the SCS instance installation.  For more information, see <a href="#">SCS Instance with Embedded SAP Web Dispatcher [page 27]</a>	software provisioning manager 1.0 SP23 (SL Toolset 1.0 SP23)
software provisioning manager Log Files Improvements	software provisioning manager log files are now available immediately after software provisioning manager has been started, that is <b>before</b> a product has been selected on the <i>Welcome</i> screen. For more information, see <a href="#">Useful Information about Software Provisioning Manager [page 98]</a> and <a href="#">Troubleshooting with Software Provisioning Manager [page 109]</a> .	software provisioning manager 1.0 SP22 (SL Toolset 1.0 SP22)
Digital Signature Check of Installation Archives	The digital signature of installation archives is checked <b>automatically</b> by software provisioning manager during the <i>Define Parameters</i> phase while processing the <i>Software Package Browser</i> screens. As of now software provisioning manager only accepts archives whose digital signature has been checked. For more information, see <a href="#">Downloading SAP Kernel Archives (Archive-Based Installation) [page 78]</a> .	software provisioning manager 1.0 SP22 (SL Toolset 1.0 SP22)
Enabling IPv6	You can now set up a new SAP system or SAP system instance using Internet Protocol Version 6 (IPv6).  For more information, see <a href="#">Prerequisites for Running Software Provisioning Manager [page 90]</a> .	software provisioning manager 1.0 SP22 (SL Toolset 1.0 SP22)
Option to install an SCS instance with embedded SAP Web Dispatcher	You can now install an SAP Web Dispatcher in an SCS instance. You can choose this option while running the SCS instance installation.  For more information, see <a href="#">SCS Instance with Embedded SAP Web Dispatcher [page 27]</a>	software provisioning manager 1.0 SP22 (SL Toolset 1.0 SP22)

Feature	Description	Availability
Media Signature Check	<p>The digital signature of media is checked <b>automatically</b> by the software provisioning manager during the <i>Define Parameters</i> phase while processing the <i>Media Browser</i> screens. The software provisioning manager only accepts media whose digital signature has been checked.</p> <p>For more information, see <a href="#">Preparing the Installation Media [page 72]</a> and <a href="#">Running the software provisioning manager [page 91]</a>.</p>	software provisioning manager 1.0 SP21 (SL Toolset 1.0 SP21)
SAP Host Agent Upgrade During the Installation (Optional)	<p>During the <i>Define Parameters</i> 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 <i>General Parameters</i> table in <a href="#">SAP System Parameters [page 45]</a>.</p>	software provisioning manager 1.0 SP21 (SL Toolset 1.0 SP21)
SL-UI with SAPINST 7.49	<p>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 <a href="#">Useful Information about Software Provisioning Manager [page 98]</a>, <a href="#">Running Software Provisioning Manager [page 91]</a>.</p>	software provisioning manager 1.0 SP20 (SL Toolset 1.0 SP20)
Verification of Integrity of Data Units in software provisioning manager	<p>The integrity of data units extracted from the software provisioning manager archive is verified. For more information, see <a href="#">Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 77]</a>.</p> <p>In addition, check SAP Note <a href="#">1680045</a> whether additional information is available.</p>	software provisioning manager 1.0 SP19 (SL Toolset 1.0 SP19)
Archive-Based Installation	<p>You can now download the required <b>installation archives</b> instead of the complete SAP kernel installation media. For more information, see section <i>Downloading Specific Installation Archives (Archive-Based Installation)</i> in <a href="#">Preparing the Installation Media [page 72]</a>.</p>	software provisioning manager 1.0 SP17 (SL Toolset 1.0 SP17)
Diagnostics Agent	<p>The Diagnostics Agent is no longer installed automatically with the SAP system. The <i>Install Diagnostics Agent</i> check box on the <i>Install Diagnostics Agent</i> screen is no longer available.</p> <p>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).</p> <p>For more information, see the Diagnostics Agent Installation Strategy attached to SAP Note <a href="#">1365123</a>, to SAP Note <a href="#">1833501</a>, and to SAP Note <a href="#">1858920</a> and the attached <i>Diagnostics Agent Setup Guide</i>.</p>	software provisioning manager 1.0 SP10 (SL Toolset 1.0 SP16)

Feature	Description	Availability
System Provisioning for SAP NetWeaver 7.5 and SAP NetWeaver 7.5-based Products	<p>All system provisioning tasks (installation, system copy, system rename) are available for the new SAP NetWeaver 7.5 release.</p> <p>The Dual Stack option, which integrates an AS ABAP and AS Java in a single system (common System ID &lt;SAPSID&gt;, common startup framework, common database), is no longer supported in SAP systems based on SAP NetWeaver 7.5.</p> <p>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.</p> <p>For more information, see the <i>Upgrade Master Guide - SAP NetWeaver 7.5</i> at: <a href="https://help.sap.com/nw75">https://help.sap.com/nw75</a> &gt;&gt; <i>Installation and Upgrade</i> &gt;</p>	software provisioning manager 1.0 SP09 (SL Toolset 1.0 SP15)
System Provisioning for SAP Solution Manager 7.2	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)
Windows Domain Organizational Units	<p>You can now specify an optional organizational unit (OU) within the Windows domain where you want software provisioning manager to create the SAP system accounts.</p> <p>For more information, see <a href="#">SAP System Parameters [page 45]</a>.</p>	software provisioning manager 1.0 SP09 (SL Toolset 1.0 SP14)
Creating Kernel Archives from existing SAP System	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.	software provisioning manager 1.0 SP09 (SL Toolset 1.0 SP14)
<div style="background-color: #f0f0f0; padding: 10px; margin-bottom: 10px;"> <p><b>Note</b></p> <p>This feature is only available for Unicode systems.</p> </div> <div style="background-color: #f0f0f0; padding: 10px;"> <p><b>Caution</b></p> <p>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 <i>Welcome</i> screen. This deprecation has been accomplished to ensure compliancy with the new feature "Media Signature Check" of Software Provisioning Manager 1.0 SP21 (SL Toolset 1.0 SP21) described above in this table.</p> </div>		

Feature	Description	Availability
Usage Type Library Deprecation for SAP Systems Based on SAP NetWeaver 7.3 EHP1 and Higher	software provisioning manager 1.0 no longer uses the "Usage Types" definitions in its business logic for SAP systems based on SAP NetWeaver 7.3 EHP1 and higher. This is done to unify modeling and terminology across all SAP tools used during the planning, installation and maintenance activities. The "Product Instance" definition replaces "Usage Types" regarding product modeling. For more information, see SAP Notes <a href="#">1970349</a> and <a href="#">1877731</a> .	software provisioning manager 1.0 SP07 (SL Toolset 1.0 SP12)
Adaptive Installation	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.  For more information, see <a href="#">SAP System Parameters [page 45]</a> .	software provisioning manager 1.0 SP07 (SL Toolset 1.0 SP12)
Feedback Evaluation Form	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 <a href="#">Prerequisites for Running Software Provisioning Manager [page 90]</a> .	software provisioning manager 1.0 SP07 (SL Toolset 1.0 SP12)
Option <i>Verify Signed Media</i>	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 <a href="#">1979965</a> .	software provisioning manager 1.0 SP06 (SL Toolset 1.0 SP11)

## 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.

After you have decided on the installation option that you want to use, continue with [Planning \[page 30\]](#).

[Standard System \[page 23\]](#)

[Distributed System \[page 24\]](#)

[High Availability System \[page 25\]](#)

[Additional Application Server Instance \[page 25\]](#)

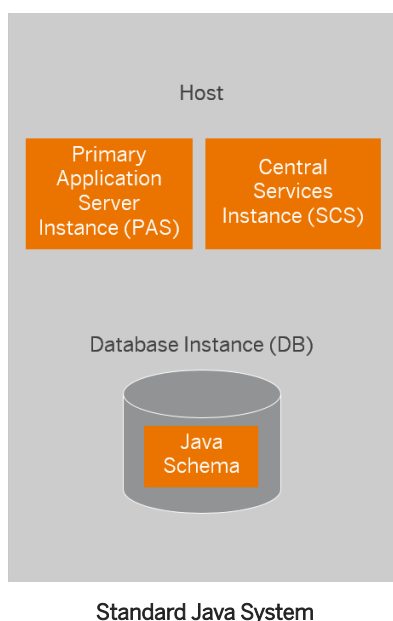
[SCS Instance with Embedded SAP Web Dispatcher \[page 27\]](#)

### 2.1 Standard System

You can install a **standard** system on a **single** host.

There are the following instances:

- Central services instance (SCS instance)  
Contains the Java message server and the Java enqueue server  
Optionally, you can install the SCS instance with an embedded SAP Web Dispatcher. For more information, see [SCS Instance with Embedded SAP Web Dispatcher \[page 27\]](#).
- Database instance (DB)
- Primary application server instance (PAS instance)



## 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.

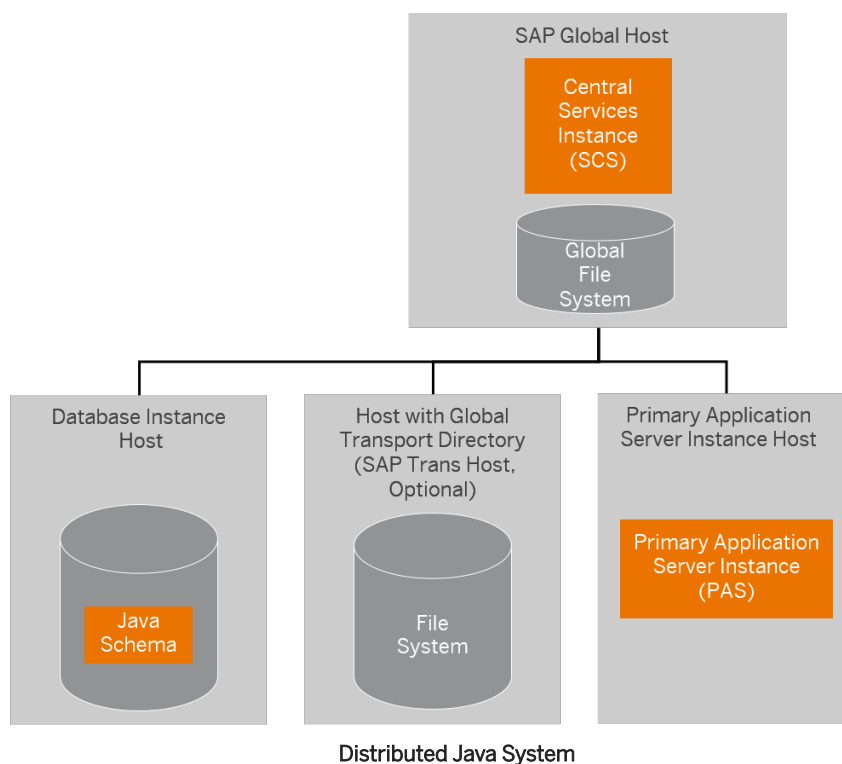
- Central services instance (SCS instance)  
Contains the Java message server and the Java enqueue server  
Optionally, you can install the SCS instance with an embedded SAP Web Dispatcher. For more information, see [SCS Instance with Embedded SAP Web Dispatcher \[page 27\]](#).
- Database instance (DB)  
The Java stack uses its own database schema in the database.
- Primary application server instance (PAS)

The following figure assumes the following:

- The SCS instance runs on the SAP global host.
- The global transport directory resides on a separate SAP transport host.
- During the installation of an SAP system distributed over several hosts, you can now specify that the SAP Global directories are installed on a host different from the SCS instance host. For more information, see SAP Note [3349121](#).

Optionally, you can install one or more additional application server instances. For more information, see [Installation of an Additional Application Server Instance \[page 25\]](#).





## 2.3 High Availability System

For more information about the system components you have to install and how to distribute them on the specific hosts, see [System Configuration with Microsoft Failover Clustering \[page 169\]](#).

## 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
- On a dedicated host

### ⓘ Note

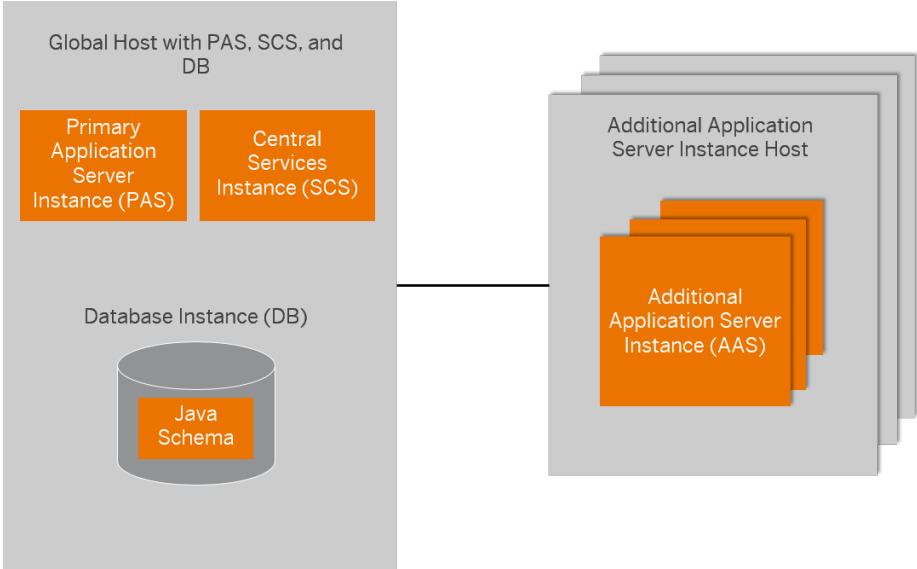
We do not recommend installing additional application server instances on the SAP global host.

### ⓘ Note

If you want to install an additional application server instance on an existing SAP system, you must perform a domain installation. You must also make sure that your existing SAP system was installed as a domain installation. For more information, see [Domain or Local Installation \[page 43\]](#).

## Additional Application Server Instance for a Standard System

The following figure shows additional application server instances that are running on dedicated hosts.

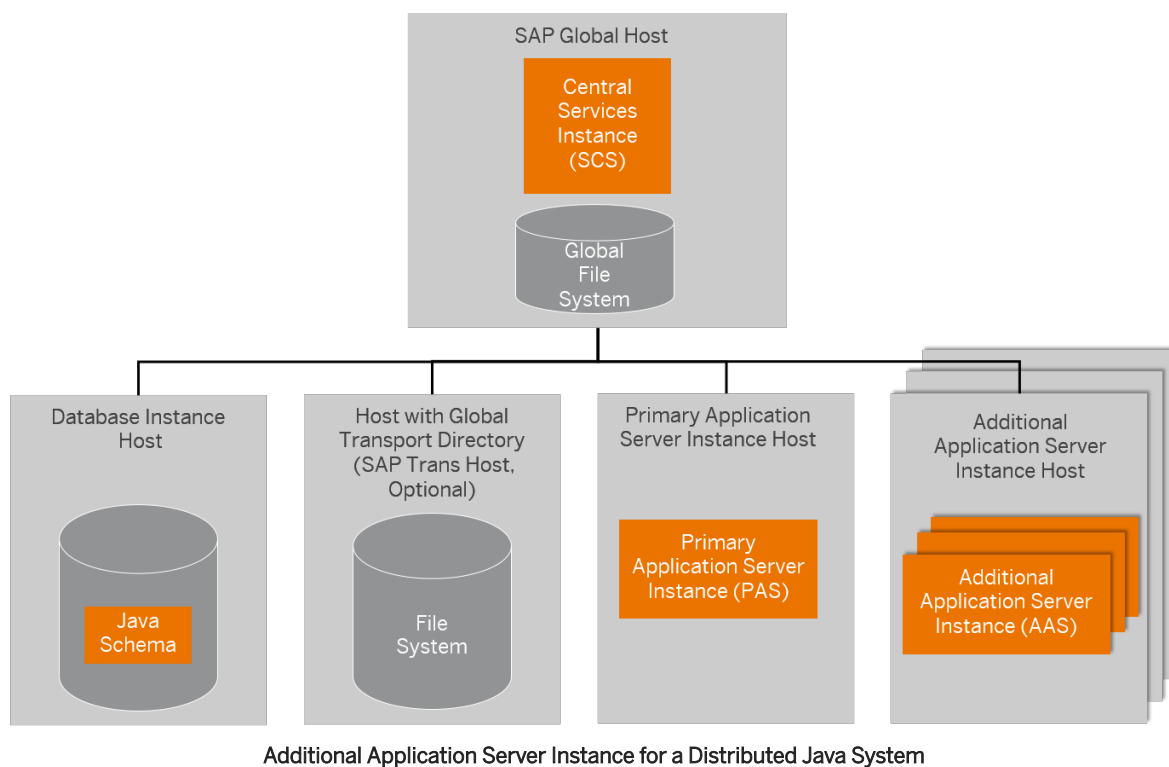


Additional Application Server Instance for a Standard Java System

For more information, see [Standard System \[page 23\]](#).

## Additional Application Server Instance for a Distributed System

The following figure shows additional application server instances that are running on dedicated hosts.



For more information, see [Distributed System \[page 24\]](#).

Only valid for 'High Availability': HA (Windows)

## Additional Application Server Instance for a High-Availability System

In a high-availability system, you require, apart from the primary application server instance, at least one additional application server instance. For more information about how to install and distribute the application servers in an HA configuration, see section [System Configuration with Microsoft Failover Clustering \[page 169\]](#).

End of 'High Availability': HA (Windows)

## 2.5 SCS Instance with Embedded SAP Web Dispatcher

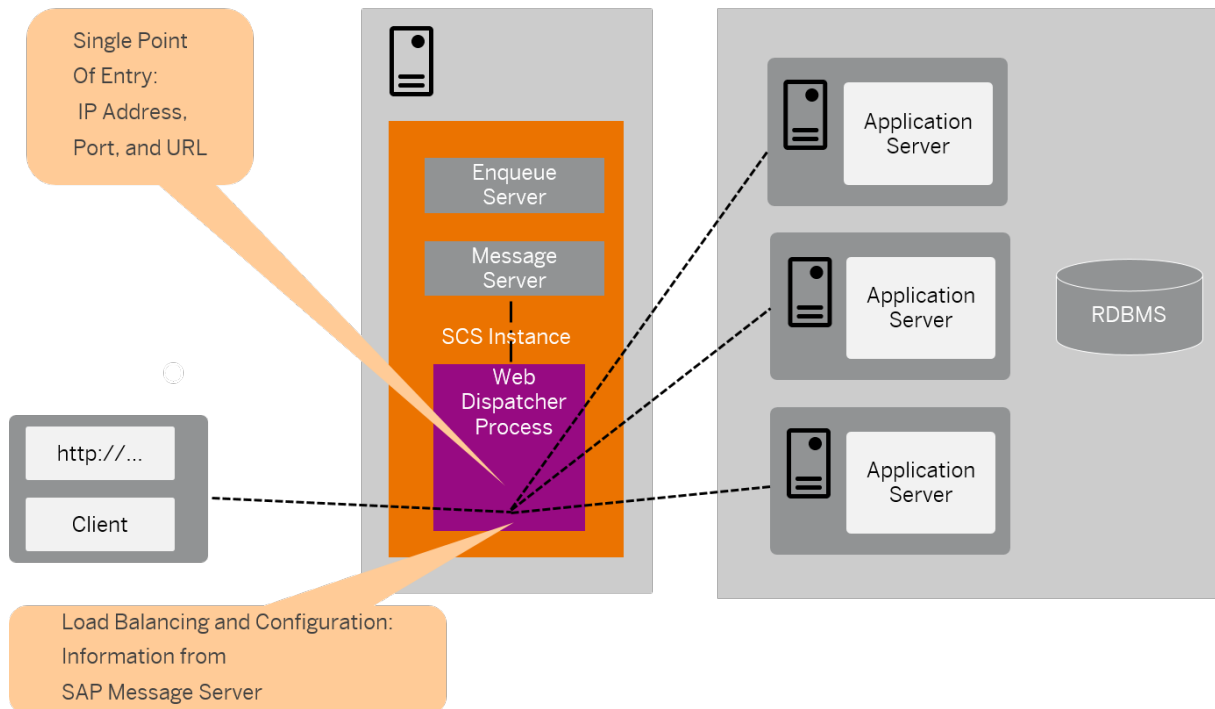
You can install an SAP Web Dispatcher embedded in the SCS instance. If you select this option, an SAP Web Dispatcher is installed running within the SCS instance. No separate SAP Web Dispatcher instance and no dedicated <SAPSID> are created for the SAP Web Dispatcher.

### → 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.



SCS Instance with Embedded SAP Web Dispatcher

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 SCS 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/slttoolset> >>> [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:

SAP Release and SAP Library Quicklink	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>• <b>SAP Solution Manager 7.2 SR2 only:</b> SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></li><li>• SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li></ul>	<p>▶ <a href="#">Application Help</a> ▶ <a href="#">Function-Oriented View</a> ▶ <a href="#">Application Server</a> ▶ <a href="#">Application Server Infrastructure</a> ▶ <a href="#">Components of SAP NetWeaver Application Server</a> ▶ <a href="#">SAP Web Dispatcher</a> &gt;</p>

## Related Information

[Parameters for Additional Components to be Included in the SCS Instance \[page 58\]](#)

# 3 Planning

## 3.1 Planning Checklist

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

### Note

For implementing [SAP Business Suite systems based on the Application Server Java of SAP NetWeaver 7.5 \[page 12\]](#) you have to run an [Installation Using a Stack XML File \[page 31\]](#) since the installation options for these product releases are no longer available on the [Welcome](#) screen of Software Provisioning Manager 1.0.

- 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 \[page 16\]](#).
2. You have decided on your installation option (see [Installation Options Covered by this Guide \[page 23\]](#)).

### Standard, Distributed, or High-Availability System

### Note

In a standard system, all mandatory instances are installed on one host. Therefore, if you are installing a standard system, you can ignore references to other hosts. Since an SAP system on IBM Db2 for z/OS system is always a distributed constellation, we only offer two installation options: standard or high-availability.

1. **Installation Using a Stack XML File [page 31]:**  
If you want to install an SAP Java system along with the required Support Package Stack 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/4HANA SAP on Premise.

#### 2. [Installation Using a Stack XML File \[page 31\]](#):

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 \[page 34\]](#) on every installation host.
4. You [plan how to set up user and access management \[page 42\]](#).
5. You identify [Basic SAP System Installation Parameters \[page 44\]](#).
6. You [decide whether you want to perform a domain or local installation \[page 43\]](#).
7. For the database installation, you [decide on how to distribute your database components to disk \[page 58\]](#).
8. You [decide on the transport host to use \[page 61\]](#).
9. You decide whether you want to [integrate LDAP Directory Services in your SAP system \[page 136\]](#).
10. Only valid for 'High Availability': HA (Windows)  
To install a high-availability system with **Microsoft Failover Clustering**, you perform the [HA-specific planning steps \[page 167\]](#).  
End of 'High Availability': HA (Windows)
11. Optionally, you decide whether you want to [install the database for multiple components with MS SQL Server \[page 146\]](#) or whether you want to [install multiple components in one database \(MCOD\) \[page 148\]](#).
12. Continue with [Preparation \[page 63\]](#).

## Additional Application Server Instance

1. You check the [hardware and software requirements \[page 34\]](#) 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 \[page 44\]](#).
3. Continue with [Preparation \[page 63\]](#).

## 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
- 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.

### Note

For implementing [SAP Business Suite systems based on the Application Server Java of SAP NetWeaver 7.5 \[page 12\]](#) you have to run an installation using a Stack XML file since the installation options for these product releases are no longer available on the [Welcome](#) screen of Software Provisioning Manager 1.0.

### → 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](#).

## 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/>.



### Note




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

- You can also run an installation using a Stack XML file in **unattended mode** as described in [System Provisioning Using an Input Parameter File \[page 99\]](#) .
- 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 \[page 81\]](#).

## Integration

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/sitoolset>   [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 \[page 30\]](#)
- [Additional Parameters When Using a Stack XML File \[page 57\]](#)
- [Downloading Software Packages for a Maintenance Planner Transaction \[page 81\]](#)
- [Running Software Provisioning Manager \[page 91\]](#)

## 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.

### 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 \[page 35\]](#).
    - Integrated in the installation tool (mandatory) as part of the installation process  
For more information, see [Running Software Provisioning Manager \[page 91\]](#).
  - The hardware and software requirements tables in [Requirements for the SAP System Hosts \[page 36\]](#)
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>.

#### Note

If you want to install usage type Development Infrastructure (DI), also check SAP Note [737368](#) for system requirements and 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 \[page 77\]](#).
2. Make either the separate `SAPEXE<Version>.SAR` archive or the complete kernel medium available as described in [Preparing the Installation Media \[page 72\]](#).
3. Start the software provisioning manager as described in [Running Software Provisioning Manager \[page 91\]](#).
4. On the *Welcome* screen, choose ► *<SAP\_Product>* ► *<Database>* ► *Preparations* ► *Prerequisites Check* ►.
5. Follow the instructions in the software provisioning manager dialogs and enter the required parameters.

#### ⓘ Note

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

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

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

## Results

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

## Related Information

[Downloading and Extracting the Software Provisioning Manager 1.0 Archive \[page 77\]](#)

[Preparing the Installation Media \[page 72\]](#)

### 3.3.2 Requirements for the SAP System Hosts

This section provides information about the hardware and software requirements for the:

- Central services instance (SCS)
- Database instance
- Primary application server instance
- Additional application server instance

#### Note

The additional application server instance is optional in a non-HA system, but mandatory in an HA system.

- Only valid for 'High Availability': HA (Windows)  
**High Availability only:** Enqueue Replication Server instance (ERS)  
End of 'High Availability': HA (Windows)
- SAP Host Agent

Only valid for 'High Availability': HA (Windows)

### General Requirements for a High-Availability System

- You must validate your failover cluster configuration by running the command `test-cluster` in a PowerShell.  
The *Failover Cluster Validation Report* must not show any errors.
- The cluster nodes of the cluster must be connected by a private and public network:
  - The public network enables communication from the cluster nodes of the cluster to other resources in the local area network (LAN).
  - The private network enables internal communication between the cluster nodes. In particular, it enables the Cluster Service running on all cluster nodes to regularly exchange messages on the state of the cluster nodes so that the failure of resources is quickly detected.

- Each of the cluster nodes in the cluster must have its own local disks and have access to an external file share or shared disks that can be reached by the cluster nodes via a shared bus.  
For more information about the distribution of components to local and shared disk, see [Distribution of SAP System Components to Disks for Failover Clustering \[page 176\]](#).
- All disk controllers must be able to support hardware-based RAID.

### ⚠ Caution

You **cannot** use a host with a domain controller as a cluster node.

End of 'High Availability': HA (Windows)

## Hardware and Software Requirements

The following tables show the hardware and software requirements. Most of the requirements are valid for every installation host whereas some requirements are instance-specific and are marked accordingly.

### 📘 Note

- The listed values are sufficient for **development systems** or **quality assurance systems** but **not** for **production systems**.
- If you install several SAP instances on one host, you need to add up the requirements.

Only valid for 'High Availability': HA (Windows)

If you install **multiple** SAP systems in one Failover Cluster, make sure that together with your hardware partner you have set up the correct sizing for your system configuration.

End of 'High Availability': HA (Windows)

- For up-to-date information on the released and supported operating system versions for your SAP product and database, see the [Product Availability Matrix \(PAM\)](#) at: <http://support.sap.com/pam>.

## Hardware Requirements

Hardware Requirement	Requirement	How to Check
Minimum disk space	<ul style="list-style-type: none"> <li>Database software: 4 GB</li> <li>Central services instance (SCS) (not including paging file): 5 GB If you install the SCS 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 productive use of the SAP Web Dispatcher, you need to reserve at least 5 GB.</li> <li>Database instance (not including paging file): 2 GB</li> <li>Only valid for 'High Availability': HA (Windows) <b>High Availability only:</b> Enqueue replication server instance (ERS) (not including paging file): 5 GB End of 'High Availability': HA (Windows)</li> <li>Primary application server instance (not including paging file): 5 GB <ul style="list-style-type: none"> <li>In addition you require 4 GB per additional platform.</li> <li>Up to 2 GB for each usage type or software unit you want to install.</li> </ul> </li> <li>Additional application server instance (not including paging file): 2.5 GB</li> <li>SAP Host Agent: 256 MB</li> <li>Temporary disk space for every required installation medium that you have to copy to a local hard disk: Up to 6 GB</li> </ul>	<p>To check disk space:</p> <ol style="list-style-type: none"> <li>Open PowerShell in elevated mode, and enter the following command: <b>get-volume</b></li> <li>Check the value <i>SizeRemaining</i> of the disk you want to install on.</li> </ol>
Minimum RAM	<ul style="list-style-type: none"> <li>All instances, except SAP Host Agent: 8 GB</li> <li>SAP Host Agent: 0.5 GB</li> </ul>	<p>To check RAM:</p> <p>Open PowerShell in elevated mode, and enter the following command:</p> <p><b>Get-WmiObject Win32_ComputerSystem</b></p> <p>If you want to install usage type BI Java, see SAP Note <a href="#">927530</a> for current information on hardware sizing.</p>

Hardware Requirement	Requirement	How to Check
Paging file size	For more information, see SAP Note <a href="#">1518419</a> .	To check paging file size:  For more information, see <a href="#">Checking and Changing the Paging File Settings on Windows Server [page 144]</a>
Processing units	<p><b>For application server instances and database instances:</b></p> <p>The number of physical or virtual processing units usable by the operating system image must be equal to or greater than 2.</p> <p><b>For an SCS instance running on a separate host:</b> One physical or virtual processing unit usable by the operating system image might be sufficient.</p> <p>Examples of processing units are processor cores or hardware threads (multithreading).</p> <p>In a virtualized environment, ensure that adequate processor resources are available to support the workloads of the running SAP systems.</p>	
Suitable backup system		

Software Requirement	Requirement	How to Check
Windows operating system	<ul style="list-style-type: none"> <li>• <b>64-bit version</b> of one of the following Windows Server Editions:                             <ul style="list-style-type: none"> <li>• Windows Server Standard Edition</li> <li>• Windows Server Datacenter Edition</li> </ul> </li> </ul>	<p>To check your Windows version:</p> <p>Open PowerShell in elevated mode, and enter the following command:</p>
	<p><b>⚠ Caution</b></p> <p>For up-to-date information on the released and supported operating system versions for your SAP product and database, see the Product Availability Matrix (PAM) at <a href="http://support.sap.com/pam">http://support.sap.com/pam</a>.</p>	<pre>Get-WmiObject Win32_OperatingSystem   select caption</pre>
	<p><b>⚠ Caution</b></p> <p>Make sure that you install the <b>English</b> language pack so that your support requests can be handled quickly.</p>	<p>Only valid for 'High Availability': HA (Windows)</p>
	<ul style="list-style-type: none"> <li>• For any version of Windows Server, you need the latest supported service pack</li> </ul>	<p><b>📌 Note</b></p> <p>You must add the operating system feature <i>Failover Clustering</i> on <b>all</b> cluster nodes.</p>
		<p>End of 'High Availability': HA (Windows)</p>



Software Requirement	Requirement	How to Check
Database software	<ul style="list-style-type: none"> <li>• Central services instance (SCS), primary application server instance, or additional application server instance:               <ul style="list-style-type: none"> <li>• SQL 2014 and higher ODBC Driver for SQL Server.</li> <li>• SQL Server 2012 Native Access Client (SNAC) software</li> <li>• Latest service pack and hotfix, or cumulative update if available For more information, see SAP Note <a href="#">62988</a>.</li> </ul> </li> <li>• Database instance:               <ul style="list-style-type: none"> <li>• Enterprise Edition: Server Software                   <ul style="list-style-type: none"> <li>• Latest service pack and hotfix, if available. For more information, see SAP Note <a href="#">62988</a>.</li> <li>• Unicode collation SQL_Latin1_General_CP850_B IN2</li> </ul> </li> </ul> </li> </ul>	
<div style="border-left: 2px solid orange; padding-left: 10px;"> <p><b>⚠ Caution</b></p> <p>For up-to-date information on the released and supported database versions for your SAP product and database, see the Product Availability Matrix (PAM) at <a href="http://support.sap.com/pam">http://support.sap.com/pam</a>.</p> </div>		
Important information about the delivery of Microsoft Visual C++ redistributables (VCredist) versions with software provisioning manager 1.0	<p>The software provisioning manager 1.0 no longer delivers any VCredist versions that are no longer in maintenance by the manufacturer Microsoft. SAP cannot therefore assume maintenance responsibility for these 3rd party components. At the time of delivery, this affects VCredist 2005 and 2010. As a result, a manual subsequent installation of the VCredist files by the customer may be required during the installation of SAP kernels that are based on these specified versions. For more information, see SAP Note <a href="#">1553465</a> - <i>Installation requirements for SAP kernels on Windows (C++ runtime environment, VCredist versions)</i></p>	–

Software Requirement	Requirement	How to Check
Windows regional settings	<p><i>English (United States)</i> must be set by default. For more information about localized Windows versions, see SAP Note <a href="#">362379</a>.</p> <p>You can install additional languages but the default setting for new users must always be <i>English (United States)</i>.</p>	Choose ► <i>Start</i> ► <i>Control Panel</i> ► <i>Clock, Language, and Region</i> ► <i>Language</i> ►.
Minimum Web Browser	<p>Make sure that you have at least one of the following web browsers installed on the host where you run the software provisioning manager GUI:</p> <ul style="list-style-type: none"> <li>• Microsoft Internet Explorer 11 or higher</li> <li>• Microsoft Edge</li> <li>• Mozilla Firefox</li> <li>• Google Chrome</li> </ul> <p>Always use the latest version of these web browsers.</p> <p>You need a web browser to be able to run the SL-UI, and to display the Evaluation Form and send it to SAP.</p>	Choose ► <i>Start</i> ► <i>Control Panel</i> ► <i>Programs and Features</i> ►.

## 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:

- The database of AS Java.
- An external ABAP system as the data source for user data
- An LDAP directory as the data source for user data

### Note

If you want to install an Advanced Adapter Engine Extended (AEX), you can only use the database of AS Java for the user management. After the installation has finished, you cannot change the user management configuration.

You cannot configure the AS Java to simultaneously access an LDAP directory and an AS ABAP as the data source. The AS Java can also use its own database as the data source.

## 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 \[page 89\]](#).

## More Information

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

SAP Release and SAP Library Quicklink	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>• <b>SAP Solution Manager 7.2 SR2 only:</b> SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></li><li>• SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li></ul>	<p>▶ <i>Application Help</i> ▶ <i>SAP NetWeaver Library: Function-Oriented View</i> ▶ <i>Security</i> ▶ <i>Identity Management</i> ▶ <i>User Management of SAP NetWeaver AS for Java</i> ▶</p>

## 3.5 Domain or Local Installation

Before you install the SAP system, you have to decide whether you want to perform a **domain** or **local** installation, since this affects how the user account information is stored and accessed.

For more information about the differences between a local and domain installation, go to ▶ *Start* ▶ *Help and Support* ▶ and search for *What is the difference between a domain and a workgroup?*.

### Domain Installation

In a domain installation, the user account information is stored centrally in one database on the domain controller and is accessible to all hosts in the system.

You have to perform a domain installation if one of the following applies:

- You install a distributed system.
- Only valid for 'High Availability': HA (Windows)  
You install a high-availability system with Microsoft Failover Clustering.  
End of 'High Availability': HA (Windows)
- You use a common transport host for several SAP systems running on different computers.

### Local Installation

In a local installation, all Windows account information is stored locally on one host and is not visible to any other hosts in the system.

If the SAP system is to run on a **single** machine (standard system), you can perform a local installation.

### 📘 Note

If your SAP system was installed as a local installation and you want to later change to a domain installation, you can use the system rename option. For more information, see the *System Rename Guide* for your SAP system at:

<https://support.sap.com/sltoolset>  [System Provisioning](#) 

## More Information

[Required User Authorization for Running Software Provisioning Manager \[page 66\]](#)

## 3.6 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
  - JCE Unlimited Strength Jurisdiction Policy files archive (only prompted if you install Adobe Document Services)
  - SAP system profile directory – only for systems with instances on separate hosts
  - User Management Engine (UME) Configuration

### 📘 Note

If you want to install an optional standalone unit - Advanced Adapter Engine (AAE) , Advanced Adapter Engine Extended (AEX), or Process Integration and Orchestration (PI-CP) - you are **not** prompted for UME Configuration. Instead, optional standalone units are automatically configured to store the SAP system users in the Java database (see also section *User Management Engine Parameters* in [SAP System Parameters \[page 45\]](#)).

For more information about the installation parameters, see the corresponding tables below in this document. If you want to change any of the default settings, you can do so on the *Parameter Summary* screen.

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

## Note

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

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 \[page 45\]](#)

[SAP System Database Parameters \[page 56\]](#)

[Additional Parameters when Installing SAP Process Integration 7.5 or SAP Solution Manager 7.2 \[page 57\]](#)

[Additional Parameters When Using a Stack XML File \[page 57\]](#)

[Parameters for Additional Components to be Included in the SCS Instance \[page 58\]](#)

## 3.6.1 SAP System Parameters

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

General Parameters

Parameter	Description
Unicode System	A Java standalone system is always a Unicode system.

Parameter	Description
SAP System ID <SAPSID>	<p>The SAP system ID (&lt;SAPSID&gt;) identifies the entire SAP system.</p> <p>The software provisioning manager prompts you for the &lt;SAPSID&gt; when you execute the <b>first</b> installation option to install a new SAP system.</p> <p>If there are further installation options to be executed, the software provisioning manager prompts you for the <code>profile</code> directory. For more information, see the description of the parameter <i>SAP System Profile Directory</i>.</p> <div style="background-color: #f0f0f0; padding: 5px;"> <p><b>❖ Example</b></p> <p>This prompt appears when you install the SCS instance, which is the first instance to be installed in a distributed system.</p> </div> <div style="background-color: #f0f0f0; padding: 5px;"> <p><b>⚠ Caution</b></p> <p>Choose your SAP system ID carefully since renaming requires considerable effort.</p> </div> <p>Make sure that your SAP system ID:</p> <ul style="list-style-type: none"> <li>• Is unique throughout your organization. Do not use an existing &lt;SAPSID&gt; when installing a new SAP system.</li> </ul> <div style="background-color: #f0f0f0; padding: 5px;"> <p><b>❖ Example</b></p> <p>If you have already installed an ABAP system and you want to install a new Java system on the same host, make sure that you enter a &lt;SAPSID&gt; that is different from the &lt;SAPSID&gt; of the existing ABAP system. The &lt;SAPSID&gt; of a Java stack can only be equal to the &lt;SAPSID&gt; of an ABAP stack if they form a dual-stack system.</p> <p>Dual stack is no longer supported in SAP systems based on SAP NetWeaver 7.5 or higher.</p> </div> <ul style="list-style-type: none"> <li>• Consists of exactly three alphanumeric characters</li> <li>• Contains only uppercase letters</li> <li>• Has a letter for the first character</li> <li>• Does not include any of the reserved IDs listed in SAP Note <a href="#">1979280</a>.</li> <li>• 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.</li> </ul>

Parameter	Description
SAP System Instance Numbers	<p>Technical identifier for internal processes. It consists of a two-digit number from 00 to 97.</p> <p>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.</p> <p>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.</p> <p>Only valid for 'High Availability': HA (Windows)</p> <div style="border: 1px solid #ccc; padding: 5px; background-color: #f9f9f9;"> <p><b>Note</b></p> <p>If you install the central instance and the dialog instances on the cluster nodes of a Microsoft failover cluster, SAPinst by default assigns the same instance number.</p> <p>If you install the central instance and the dialog instances on hosts that are not part of a Microsoft failover cluster, we recommend that you use the same instance number for them. If the instance number is already used on other hosts, you have to assign a different instance number for the central instance and the dialog instances.</p> </div> <p>End of 'High Availability': HA (Windows)</p> <p>To find out the 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 <code>\usr\sap\&lt;SAPSID&gt;</code> directories.</p> <p>For more information, see <a href="#">SAP Directories [page 139]</a>.</p> <div style="border: 1px solid #ccc; padding: 5px; background-color: #f9f9f9;"> <p><b>Caution</b></p> <p>Do <b>not</b> use 43, and 89 for the instance number because:</p> <ul style="list-style-type: none"> <li>• 43 is part of the port number for high availability</li> <li>• 89 is part of the port number for Windows Terminal Server</li> </ul> </div>

Parameter	Description
Virtual Host Name	<p>Virtual host name (network name) of the SAP&lt;SAPSID&gt; cluster group</p> <p>You can assign a virtual host name to an SAP instance in one of the following ways:</p> <ul style="list-style-type: none"> <li>You can assign a virtual host name for the instance to be installed, by specifying it in the &lt;Instance Name&gt; <i>Host Name</i> field of the &lt;Instance Name&gt; <i>Instance</i> screen. Then this instance is installed with this virtual host name.</li> <li>Alternatively you can assign virtual host names also by starting the software provisioning manager with the <code>SAPINST_USE_HOSTNAME</code> property. For more information, see <a href="#">Running Software Provisioning Manager [page 91]</a>.</li> </ul> <p>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 (= Windows host name) of the host where you run the software provisioning manager.</p> <p>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 <a href="#">Using Virtual Host Names [page 68]</a>.</p> <div style="background-color: #f0f0f0; padding: 10px; border: 1px solid #ccc;"> <p><b>Note</b></p> <p>Fully qualified host names, IPv4, IPv6 are not accepted as virtual host names.</p> </div>
SAP System Profile Directory	<p><code>\\&lt;SAPGLOBALHOST&gt;\sapmnt\&lt;SAPSID&gt;\SYS\profile</code></p> <p>The software provisioning manager retrieves parameters from the SAP system profile directory of an existing SAP system.</p> <p>SAP profiles are operating system files that contain instance configuration information.</p> <p>The software provisioning manager prompts you to enter the location of the <code>profile</code> 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 <i>SAP System ID</i> and <i>Database ID</i>.</p>
Destination drive	<p>Base directory for the SAP system.</p> <div style="background-color: #f0f0f0; padding: 10px; border: 1px solid #ccc;"> <p><b>Note</b></p> <p>If you install a subsequent SAP system, the <code>saploc</code> share already exists and you cannot select the installation drive. The software provisioning manager uses the installation drive where the <code>saploc</code> share points to.</p> </div>



Parameter	Description
Master Password	<p>Common password for all users that are created during the installation:</p> <ul style="list-style-type: none"> <li>Operating system users (for example <code>&lt;sapsid&gt;adm</code>, <code>SAPService&lt;sapsid&gt;</code>)</li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px 0;"> <p><b>⚠ Caution</b></p> <p>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 <i>Operating System Users</i>). In this case, make sure that the master password meets the requirements of your operating system.</p> </div> <ul style="list-style-type: none"> <li>Java users (for example <code>Administrator</code>)</li> <li>Secure Store key phrase  <b>SAP systems based on SAP NetWeaver lower than 7.4:</b> For more information, see line <i>Key Phrase for Secure Store Settings</i> in this table.</li> </ul> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px 0;"> <p><b>📌 Note</b></p> <p>If a user already exists, you are prompted to confirm the password for this user.</p> </div> <p><b>Basic Password policy</b></p> <p>The master password must meet the following requirements:</p> <ul style="list-style-type: none"> <li>It can be 8 to 30 characters long</li> <li>It must contain at least one letter (a-z, A-Z)</li> <li>It must contain at least one digit (0-9)</li> <li>It must not contain <code>\</code> (backslash) or <code>"</code> (double quote).</li> </ul> <p><b>Additional restrictions depending on Windows:</b></p> <ul style="list-style-type: none"> <li>If a user already exists, you are prompted to confirm the password for this user.</li> <li>Depending on the configuration of the password policy, additional restrictions might apply.</li> </ul> <p>Depending on the installation option, additional restrictions may apply.</p> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px 0;"> <p><b>🔗 Example</b></p> <p>The master password must not contain the name of a Java user created during the installation).</p> </div> <div style="border: 1px solid #ccc; padding: 5px; margin: 5px 0;"> <p><b>→ Recommendation</b></p> <p>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.</p> <p>For more information, see <a href="#">Ensuring User Security [page 128]</a>.</p> </div>

Parameter	Description
Message Server Access Control List	<p>You can specify if you want to have a message server Access Control List (ACL) created.</p> <p>The ACL is created as a file in the / &lt;sapmnt&gt; / &lt;SAPSID&gt; / global directory. If it exists, it defines the hosts from which the message server accepts requests.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p><b>⚠ Caution</b></p> <p>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.</p> </div> <p>For more information, see the information about <code>ms/ac1_info</code> in SAP Notes <a href="#">1495075</a> and <a href="#">826779</a>.</p>
Java(TM) Cryptography Extension (JCE) Unlimited Strength Jurisdiction Policy Files Archive	<p>If you want to install <i>Adobe Document Services</i>, make sure that you download the <b>unlimited</b> version of the JCE Jurisdiction Policy Files archive. For more information about where to download it, see SAP Note <a href="#">1240081</a>.</p>
Key Phrase for Secure Store Settings	<p>This is a random word or phrase that is used to encrypt the secure store.</p> <p>The Java EE engine uses this phrase to generate the key that is used to encrypt the data.</p> <p>The uniqueness of the phrase you use contributes to the uniqueness of the resulting key.</p> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p><b>→ Recommendation</b></p> <p>Use a long key phrase that cannot be guessed easily. Use both uppercase and lowercase letters in the phrase and include special characters.</p> </div> <div style="border: 1px solid #ccc; padding: 10px; margin-top: 10px;"> <p><b>ⓘ Note</b></p> <p>If you choose <i>Typical</i> mode, the software provisioning manager sets the master password for the key phrase. In this case, make sure that you replace the master password with the required unique key phrase either on the <i>Parameter Summary</i> screen or after the installation has finished.</p> </div>

Parameter	Description
DNS Domain Name for SAP System	<p>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.</p> <p>The DNS Domain Name is used to calculate the Fully Qualified Domain Name (FQDN), which is configured in profile parameter <code>SAPLOCALHOSTFULL</code>. FQDN is the fully qualified domain name for an IP address. It consists of the host name and the domain name:</p> <pre>&lt;Host_Name&gt;.&lt;Domain_Name&gt;</pre> <p>The DNS Domain Name is needed to define the URLs for the Java application servers. It is appended to the server name to calculate the FQDN.</p> <p>For more information, see SAP Note <a href="#">654982</a>.</p> <div style="background-color: #f0f0f0; padding: 10px; border: 1px solid #ccc;"> <p><b>❖ Example</b></p> <p>If your application server host is called <code>kirk.wdf.sap.com</code>, the DNS Domain Name is <code>wdf.sap.com</code>.</p> </div>

SAP Host Agent Upgrade (Optional)	<p>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 <code>SAPHOSTAGENT&lt;Version&gt;.SAR</code> archive.</p> <p>For more information, see <a href="#">Downloading SAP Kernel Archives (Archive-Based Installation) [page 78]</a></p>
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Ports

Parameter	Description
Java Message Server Port	<div style="background-color: #f0f0f0; padding: 10px; border: 1px solid #ccc;"> <p><b>⚠ Caution</b></p> <p>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.</p> </div> <p>The SCS instance profile contains the configuration for the Java message server.</p> <p>The Java message server port uses the parameter <code>rdisp/msserv_internal</code> with default value <code>39&lt;SCS_Instance_Number&gt;</code>.</p> <p>For more information about the parameters used for message server ports, see SAP Note <a href="#">821875</a>.</p>

Parameter	Definition
Password of Operating System Users	<p>The passwords of the operating system users <b>must</b> comply with the Windows password policy. The software provisioning manager processes the passwords of operating system users as follows:</p> <ul style="list-style-type: none"> <li>• If the operating system users do <b>not</b> exist, SAP creates the following users: <ul style="list-style-type: none"> <li>• <code>&lt;sapsid&gt;adm</code> This user is the SAP system administrator user. It is a member of the local <code>Administrators</code> group.</li> <li>• <code>SAPService&lt;SAPSID&gt;</code> This user is the Windows account to run the SAP system. It is not a member of the local <code>Administrators</code> group.</li> <li>• <code>sapadm</code> The SAP Host Agent user <code>sapadm</code> is used for central monitoring services. The software provisioning manager creates this user by default as a local user although it is not a member of the local <code>Administrators</code> group. If required, you can change this user to become a domain user on the <a href="#">Parameter Summary</a> screen. For more information, see <a href="#">Performing a Domain Installation Without Being a Domain Administrator [page 143]</a>. For security reasons, however, SAP strongly recommends you to create this user as a local user.</li> </ul> <p>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 <i>Custom</i> or by changing them on the <a href="#">Parameter Summary</a> screen.</p> </li> <li>• If the operating system users already exist, the software provisioning manager prompts you for the existing password, except the password of these users is the same as the master password.</li> </ul>
<p><b>⚠ Caution</b></p> <p>Make sure that you have the <a href="#">required user authorization [page 66]</a> for these accounts before you start the installation.</p>	

Windows Domain Organizational Units	<p>You can choose the organizational units (OUs) within the Windows domain where you want to create the SAP system accounts.</p> <p>By default, the software provisioning manager creates the domain users <code>SAPService&lt;SAPSID&gt;</code>, <code>&lt;SAPSID&gt;adm</code>, and the domain group <code>SAP_&lt;SAPSID&gt;_Globaladmin</code> in the domain Users container. Here you can specify an optional organizational unit where the software provisioning manager creates these domain users and group. The user who performs the installation needs read and write permissions to this organizational unit.</p> <p>The OU feature is only available when you select <i>Custom mode</i> in SWPM and choose <i>Use Domain of current user</i>. For more information, see SAP Note <a href="#">2247673</a>.</p>
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Parameter	Definition
UME Configuration <div data-bbox="193 434 788 754" style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p><b>Note</b></p> <p>If you want to install an optional standalone unit - Advanced Adapter Engine (AAE) , Advanced Adapter Engine Extended (AEX), or Process Integration and Orchestration (PI-CP) - you can skip this section because you are <b>not</b> prompted for UME Configuration. Optional standalone units are automatically configured during the installation to store the SAP system users in the Java database.</p> </div>	<p>The software provisioning manager prompts you for how to configure the UME during the input phase of the installation.</p> <p>You can choose between the following options:</p> <ul style="list-style-type: none"> <li> <p><i>Use Java Database</i></p> <p>If you choose this option, administrators can manage users and groups with the <code>UME Web admin tool</code> and <code>SAP NetWeaver Administrator</code> only.</p> <p>For LDAP, use this configuration for the installation and change the configuration to LDAP after the installation.</p> </li> <li> <p><i>Use External ABAP System</i></p> <p>If you choose this option, administrators can manage users with the transaction SU01 on the external ABAP system, and, depending on the permissions of the communication user, also with the <code>UME Web admin tool</code> and <code>SAP NetWeaver Administrator</code>.</p> <p>You must have created the required users manually on the external ABAP system.</p> </li> </ul> <div data-bbox="852 1021 1394 1449" style="background-color: #f0f0f0; padding: 10px; margin-top: 10px;"> <p><b>Note</b></p> <p>If you want to install the application server Java for an SAP NetWeaver 7.5 Process Integration (PI) system or for an SAP Solution Manager 7.2 system, you must use the already installed Application Server ABAP as the data source for user data for the Application Server Java to be installed. In this case, the required users were already created during the installation of the Application Server ABAP and you are prompted to enter these users during the installation of the Application Server Java.</p> </div> <p>For more information, see <a href="#">Preparing User Management for an External ABAP System (Optional)</a> [page 70].</p> <p>For more information about supported UME data sources and change options, see SAP Note <a href="#">718383</a>.</p>
<hr/> <p><b>Using the Java Database:</b></p> <hr/>	
Administrator User	<p>The software provisioning manager sets the user name <code>Administrator</code> and the master password by default.</p> <p>If required, you can choose another user name and password according to your requirements.</p>

Parameter	Definition
Guest User	<p>The software provisioning manager sets the user name <code>Guest</code> and the master password by default.</p> <p>The guest user is a user for anonymous access.</p>

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#### Using an External ABAP System – Parameters for the ABAP Connection:

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Application Server Instance Number	<p>This is the instance number on the application server of the central ABAP system to which you want to connect the Application Server Java.</p> <p>To find out the number on the host of the primary application server instance, look in the following SAP directory:</p> <ul style="list-style-type: none"> <li> <b>SAP systems based on SAP NetWeaver 7.4 (SAP Solution Manager 7.2 SR2 only) :</b>  <code>/usr/sap/&lt;SAPSID&gt;/DVEBMGS&lt;Instance_Number&gt;</code> </li> <li> <b>SAP systems based on SAP NetWeaver 7.5:</b>  <code>/usr/sap/&lt;SAPSID&gt;/D&lt;Instance_Number&gt;</code> </li> </ul>
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Application Server Host	<p>This is the host name of the relevant application server instance.</p> <p>To find out the host name, enter <b>hostname</b> at the command prompt of the host running the primary application server instance.</p>
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Communication User	<p>This is the name and password of the existing ABAP communication user. You must have created this user manually on the external ABAP system.</p> <p>The default user name is <code>SAPJSP</code></p>
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#### ⓘ Note

If you are installing a SAP NetWeaver 7.5 Process Integration (PI) or a SAP Solution Manager 7.2 system, this user has been created during the installation of the SAP NetWeaver 7.5 PI application server ABAP.

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#### Using an External ABAP System – Parameters for the Application Server Java Connection:

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Parameter	Definition
Administrator User	<p>This is the name and password of the administrator user that you created on the external ABAP system.</p> <p>The default user name is <code>J2EE_ADMIN</code></p> <div style="border: 1px solid #ccc; background-color: #f9f9f9; padding: 10px; margin-top: 10px;"> <p><b>Note</b></p> <p>If you are installing a SAP NetWeaver 7.5 Process Integration (PI) or a SAP Solution Manager 7.2 system, this user has been created during the installation of the Application Server ABAP.</p> </div>
Administrator Role	<p>The role <code>SAP_J2EE_ADMIN</code> must exist on the external ABAP system.</p>
Guest User	<p>This is the name and password of the guest user that you created on the external ABAP system.</p> <p>The guest user is a user for anonymous access.</p> <p>The default user name is <code>J2EE_GUEST</code></p> <div style="border: 1px solid #ccc; background-color: #f9f9f9; padding: 10px; margin-top: 10px;"> <p><b>Note</b></p> <p>If you are installing a SAP NetWeaver 7.5 Process Integration (PI) or an SAP Solution Manager 7.2 system, this user has been created during the installation of the Application Server ABAP.</p> </div>
Guest Role	<p>The role <code>SAP_J2EE_GUEST</code> must exist on the external ABAP system.</p>

## System Landscape Directory

Parameter	Definition
SLD Destination for the System	<p>The System Landscape Directory (SLD) registers the systems and the installed software of your entire system landscape.</p> <p>You can choose between the following options:</p> <ul style="list-style-type: none"> <li> <p><b>Register in existing SLD</b></p> <p>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.</p> </li> <li> <p><b>No SLD destination</b></p> <p>Choose this option if you do <b>not</b> 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.</p> </li> </ul>

Parameter	Definition
SLD Host	The host name of the existing SLD.
SLD HTTP(S) Port	<p>HTTP port of the SAP system based on AS Java on which the System Landscape Directory (SLD) resides. The following naming convention applies:  <code>5&lt;Primary_Application_Server_Instance_Number&gt;00.</code></p> <div style="border: 1px solid #ccc; padding: 5px; background-color: #f9f9f9;"> <p><b>Example</b></p> <p>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.</p> </div>
SLD Data Supplier User and password	The existing SLD Data Supplier user and password of the existing SLD

## 3.6.2 SAP System Database Parameters

Parameters	Description
Database ID <DBSID>	<p>The &lt;DBSID&gt; identifies the database instance. The software provisioning manager prompts you for the &lt;DBSID&gt; when you are installing the database instance.</p> <p>The &lt;DBSID&gt; must be the same as the &lt;SAPSID&gt;.</p> <div style="border: 1px solid #ccc; padding: 5px; background-color: #f9f9f9;"> <p><b>Caution</b></p> <p>Choose your database ID carefully. Renaming is difficult and requires you to reinstall the SAP system.</p> <ul style="list-style-type: none"> <li>If you want to install a new database: Make sure that your database ID: <ul style="list-style-type: none"> <li>Is unique throughout your organization</li> <li>Consists of exactly three alphanumeric characters</li> <li>Contains only uppercase letters</li> <li>Has a letter for the first character</li> <li>Does not include any of the reserved IDs listed in SAP Note <a href="#">1979280</a>.</li> </ul> </li> <li><b>MCOD only:</b> If you want to use an existing database system, enter exactly the database ID of the existing database to which you want to add the system. For more information, see <a href="#">Installation of Multiple Components in One Database [page 148]</a>.</li> </ul> </div>



Parameters	Description
Database instance name	<p>MS SQL Server instance name</p> <p>You can also specify a remote database instance.</p> <p>For a named instance, enter &lt;Host_Name&gt;\&lt;Instance_Name&gt;.</p> <p>Only valid for 'High Availability': HA (Windows)</p> <p>In an HA-environment, enter the SQL Server failover network (virtual) name.</p> <p>End of 'High Availability': HA (Windows)</p>

### 3.6.3 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.

Parameter	Description
When Using a Stack XML File: SAP System ID <SAPSID>	<p>When <a href="#">Installation Using a Stack XML File [page 31]</a>, in addition to the requirements listed in <a href="#">using a stack configuration file [page 45]</a> <b>▶▶ General Parameters ▶ SAP System ID</b> <b>▶</b>, make sure that the SAP system ID (SAPSID) of the ABAP system must be different from the SAPSID of the Java system.</p>

### 3.6.4 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.

Parameter	Description
SAP Process Integration (PI) 7.5, SAP Solution Manager 7.2: SAP System ID <SAPSID>	<p>In addition to the requirements listed in <a href="#">SAP System Parameters [page 45]</a> <b>▶▶ General Parameters ▶ SAP System ID</b> <b>▶</b>, make sure that the SAP system ID (SAPSID) of the ABAP system must be different from the SAPSID of the Java system.</p>

For more information, see [Installation Using a Stack XML File \(Optional\) \[page 31\]](#).

## Related Information

[Installation Using a Stack XML File \[page 31\]](#)

### 3.6.5 Parameters for Additional Components to be Included in the SCS Instance

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

Parameters	Description
Install an SAP Web Dispatcher embedded in the SCS instance	<p>When processing the screens for the ASCS instance installation, you are prompted to mark this checkbox on the screen <i>Additional Components to be Included in the SCS Instance</i>.</p> <p>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:</p>
	<p>Message Server Host</p> <p>The name of the host on which the message server is located (profile parameter <code>rdisp/mshost</code>)</p>
	<p>Message Server HTTP Port</p> <p>HTTP port of the message server (profile parameter <code>ms/server_port_&lt;xx&gt;</code>)</p>
	<p>Password for the Internet Communication Management (ICM) user</p> <p>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.</p> <p>You have to assign a password for this user.</p>

## Related Information

[SCS Instance with Embedded SAP Web Dispatcher \[page 27\]](#)

## 3.7 Distribution of SAP System Components to Disks

When you install the SAP system, the main directories required for the system are automatically created. However, during the installation procedure, the software provisioning manager prompts you to enter drive

letters for the main components of the system. This gives you the opportunity to distribute components to disks in the system as you wish. How you do this significantly affects system throughput and data security, and must therefore be carefully planned. The best distribution depends on your specific environment and must take into consideration factors such as the size of the components involved, security requirements, and the expected workload.

When you work out the assignment of components to disks, you first need to get an overview of the main components and their corresponding directories. Then, on the basis of sample configurations and the recommendations provided in this documentation, you can decide which assignment is best for your particular system.

The following table gives you an overview of the main SAP system components, directories, and their purpose.

A good distribution to disks ensures that:

- Enough free space is available for system growth
- The data is secure
- Performance is good

SAP System Components and their Directories

Directory Type	Directory Structure	Description
SAP System	<ul style="list-style-type: none"> <li>• \usr\sap</li> <li>• \usr\sap\trans</li> </ul>	<ul style="list-style-type: none"> <li>• SAP kernel and related files</li> <li>• SAP transport directory</li> </ul>
Database Management System (DBMS)	\Program Files\Microsoft SQL Server	SQL Server program files including the master, msdb and model database files.
SAP Database	\<SAPSID>DATA0 \<SAPSID>DATA1 \<SAPSID>DATA2 \<SAPSID>DATA3 ... \<SAPSID>DATA<N>	Database data files <0-N>
SAP Database Transaction Log	\<SAPSID>log<N>	Database transaction log files
Tempdb	\Tempdb	Tempdb data files

## Database Components

When you install an SAP system with SQL Server, the central components of the database are the SQL Server **program files**, **tempdb files**, **SAP database data files** and **SAP database transaction log files**. The log files record all the changes made to the database to enable restore and recovery. The tempdb holds all temporary tables and stored procedures. The data files contain the data for the SAP system.

- SAP Database Data Files**

The data files are created by default in the directories `\<SAPSID>DATA<N>` on the disk with the most free available space. The first data file is called `<SAPSID>DATA0.mdf` and subsequent files `<SAPSID>DATA<N>.ndf`, where `<N>` denotes the number of the file.

For performance reasons, locate the data files on a separate disk system. They should not be included in the same disk system as the log files or other SQL Server program and database files. To ensure data redundancy, we recommend the use of at least RAID 5.
- Transaction Log File**

The transaction log for the database is created by default in the directory `\<SAPSID>LOG1` on the disk with the most free available space. The log file is called `<SAPSID>LOG1.ldf`.

The transaction log file records all the changes made to the database and, if required, enables modifications to be redone or undone. It plays a crucial role when the database has to be restored due to database damage or media failure.

We recommend the use of RAID 1, which implements hardware-based mirroring.
- Program Files**

The files other than the SAP database data and transaction log files are created in the subdirectories of `\Program Files\Microsoft SQL Server`. These include the SQL Server program files and the `master`, `msdb`, and `model` database files.

Locate these on a separate, third, disk system and not on the same disks as the transaction log files or SAP database data files. We recommend the use of RAID 1.

For performance reasons, it is advisable to place the `tempdb` files on a fast disk system. This is particularly recommended because the `tempdb` is frequently accessed during SQL Server operation and could otherwise affect performance.

#### Note

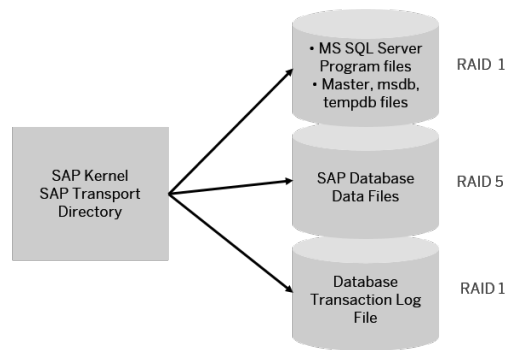
After the initial installation of the database software, the `tempdb` is located in a subdirectory of `\Program Files\Microsoft SQL Server`. However later, when the software provisioning manager builds and loads the database, it is transferred to a new `\TEMPDB` directory and extended to a size of 300 MB.

## Distribution of Main Directories to RAID Array

The following graphic illustrates how the main directories that are created during the installation can be distributed to RAID arrays. The distribution is suitable for an average-sized production system. Keep in mind that this is only an example and that no single solution is fitting for all environments.

#### Note

The SAP kernel files and the transport directory can be assigned to any of the arrays depicted, but must both be located on the same array. The transport directory does not necessarily have to reside on the primary application server instance host.



Distribution of SAP System Components to RAID Arrays

#### Distribution of Directories to Arrays

Array 1	\Program files\Microsoft SQL Server \TEMPDB
Array 2	\<SAPSID>DATA0 \<SAPSID>DATA1 \<SAPSID>DATA2 \<SAPSID>DATA3 ... \<SAPSID>DATA<N>
Array 3	\<SAPSID>log1

## Optimizing Performance

If you wish to optimize performance, isolate the `tempdb` on a separate, fast disk. This improves performance significantly because the `tempdb` is continually accessed during MS SQL Server operation.

A further option for improving performance is to place the Windows paging file on a separate, fast disk.

## 3.8 SAP System Transport Host

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

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

- Use the transport directory that the 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 \[page 69\]](#).

## More Information

- [SAP Directories \[page 139\]](#)

# 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

#### Note

In a standard system, all mandatory instances are installed on one host. Therefore, if you are installing a standard system, you can ignore references to other hosts.

1. [Disable the Windows Server \[page 64\]](#) firewall operating system users and groups on each host.
2. You [perform basic preparations on Windows \[page 64\]](#).
3. You [check that you have the required user authorization for running the software provisioning manager \[page 66\]](#).
4. If required, you [prepare the SAP system transport host \[page 69\]](#) for your SAP system.
5. You check that the required [installation media \[page 72\]](#) are available for each installation host.
6. 

Only valid for 'High Availability': HA (Windows) To install a high-availability system with Microsoft Failover Clustering, you also perform the <a href="#">HA-specific preparation steps [page 167]</a> .
End of 'High Availability': HA (Windows)
7. You continue with [Installation \[page 86\]](#).

### Additional Application Server Instance

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

1. [Disable the Windows Server firewall \[page 64\]](#) operating system users and groups on each host.
2. You [perform basic preparations on Windows \[page 64\]](#).
3. You [check that you have the required user authorization for running the software provisioning manager \[page 66\]](#).
4. If required, you [prepare the SAP system transport host \[page 69\]](#).

5. You check that the required [installation media \[page 72\]](#) are available on each installation host.
6. You continue with [Installation \[page 86\]](#).

## 4.2 Disabling the Windows Server Firewall on Windows Server

The Windows firewall – which is turned on by default on all Windows versions – is configured to allow only a small set of Windows-specific inbound IP connections. By default, outbound connections are not limited to rules and are therefore not restricted by the firewall.

The firewall settings apply to local policies. For domain policies that override local policies, other rules might apply.

To avoid any problems with non-configured TCP/IP ports that are used by the SAP system, you need to disable the firewall on all Windows hosts before you install the SAP system with the software provisioning manager. We recommend that you secure network access to the SAP application servers with a real physical firewall or use a router Access Control List (ACL).

### Procedure

Only valid for 'High Availability': HA (Windows)

#### Note

In a high-availability system, you have to disable the firewall on **all** failover cluster nodes.

End of 'High Availability': HA (Windows)

Open PowerShell in elevated mode, and enter the following command:

```
Set-NetFirewallProfile -enabled false
```

## 4.3 Performing Basic Windows Preparation Steps

### Use

This section informs you about basic preparation steps that you have to perform before you install the SAP system, including the following:

- Deactivate the file and directory attribute caches
- Checking the Windows file system
- Checking the Windows domain structure (domain installation only)



- Deciding whether you want to use organizational units (OUs) in the Windows domain (domain installation only)

## Procedure

### Deactivate the File and Directory Attribute Caches

You need to set the following three file and directory attribute caches to 0:

For more information, see [3358301](#).

Perform as follows:

1. Open PowerShell
2. Enter the following three commands:
  - Set-SmbClientConfiguration -FileInfoCacheLifetime 0
  - Set-SmbClientConfiguration -FileNotFoundCacheLifetime 0
  - Set-SmbClientConfiguration -DirectoryCacheLifetime 0

### Checking the Windows File System

You need to check which Windows file system you are using on hosts where you want to install the SAP system.

You should use the Windows file system ReFs or NTFS. Older Windows Server versions must use NTFS.

#### Note

Do **not** install the SAP system on a FAT partition.

Perform the check as follows:

- Use PowerShell:
  1. Open PowerShell in elevated mode, and enter the following command:  
`get-volume`
  2. Check that the value *FileSystem* is ReFs or NTFS.
- Use Windows Explorer:
  1. Open the Windows Explorer.
  2. Select the relevant disk.
  3. Choose **Properties** > **General**.  
The system displays the type of file system in use.
  4. Check that the file system is NTFS.

### Checking the Windows Domain Structure

#### Note

You do **not** need this step for a local installation.

For a domain installation, we recommend that you check that all SAP system hosts are members of a single Windows domain. We recommend this for all SAP system setups.

We assume that you are familiar with checking Windows domain structures. For more information, see the Windows documentation.

In Windows, you can implement either of the following domain models for the SAP system:

- Extra domain  
In this model, the SAP system is embedded in its own domain, which is specially defined for SAP. A second domain exists for the user accounts.  
In Windows, the SAP domain and user domain must be incorporated in a domain tree. In this tree, the user accounts must form the root domain and the SAP domain must be a child domain of this.
- Single domain  
In this model, the SAP system, and the user accounts are included in a single domain.

#### ⚠ Caution

You cannot create local users and groups on the host that is used as domain controller. Therefore, we do **not** support running an SAP instance (including the database instance) on the host where the domain controller is installed.

### Deciding Whether to Use Organizational Units (OUs) in the Windows Domain

#### 📌 Note

You do **not** need this step for a local installation.

For a domain installation, the software provisioning manager needs to create certain OS users for SAP and database operations in the Windows domain, also called the “Active Directory” (AD). These users are created by default in the AD container “Users”.

Depending on a customer’s AD landscape and security policy, there are certain restrictions on where to store users and groups in AD. Contact the administrator of your AD infrastructure to understand where to store all SAP and database-related domain users and domain groups.

The SAP software provisioning manager offers to define an existing OU in AD to create all needed SAP and database users in this OU.

There are many different scenarios and prerequisites concerning how to use OUs. For more information, see SAP Note [2247673](#), which explains these issues in detail and shows some examples of how to use them.

#### ⚠ Caution

The software provisioning manager does **not** create OUs. The software provisioning manager does **not** move existing domain users or groups. The software provisioning manager does **not** delete existing users, groups, OUs, nor any other object in a Windows domain.

The only exception to this rule is the Uninstall option in the software provisioning manager.

## 4.4 Required User Authorization for Running Software Provisioning Manager

Although the software provisioning manager automatically grants the rights required for the installation to the user account used for the installation, you have to check whether this account has the required authorization

to perform the installation. The authorization required depends on whether you intend to perform a **domain** or **local** installation. If necessary, you have to ask the system administrator to grant the account the necessary authorization **before** you start the installation. If you attempt the installation with an account that does not have the required authorization, the installation aborts.

This section informs you about the authorization required for a domain and a local installation.

## Procedure

### ⚠ Caution

Do **not** use the user `<sapsid>adm` or the built-in administrator account for the installation of the SAP system.

### Domain Installation

For a domain installation the account used for the installation needs to be a member of the local `Administrators` group. In many old installation guides, you find the information that the account must be a member of the `Domain Admins` group. The account can be either a member of the `Domain Admins` group or belong to the `Domain Users` group and have the necessary rights to create/modify objects in the domain.

For a list of the required permissions, see [Performing a Domain Installation without being a Domain Administrator \[page 143\]](#).

All machines in the system must belong to the same domain. In a domain installation, the user information is stored centrally on the domain controller and is accessible to all hosts in the system.

If the SAP system is to be distributed across **more than one** machine, SAP strongly recommends that you perform a domain installation to avoid authorization problems.

### ⚠ Caution

- If you install a distributed system as a local installation, this can lead to authorization problems for the operating system users `<sapsid>adm` and `SAPService<SAPSID>`. It can also lead to problems with the transport directory, which is usually shared by several SAP systems. SAP does **not** support distributed SAP systems running with local user accounts.
- Only valid for 'High Availability': HA (Windows)  
In a high-availability configuration, you always have to perform a **domain** installation.  
End of 'High Availability': HA (Windows)
- For performance and security reasons, SAP does not support an SAP system installation on a domain controller.

### Local Installation

For a local installation the account used for the installation needs to be a member of the local `Administrators` group of the machine involved. In a local installation, all Windows account information is stored locally on one host and is not visible to any other hosts in the system.

If the SAP system is to run on a **single** machine, you can perform a local installation.

### ⚠ Caution

Do not use the Windows built-in account `Administrator` or the renamed built-in account to install your SAP system. The built-in account only has restricted network access rights that are required by the

software provisioning manager. If you renamed the built-in account `Administrator`, do not create a new account named `Administrator`.

For a local installation, you need to:

1. Check that the account used for the installation is a member of the local `Administrators` group.
2. If required, obtain these rights by asking the system administrator to enter the account as a member of the local `Administrators` group.

## Related Information

[Performing a Domain Installation Without Being a Domain Administrator \[page 143\]](#)

## 4.5 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.
- Make sure that you configured the Windows operating system properly to use virtual host names. For more information, see SAP Note [1564275](#).

### Context

Only valid for 'High Availability': HA (Windows)

#### ⚠ Caution

##### High Availability only:

- Only use virtual host names if this is explicitly stated in the parts of this installation guide specific to high availability. Otherwise, use the physical host name.
- Do **not** start the software provisioning manager with the command line parameter `SAPINST_USE_HOSTNAME=<virtual hostname>` on failover cluster nodes.

End of 'High Availability': HA (Windows)

## Procedure

To install a **non-high-availability** system, proceed as described in SAP Note [1564275](#).

## 4.6 Preparing the SAP System Transport Host

The transport host has a directory structure that is used by the SAP transport system to store transport data and metadata.

### Context

When you install an SAP system, the software provisioning manager by default creates the transport directory on the global host in `\usr\sap\trans`.

If you do not intend to use the directory structure of the system you are going to install, but want to use another new transport directory on another host, or an existing transport directory in your system landscape, you need to prepare that transport host:

- If the directory structure already exists, you must set up its security to allow the new system to write to it.
- If it does not yet exist, you must create the core directory structure and a share to export it for other computers as well as set the security on it.

### Procedure

1. If the transport directory does not yet exist, do the following:
  - a. Create the directory `\usr\sap\trans` on the host to be used as the transport host.
  - b. Share the `usr\sap` directory on the transport host as `SAPMNT` and set the permission for *Everyone* to *Full Control* for this share.

This enables the software provisioning manager to address the transport directory in the standard way as `\\SAPTRANSHOST\SAPMNT\trans`.
2. Grant *Everyone* the permission *Full Control* for the transport directory.

#### ⚠ Caution

Remove the *Full Control to Everyone* permission after you have finished the installation and only grant *Full Control* on this directory to the `SAP_<SAPSID>_GlobalAdmin` groups of all the systems that are part of your transport infrastructure. The software provisioning manager assigns the appropriate rights with the help of an additional `SAP_LocalAdmin` group. For more information, see [Automatic Creation of Accounts and Groups \[page 157\]](#).

## 4.7 Preparing an External ABAP System as Source for User Data

You can use an external ABAP system as the data source for user data for the Application Server Java of your SAP Java system to be installed. To do so, you configure the User Management Engine (UME) of the AS Java for the user management of this external ABAP system.

### Prerequisites

The ABAP system is based on at least SAP Web AS ABAP release 6.20 SP25.

### Context

#### 📘 Note

If you want to install an optional standalone unit - Advanced Adapter Engine (AAE) , Advanced Adapter Engine Extended (AEX), or Process Integration and Orchestration (PI-CP) - you can skip this section because you are **not** prompted for UME Configuration. Optional standalone units are automatically configured during the installation to store the SAP system users in the Java database.

If you want to connect more than one Java system to the same ABAP system, you need to work out a concept for the communication, administrator, and guest users for each system.

#### 📘 Note

If you want to install the application server Java for an **SAP NetWeaver 7.5 Process Integration (PI)** system or for an **SAP Solution Manager 7.2** system, you must use the already installed Application Server ABAP (AS ABAP) as the data source for user data for the Application Server Java to be installed. In this case, the required users were already created during the installation of the Application Server ABAP and you are prompted to enter these users during the installation of the Application Server Java.

You can take one of the following approaches when using an external ABAP system as source for user data:

Approach	Advantages	Disadvantages
Each Java system uses different users	No interdependencies between the connected engines	Initially more administration to create the users in the ABAP system

Approach	Advantages	Disadvantages
All Java systems use the same configuration	You create the users only once and enter the same information for every Java system that you install.	Interdependencies between the connected engines: <ul style="list-style-type: none"> <li>If you change the password of any of the users on the ABAP system, this change affects <b>all</b> connected engines.</li> <li>If you change the administrator user's password, you must also change the password in secure storage on <b>all</b> of the connected Java EE Engines</li> </ul>

### → Recommendation

For security reasons, we recommend the **first** approach.

The procedures below assume that you are using the first approach.

## More Information

For more information about AS ABAP user management as data source, see the SAP Library at:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
<ul style="list-style-type: none"> <li><b>SAP Solution Manager 7.2 SR2 only:</b> SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></li> <li>SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li> <li>SAP NetWeaver AS for ABAP 7.51 innovation package <a href="https://help.sap.com/nw751abap">https://help.sap.com/nw751abap</a></li> <li>SAP NetWeaver AS for ABAP 7.52 <a href="https://help.sap.com/nw752abap">https://help.sap.com/nw752abap</a></li> </ul>	<ul style="list-style-type: none"> <li>Application Help &gt; SAP NetWeaver Library: Function-Oriented View &gt; Security &gt; Identity Management &gt; User Management of SAP NetWeaver AS for Java</li> <li>Configuring User Management &gt; UME Data Sources &gt; User Management of Application Server ABAP as Data Source</li> </ul>

## Procedure

- The following procedures describe the activities you have to perform in the existing ABAP system and for the Java system to be installed.
- Perform the following steps in the existing ABAP system:
  - Call transaction `PF03` to do the following:
    - Check that the roles `SAP_BC_JSF_COMMUNICATION` and `SAP_BC_JSF_COMMUNICATION_RO` exist and make sure that their profiles are generated.
    - Check that the roles `SAP_J2EE_ADMIN`, `SAP_J2EE_GUEST`, and `SAP_BC_FP_ICF` exist. Neither role contains any ABAP permissions, so you do not need to generate any profiles.
  - Call transaction `SU01` to do the following:

- Create a new communication user and assign it to the role `SAP_BC_JSF_COMMUNICATION_RO`. We recommend that you do the following:
  - Name this user `SAPJSF`. You can use any password.
  - Assign this user the role `SAP_BC_JSF_COMMUNICATION_RO` for read-only (display) access to user data with Java tools. If you intend to maintain user data (that is, to change, create, or delete users) with Java tools, you need to assign the role `SAP_BC_JSF_COMMUNICATION` instead.
  - Assign this user the type *Communications* under *Logon data* to make sure that it can only be used for communication connections between systems and not as a dialog user.
- Create a new administrator user for the J2EE engine and assign it to role `SAP_J2EE_ADMIN`. We recommend that you name this user `J2EE_ADM_<SAPSID_Java_System>`. You can use any password.
- Create a new guest user for the J2EE engine and assign it to role `SAP_J2EE_GUEST`. We recommend that you name this user `J2EE_GST_<SAPSID_Java_System>`. You can use any password.  
Since this user is only used for anonymous access to the system, we recommend you to deactivate the password and, if required, lock it after installation to prevent anyone from using it for explicit named logons.
- c. Make sure that you change the initial passwords of these users and take the precautions described in the relevant SAP security guide **before** you start the installation of the Java system. You can find the security guide in the *Security* section of the product page for your SAP product at <https://help.sap.com/>.
- Perform the following steps in the Java System:
  - a. **Before** the installation of the Java system, make sure that you have the correct user names and passwords of the users listed above for the separate ABAP system.
  - b. **During** the installation of the Java system, make sure that you enter the correct users and passwords in the corresponding software provisioning manager dialogs.

## 4.8 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 \[page 77\]](#).
- 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



[2083594](#) - SAP Kernel Versions and SAP 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

- 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 \(Archive-Based Installation\) \[page 78\]](#).

If you are performing an [Installation Using a Stack XML File \[page 31\]](#), you can directly download the artefacts (SAR archives) as specified in the Maintenance Plan.

- 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 \[page 73\]](#).
- Download the complete kernel media from the SAP Software Download Center.  
For more information, see [Downloading Complete Installation Media \[page 83\]](#).

- 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 \[page 73\]](#).

[Media Required for the Installation - Listed by SAP System Instance \[page 73\]](#)

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

## 4.8.1 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 \[page 91\]](#)). 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

[2083594](#) - SAP Kernel Versions and SAP 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

In addition, check the Product Availability Matrix at: <http://support.sap.com/pam>.

Proceed as follows to make the media available:

1. Identify the required media [for your installation \[page 23\]](#) as listed below.

SAP Instance Installation	Required Software Packages from Installation Media
Central services instance (SCS instance)	<ul style="list-style-type: none"><li>• Software Provisioning Manager 1.0 archive</li><li>• UC Kernel (folder <code>κ_&lt;Version&gt;_ϖ_&lt;OS&gt;</code>) where <code>ϖ</code> means Unicode.</li></ul>
Database instance	<ul style="list-style-type: none"><li>• Software Provisioning Manager 1.0 archive</li><li>• UC Kernel (folder <code>κ_&lt;Version&gt;_ϖ_&lt;OS&gt;</code>) where <code>ϖ</code> means Unicode.</li><li>• Database software</li><li>• <b>SAP Business Suite Java Applications only:</b> SAP Business Suite Java Content (folders <code>JAVA_*</code>)</li></ul>
<b>Note</b> For an MCOD system you require the database client software instead of the database software and the database patches (if available).	
Enqueue Replication Server	<ul style="list-style-type: none"><li>• Software Provisioning Manager 1.0 archive</li><li>• UC Kernel (folder <code>κ_&lt;Version&gt;_ϖ_&lt;OS&gt;</code>) where <code>ϖ</code> means Unicode.</li></ul>
Primary application server instance	<ul style="list-style-type: none"><li>• Software Provisioning Manager 1.0 archive</li><li>• UC Kernel (folder <code>κ_&lt;Version&gt;_ϖ_&lt;OS&gt;</code>) where <code>ϖ</code> means Unicode.</li><li>• SAP NetWeaver AS for Java Component (folders <code>JAVA_*</code>)</li><li>• <b>SAP Business Suite Java Applications only:</b> SAP Business Suite Java Content (folders <code>JAVA_*</code>)</li><li>• Database Client Software</li><li>• CLI Driver / JDBC Driver</li></ul>

## SAP Instance

### Installation Required Software Packages from Installation Media

Additional application server instance	<ul style="list-style-type: none"><li>• Software Provisioning Manager 1.0 archive</li><li>• UC Kernel (folder <code>K_&lt;Version&gt;_U_&lt;OS&gt;</code>) where <code>U</code> means Unicode.</li><li>• SAP NetWeaver AS for Java Component (folders <code>JAVA_*</code>)</li><li>• <b>SAP Business Suite Java Applications only:</b> SAP Business Suite Java Content (folders <code>JAVA_*</code>)</li><li>• Database Client Software</li></ul>
--	---

SAP Host Agent (Separate Installation Only)

### SAP Instance Installation

### Required Media

SAP Host Agent (separate installation only)	<ul style="list-style-type: none"><li>• Software provisioning manager 1.0 archive</li></ul>
---	---

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 \[page 77\]](#).
2. 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 \(Archive-Based Installation\) \[page 78\]](#).

#### Note

If you are using a Stack XML file (see [Installation Using a Stack XML File \[page 31\]](#)), 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://me.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 \[page 81\]](#).

- 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.
- If you perform a domain installation and do not want to copy the media but use network drives for mapping the installation media, make sure that the `<sapsid>adm` user has access to the UNC paths of the network drives. If the user does not yet exist, you have to create the user manually before you install the SAP system.

- Download the kernel medium from the Software Download Center.  
For more information, see [Downloading Complete Installation Media \[page 83\]](#).

### 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://me.sap.com/softwarecenter> following the instructions in [Downloading SAP Kernel Archives \(Archive-Based Installation\) \[page 78\]](#).

### 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, and SAPJVM<Version>.SAR, are only prompted if they cannot be retrieved from the primary application server instance or the SCS instance of the existing SAP system. The release and patch versions must match those used for the primary application server instance and the SCS instance.

3. 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.

### 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.
- If you perform a domain installation and do not want to copy the media but use network drives for mapping the installation media, make sure that the <sapsid>adm user has access to the UNC paths of the network drives.  
If the user does not yet exist, you have to create the user manually before you install the SAP system.

## Related Information

[Downloading and Extracting the Software Provisioning Manager 1.0 Archive \[page 77\]](#)

[Downloading SAP Kernel Archives \(Archive-Based Installation\) \[page 78\]](#)

[Downloading Software Packages for a Maintenance Planner Transaction \[page 81\]](#)

[Downloading Complete Installation Media \[page 83\]](#)

## 4.8.1.1 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 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://me.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://me.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.
4. To improve usability, we recommend that you rename the executable to `sapcar`.

For more information about `SAPCAR`, see SAP Note [212876](#).

### 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/sltoolset> > *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://me.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 sapcryptolib\_84...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:

#### Note

Check SAP Notes [2178665](#)  and [1680045](#)  whether additional information is available.

```
<Path to SAPCAR>\sapcar.exe -tvVf<Path to Download
Directory>\SWPM10SP<Support_Package_Number>_<Version_Number>.SAR -crl <file
name of revocation list>
```

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

```
<Path to SAPCAR>\sapcar.exe -xvf <Path to Download
Directory>\SWPM10SP<Support_Package_Number>_<Version_Number>.SAR -R <Path to
Unpack Directory>
```

#### Note

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

#### Caution

Make sure that you unpack the Software Provisioning Manager archive to a dedicated folder. Do not unpack it to the same folder as other installation media.

## 4.8.1.2 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 81].

## Context

The digital signature of **installation archives** is checked **automatically** by the [software provisioning manager \[page 91\]](#) 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 \[page 77\]](#).
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

[2083594](#) - SAP Kernel Versions and SAP 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

3. To get all downloadable software component archives required for your SAP product, go to <https://me.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 the Java part of an SAP Process Integration 7.5 system, choose **SAP NetWeaver and complementary products > SAP NetWeaver > <Release> > Application Server Java**
  - If you want to install an optional standalone unit of SAP NetWeaver Process Integration 7.5 (Advanced Adapter Engine, Advanced Adapter Engine Extended, or Process Orchestration) choose **SAP NetWeaver and complementary products > SAP NetWeaver > <Release> > Entry by Component > Application Server Java**

- If you want to install an SAP NetWeaver Java system, choose ► *SAP NetWeaver and complementary products* ► *SAP NetWeaver* ► *<Release>* ► *[For releases lower than 7.5: Entry by Component]* ► *Application Server Java* ►
- 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* ► *<Java Product Instance>* ►

5. Choose the required package:

### 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, and SAPJVM<Version>.SAR, are only prompted if they cannot be retrieved from the primary application server instance or the SCS instance of the existing SAP system. The release and patch versions must match those used for the primary application server instance and the SCS instance.

### 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>* ►
- igsexex<Version>.sar  
► *SAP IGS <Version>* ► *<Operating System>* ►
- You require the igshelper<Version>.sar.  
Choose ► *SAP IGS HELPER* ► *# OS independent* ►
- SAPJVM<Version>.SAR:  
► *SAP JVM 8.<Version>* ► *<Operating System>* ►
- 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 *Adobe Document Services*, download the **unlimited** version of the JCE Jurisdiction Policy Files archive. For more information about where to download it, see SAP Note [1240081](#) (see also [SAP System Parameters \[page 45\]](#)).
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 \[page 73\]](#) or by downloading them as described in [Downloading Complete Installation Media \[page 83\]](#).

## Related Information

[Downloading Software Packages for a Maintenance Planner Transaction \[page 81\]](#)

### 4.8.1.3 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.

### 📘 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 NetWeaver and S/4HANA) 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 \[page 91\]](#).

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-UserID and password

You call *Software Provisioning Manager* with command line parameter

`SAPINST_STACK_XML=<Absolute_Path_To_Stack_XML_File>` to get the *Maintenance Planner Transaction ID* extracted from the Stack 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://me.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**:
  - 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

If required, request a change of your SAP Support Portal Password **and** of your SAP ONE Support Password at <https://support.sap.com/en/my-support/users.html>.

- 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://me.sap.com/softwarecenter>.

#### Caution

If you install an SAP system based on SAP NetWeaver **7.5 Java**, follow the instructions in SAP Note [1680045](#) regarding the patch level of the `SAPJVM`. SAR archive you use for the installation.

## 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 \(Archive-Based Installation\) \[page 78\]](#) - 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 \[page 83\]](#).

### 4.8.1.4 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 \[page 77\]](#).
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 \[page 73\]](#).

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://me.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.

#### Example

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

```
SAPEXE_1118-80002612.SAR
```

- Select <Your DB> to download the database-independent parts of the kernel.

#### Example

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

#### Note

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://me.sap.com/softwarecenter/> as described in [Downloading SAP Kernel Archives \(Archive-Based Installation\) \[page 78\]](#).

- To download the remaining media required for your SAP product, you can use one of the following navigation paths:
  - <https://me.sap.com/softwarecenter/> > INSTALLATIONS & UPGRADES > By Category > SAP NETWEAVER AND COMPLEMENTARY PRODUCTS > <Product> > <Product Release>
  - <https://me.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

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

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

### Example

```
SAPXEDB_1110-80002623.SAR
Kernel Part II (753) (*)
SAPXEDB_1111-80002623.SAR
Kernel Part II (753) (*)
SAPXEDB_1112-80002623.SAR
Kernel Part II (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.

### Standard System

#### ⓘ Note

1. You [install the MS SQL Server database software silently as part of the installation of the respective SAP product](#). Do not install the database software separately prior to the SAP installation. In a standard system, all mandatory instances are installed on one host. Therefore, if you are installing a standard system, you can ignore references to other hosts. [\[page 88\]](#) on the host where you install the SAP system.

#### ⓘ Note

If you want to use AlwaysOn where multiple SQL Servers host one database, see [Database High-Availability with SQL Server Always On \[page 148\]](#).

2. You [check the prerequisites \[page 90\]](#) and [run the software provisioning manager \[page 91\]](#) to install the SAP system.

#### ⓘ Note

In a standard system, all mandatory instances are installed on one host in one installation run.

3. You continue with [Post-Installation \[page 112\]](#).

### Distributed System

1. On the database instance host, you [install the MS SQL Server database software \[page 88\]](#).

### Note

If you want to use AlwaysOn where multiple SQL Servers host one database, see [Database High-Availability with SQL Server Always On \[page 148\]](#).

- On all hosts except the database instance:
  - SQL Server 2012:
    - [install the MS SQL Server Native Access Client \(SNAC\) software \[page 88\]](#).
  - SQL Server 2014 and higher:
    - install the ODBC Driver for SQL Server.  
For more information, see [1902794](#).
- On the SCS instance host, you [check the prerequisites \[page 90\]](#) and [run the software provisioning manager \[page 91\]](#) to install the central services instance.

### Note

If you want to install an SCS instance [with embedded SAP Web Dispatcher \[page 27\]](#), you must choose the *Custom* parameter mode.

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

- On the database instance host, you [check the prerequisites \[page 90\]](#) and [run the software provisioning manager \[page 91\]](#) to install the database instance.
- On the primary application server instance host, you [check the prerequisites \[page 90\]](#) and [run the software provisioning manager \[page 91\]](#) to install the primary application server instance.

### Note

SQL Server 2012, make sure that you [have installed the MS SQL Server Native Access Client \(SNAC\) software \[page 88\]](#) on this host.

For SQL Server 2014 and higher, install the ODBC Driver for SQL Server. For more information, see [1902794](#).

- If required, you install *I* to *<N>* additional application server instances on the respective hosts, as described later in this section.
- You continue with [Post-Installation \[page 112\]](#).

Only valid for 'High Availability': HA (Windows)

## High-Availability System

- To install a high-availability system with Microsoft Failover Clustering, you perform the [HA-specific installation steps \[page 167\]](#).
- You continue with [Post-Installation \[page 112\]](#).

End of 'High Availability': HA (Windows)

## Additional Application Server Instance

You perform the following steps on each host where you install the additional application server instances.

1. SQL Server 2012:
  - [install the MS SQL Server Native Access Client \(SNAC\) software \[page 88\]](#).

For SQL Server 2014 and higher:

- install the ODBC Driver for SQL Server.  
For more information, see [1902794](#).

### Note

If you install the additional application server instance on the same host as the standard system, this step is **not** required.

2. You [check the prerequisites \[page 90\]](#) and [run the software provisioning manager \[page 91\]](#) to install the additional application server instances.

Only valid for 'High Availability': HA (Windows)

### Caution

In a high-availability system, you must install at least **one** additional application server instance.

End of 'High Availability': HA (Windows)

3. You continue with [Post-Installation \[page 112\]](#).

## 5.2 Installing the SQL Server Database Software

### Use

Before you install your SAP system, you have to install the SQL Server database software.

### Procedure

For more information about how to install the SQL Server database software for your SAP system, see section "Installing SQL Server <release> for a New SAP System" in the document *Upgrade to and Installation of SQL Server <release>*, which you can find using the SAP NetWeaver Guide Finder at <https://help.sap.com/viewer/nwguidefinder>.



## 5.3 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 \[page 42\]](#).

### Procedure

#### Using the Database of AS Java

You install your SAP system as described in this installation guide. During the installation, you specify the Java database as data source for the User Management Engine (UME) (see [SAP System Parameters \[page 45\]](#)).

During the installation, the SAP system is automatically configured to use the Java database as data source for the UME.

After the installation has finished, you can still change the user management configuration. For more information, see [Configuring User Management \[page 127\]](#).

#### Using an External SAP ABAP System as Source for User Data.

1. You prepare the external SAP ABAP system as described in [Preparing an External ABAP System as Source for User Data \[page 70\]](#).
2. You install your SAP system as described in this installation guide. During the installation, you specify an external ABAP system as data source for the User Management Engine (UME) (see [SAP System Parameters \[page 45\]](#)).
3. After the installation has finished, you can no longer change this configuration of the UME. For more information, see [Configuring User Management \[page 127\]](#).

#### 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 \[page 127\]](#).

## 5.4 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 \[page 91\]](#). 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 \[page 98\]](#).

- The SAPinst framework of software provisioning manager checks certificates for the software provisioning manager, archives and media and therefore uses a certificate revocation list (CRL). Make sure that this CRL is available. For more information, see SAP Note [3207613](#).
- 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 the [required authorization \[page 66\]](#) to run the software provisioning manager. While running the software provisioning manager, this setting is then also added to the environment of the `<sapsid>adm` user.

### ℹ 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.

- You need 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. The software provisioning manager creates an installation directory `sapinst_instdir`, where it keeps its log files, and which is located directly in the `%ProgramFiles%` directory. For more information, see [Useful Information about Software Provisioning Manager \[page 98\]](#).

- Make sure that you have defined the most important SAP system parameters as described in [Basic Installation Parameters \[page 44\]](#) **before** you start the installation.
- Check that your installation host meets the requirements for the installation options that you want to install.  
For more information, see [Running the Prerequisite Checker \[page 35\]](#).
- If you want to install an additional application server instance in an existing SAP system, make sure that:
  - The service definitions for the SAP start services are configured correctly and refer to the correct profile files.
  - There are no profile backup files with an underscore “\_” in their profile name. If so, replace the “\_” with a “.”.

#### 🔗 Example

```
Rename <Drive>:\usr\sap\S14\SYS\profile\S14_J20_wsi6408_12 to
<Drive>:\usr\sap\S14\SYS\profile\S14_J20_wsi6408.12.
```

- Make sure that the following ports are not used by other processes:
  - Port 4237 is used by default as HTTPS port for communication between the software provisioning manager and the SL-UI.  
If this port cannot be used, you can assign a free port number by executing `sapinst.exe` 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.exe` 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 \[page 99\]](#) which describes an improved procedure using `infile.params`.

## 5.5 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 \[page 90\]](#).

## 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 \[page 98\]](#).

## Procedure

1. Log on to the installation host using an account with the [required user authorization to run the software provisioning manager \[page 66\]](#).

### ⚠ Caution

Do **not** use an existing `<sapsid>adm` or the built-in administrator account user.

If your security policy requires that the person running the software provisioning manager is not allowed to know administrator credentials 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 `sapinst.exe` 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 \[page 72\]](#).

### ℹ Note

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.

`<X>` of the `SAPXEDB.SAR` (for DBTYPE `<Y>`), but this PL of the `SAPXEDB.SAR` is not contained in the SAP kernel media. In this case you must download the required PL from <https://me.sap.com/softwarecenter> following the instructions given in [Downloading SAP Kernel Archives \(Archive-Based Installation\) \[page 78\]](#).

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

`sapinst.exe` (in a command prompt)

`.\sapinst.exe` (in PowerShell)

### Note

If you are using a Stack XML file (see [Installation Using a Stack XML File \[page 31\]](#)), you must call `sapinst.exe` with command line parameter `SAPINST_STACK_XML=<Absolute_Path_To_Stack_XML_File>`:

`sapinst.exe SAPINST_STACK_XML=<Absolute_Path_To_Stack_XML_File>` (in a command prompt)

`.\sapinst.exe SAPINST_STACK_XML=<Absolute_Path_To_Stack_XML_File>` (in PowerShell)

If you want to run your installation using a Stack XML file in unattended mode, consider the additional command line parameters described in [System Provisioning Using an Input Parameter File \[page 99\]](#).

By default, the SL-UI uses the default browser defined for the host where you run the software provisioning manager. However, you can also specify another supported web browser available on the host where you start the software provisioning manager. You can do this by starting the `sapinst` executable with command line option `SAPINST_BROWSER=<Path to Browser Executable>`, for example `SAPINST_BROWSER=firefox.exe`.

### Note

If you need to assign a virtual host name to the instance to be installed and you do not want to assign it by entering it as a parameter using the software provisioning manager screens (see [SAP System Parameters \[page 45\]](#)), you can alternatively assign it as follows:

1. Open a command prompt or PowerShell window in elevated mode and change to the directory to which you unpacked the Software Provisioning Manager archive.
2. Start the software provisioning manager with the following command:  
`sapinst.exe SAPINST_USE_HOSTNAME=<Virtual_Host_Name>` (in a command prompt)  
`.\sapinst.exe SAPINST_USE_HOSTNAME=<Virtual_Host_Name>` (in PowerShell)

For more information, see [Using Virtual Host Names \[page 68\]](#).

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

If you have a supported web browser (see [Prerequisites for Running Software Provisioning Manager \[page 90\]](#)) installed on the host where you run the software provisioning manager, the SL-UI starts automatically by displaying the *Welcome* screen.

If the SL-UI does not open automatically, you can find the URL you require to access the SL-UI at the bottom of the *Program Starter* window of the software provisioning manager. You find the icon of the *Program Starter* window in the taskbar of your Windows host. Open a supported web browser and run the URL from there.

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

### Note

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

1. Terminate the software provisioning manager as described in [Useful Information about Software Provisioning Manager \[page 98\]](#).
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.

### ⚠ 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:  
`%userprofile%\ .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 ►**.

- To Install an SAP system or an optional standalone unit (Advanced Adapter Engine, Advanced Adapter Engine Extended, Partner Connectivity Kit, or Process Orchestration):

- To install an SAP system based on SAP NetWeaver AS Java **from scratch**, choose **► <Product> ► <Database> ► Installation ► Application Server Java ► <System Variant> ►**.

- To install the application server Java for an SAP Process Integration system based on SAP NetWeaver 7.5 **from scratch**, choose **► SAP NetWeaver 7.5 ► <Database> ► Installation ► Application Server Java for SAP Process Integration ► <System Variant> ►**.

- To install the application server Java for an SAP Solution Manager 7.2 system **from scratch**, choose **► SAP Solution Manager 7.2 <Support\_Release> ► Installation ► <Database> ► SAP System ► Application Server Java ► <System Variant> ►**.

- To install an optional standalone unit **from scratch**, choose [SAP NetWeaver <Release>](#) [>](#) [<Database>](#) [>](#) [Installation](#) [>](#) [Optional Standalone Units](#) [>](#) [<Advanced Adapter Engine | Advanced Adapter Engine Extended | Partner Connectivity Kit | Process Orchestration>](#) [>](#) [<System Variant>](#) [>](#).
- To install an SAP system based on SAP NetWeaver AS Java **as target system of a system copy**, choose [>](#) [<Product>](#) [>](#) [<Database>](#) [>](#) [System Copy](#) [>](#) [Target System](#) [>](#) [<System\\_Variant>](#) [>](#) [Based on AS Java](#) [>](#).
- To install the application server Java for an SAP Process Integration system based on SAP NetWeaver 7.5 **as target system of a system copy**, choose [SAP NetWeaver 7.5](#) [>](#) [<Database>](#) [>](#) [System Copy](#) [>](#) [Target System](#) [>](#) [<System\\_Variant>](#) [>](#) [Based on AS Java](#) [>](#).
- To install the application server Java 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 Java](#) [>](#).
- To install an optional standalone unit **as target system of a system copy**, choose [SAP NetWeaver <Release>](#) [>](#) [<Database>](#) [>](#) [System Copy](#) [>](#) [Target System](#) [>](#) [<System\\_Variant>](#) [>](#) [Based on AS Java](#) [>](#).
- Install an additional SAP system instance, go to [>](#) [<Product>](#) [>](#) [<Database>](#) [>](#) [Additional SAP System Instances](#) [>](#) [Additional Application Server Instance](#) [>](#).

### Note

Options to install additional application server instances for **SAP Solution Manager 7.2 Java Support Release 2**:

[SAP Solution Manager 7.2 Support Release 2](#) [>](#) [SAP Solution Manager 7.2 Java Support Release 2](#) [>](#) [<Database>](#) [>](#) [Installation](#) [>](#) [Additional SAP system instances \(SAP Solution Manager 7.2 Java below SP9\)](#) [>](#)

Use these options only for SAP Solution Manager 7.2 Java lower than SP09.

For SAP Solution Manager 7.2 Java SP09 or higher, use the options of SAP NetWeaver 7.5 Java:

[SAP NetWeaver 7.5](#) [>](#) [<Database>](#) [>](#) [Installation](#) [>](#) [Application Server Java](#) [>](#) [Additional SAP System Instances](#) [>](#)

- Perform other tasks or install additional components  
Go to [Generic Options](#) [>](#) [<Database>](#) [>](#) and choose the required task.

### 6. Choose *Next*.

### 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. If the software provisioning manager prompts you to log off from your system, log off and log on again. The software provisioning manager restarts automatically.
8. Follow the instructions on the software provisioning manager screens and enter the required parameters.

### Note

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

### Note

If you want to install an SCS instance *with embedded SAP Web Dispatcher* [page 27], you must choose the *Custom* parameter mode.

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

- Only valid for 'High Availability': HA (Windows)

**High Availability only:** If you decide to install an SAP Web Dispatcher or a Gateway in the ASCS instance, note that a failure of the SAP Web Dispatcher or the Gateway causes failover of the ASCS instance to another cluster node. The failover cluster monitors all processes that are started by the SAP start service (sapstartsrv.exe). For an ASCS instance this is: msg\_server.exe (message server), ensrver.exe (enqueue server), gwrd.exe (Gateway), and sapwebdisp.exe (SAP Web Dispatcher). To prevent failover, see SAP Note 2375999.

- End of 'High Availability': HA (Windows)

### 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.

9. 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.

### Note

During the last restart of Application Server Java performed by the software provisioning manager, the portal starts the processing and upload of the new portal archives. It takes approximately 15 to 90 minutes before the deployment is completed and the portal is launched.



Do **not** stop the software provisioning manager or Application Server Java during this phase.

If you are performing an [Installation Using a Stack XML File \[page 31\]](#), 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](#) .

10. If required install an additional application server instance for a standard (central) or distributed system.
11. If you copied the software provisioning manager software to your hard disk, you can delete these files when the installation has successfully completed.
12. For security reasons, we recommend that you delete the `.sapinst` directory within the home directory of the user with which you ran the software provisioning manager:

```
%userprofile%\ .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 \[page 98\]](#).

## 5.6 Additional Information about Software Provisioning Manager

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

### [Useful Information about Software Provisioning Manager \[page 98\]](#)

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 \[page 99\]](#)

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

### [How to Avoid Automatic Logoff by Software Provisioning Manager \[page 104\]](#)

### [Restarting Interrupted Processing of Software Provisioning Manager \[page 105\]](#)

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 \[page 108\]](#)

### [Troubleshooting with Software Provisioning Manager \[page 109\]](#)

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

### [Using the Step State Editor \(SAP Support Experts Only\) \[page 110\]](#)

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

## 5.6.1 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 foot print, since only a web browser is required on the client
  - New controls and functionality, for example, view logs in 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 in the *Program Starter* window. If you have a supported web browser installed on the host where you run the software provisioning manager, the SL-UI starts automatically.

By default, the SL-UI uses the default browser defined for the host where you run the software provisioning manager. However, you can also specify another supported web browser available on the host where you start the software provisioning manager. You can do this by starting the `sapinst` executable with command line option `SAPINST_BROWSER=<Path to Browser Executable>`, for example `SAPINST_BROWSER=firefox.exe`.

Alternatively you can open a supported web browser on any device and run the URL from there.

For more information about supported web browsers see [Prerequisites for Running Software Provisioning Manager \[page 90\]](#).

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.exe` executable, the software provisioning manager creates a `.sapinst` directory underneath the `<Drive>:\Users\<User>` directory where it keeps its logs and other technical files. `<User>` is the user which you used to start 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 logs and other technical files, and which is located directly in the `%ProgramFiles%` directory. If the software provisioning manager is not able to create `sapinst_instdir` there, it tries to create `sapinst_instdir` in the directory defined by the `TEMP` environment variable.  
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.  
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_inst_dir` 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 a temporary directory (`TEMP`, `TMP`, `TMPDIR`, or `SystemRoot`). These executables are deleted 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, open a command prompt and start the software provisioning manager 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 \[page 99\]](#) which describes an improved procedure using `infile.params`.
- If required, stop the software provisioning manager by choosing the *Cancel* button.

#### ℹ Note

If you need to terminate the software provisioning manager, choose **File > Exit** in the menu of the *Program Starter* window.

## 5.6.2 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 \[page 98\]](#)) 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_GUISEVER=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_GUISEVER=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 can not 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:

```
# 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:

```
# 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:

```
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/TESE/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.JMIG = <full path to Java 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 \[page 30\]](#) and [Preparation \[page 63\]](#).
2. Create your input parameter file as follows:
  1. Start software provisioning manager as described in [Running Software Provisioning Manager \[page 91\]](#).
  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 91] 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_DIALOGS=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_DIALOGS=true
SAPINST_START_GUISERVER=false
```
6. After software provisioning manager has completed, perform follow-up activities as described in [Post-Installation \[page 112\]](#).

## 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 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](#)

### 5.6.3 How to Avoid Automatic Logoff by Software Provisioning Manager

When you install the SAP system, the installation tool checks whether the user account used for the installation has the required privileges and authorization.

For a local or domain installation, the account needs to be a member of the local `Administrators` group.

For domain installations the account can be either a member of the `Domain Admins` group, or belongs to the `Domain Users` group and has the necessary rights to create/modify objects in the domain.

For a list of the required permission, see [Performing a Domain Installation without being a Domain Administrator \[page 143\]](#)

In both cases, the user account must be authorized to do the following:

- Act as part of the operating system
- Adjust memory quotas for a process
- Replace a process level token

If the user account does not have these rights assigned, the software provisioning manager assigns them and automatically logs the account off to activate them. To avoid the software provisioning manager logging the account off, you can set these rights manually before you start the installation.

## Procedure

You perform the following steps to assign these rights to the user account used for the installation.

1. Press `Ctrl` + `Esc` and choose **Administrative Tools** > **Local Security Policy**.
2. In the **Local Security Settings** window, choose **Local Policies** > **User Rights Assignment**.
3. Double-click the required right under **Policy** and choose **Add User or Group**.
4. In the **Select Users and Groups** window, choose the required user and choose **Add**.  
The selected user appears in the box below.



5. Confirm your entry and then repeat the steps for each remaining policy that the user requires for the installation.
6. Log off and log on again to apply the changes.

## Related Information

[Required User Authorization for Running Software Provisioning Manager \[page 66\]](#)

### 5.6.4 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:

Option	Definition
<a href="#">Retry</a>	<p>The software provisioning manager retries the installation from the point of failure without repeating any of the previous steps.</p> <p>This is possible because the software provisioning manager records its progress in the <code>keydb.xml</code> file.</p> <p>We recommend that you view the entries in the log files, try to solve the problem, and then choose <a href="#">Retry</a>.</p> <p>If the same or a different error occurs, the software provisioning manager displays the same dialog box again.</p>
<a href="#">Stop</a>	<p>The software provisioning manager stops the installation, closing the dialog box and the software provisioning manager's SL-UI.</p> <p>The software provisioning manager records its progress in the <code>keydb.xml</code> 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.</p>
<a href="#">Continue</a>	The software provisioning manager continues the installation from the current point.
<a href="#">View Log</a>	Access installation log files.

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 \[page 91\]](#).
2. Make sure that the installation media are still available.

For more information, see [Preparing the Installation Media \[page 72\]](#).

### → 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.

3. Restart the software provisioning manager by double-clicking `sapinst.exe` from the directory to which you unpacked the software provisioning manager archive.

By default, the SL-UI uses the default browser defined for the host where you run the software provisioning manager. However, you can also specify another supported web browser available on the host where you start the software provisioning manager. You can do this by starting the `sapinst` executable with command line option `SAPINST_BROWSER=<Path to Browser Executable>`, for example `SAPINST_BROWSER=firefox.exe`.

- The software provisioning manager is restarting.

If you have a supported web browser (see [Prerequisites for Running Software Provisioning Manager \[page 90\]](#)) installed on the host where you run the software provisioning manager, the SL-UI starts automatically by displaying the *Welcome* screen.

If the SL-UI does not open automatically, you can find the URL you require to access the SL-UI at the bottom of the *Program Starter* window of the software provisioning manager. You find the icon of the *Program Starter* window in the taskbar of your Windows host. Open a supported web browser and run the URL from there.

```

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

```

### Note

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

1. Terminate the software provisioning manager as described in [Useful Information about Software Provisioning Manager \[page 98\]](#).
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.

### 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:  
`%userprofile%\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.

- 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.

- On the *What do you want to do?* screen, decide between the following alternatives and continue with *Next*:

Alternative	Behavior
<i>Perform a new run</i>	<p>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.</p> <p>The following naming convention is used for the backup directory:</p> <pre>log_&lt;Day&gt;_&lt;Month&gt;_&lt;Year&gt;_&lt;Hours&gt;_&lt;Minutes&gt;_&lt;Seconds&gt;</pre> <div><p><b>❖ Example</b></p><pre>log_01_Oct_2016_13_47_56</pre></div> <div><p><b>ⓘ Note</b></p><p>All actions taken by the installation before you stopped it (such as creating directories or users) are not revoked.</p></div> <div><p><b>⚠ Caution</b></p><p>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.</p></div>
<i>Continue with the existing one</i>	<p>The software provisioning manager continues the interrupted installation from the point of failure.</p>

## 5.6.5 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 for port names in `<Drive>:\WINDOWS\system32\drivers\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
```

### 📌 Note

- There is a port created for every possible instance number, regardless of which instance number you specified during the installation. For example, for `sapgw<Instance_Number> = 33<Instance_Number>/tcp` the following range of entries is created:  
`sapgw00 = 3300/tcp`  
`sapgw01 = 3301/tcp`  
`sapgw02 = 3302/tcp`  
[...]  
`sapgw98 = 3398/tcp`  
`sapgw99 = 3399/tcp`
- If there is more than one entry for the same port number, this is **not** an error.

## 5.6.6 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.

### 📌 Note

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 the files in the `.sapinst` directory underneath the `<Drive>:\Users\<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 \[page 98\]](#).

- To check the log and trace files of the software provisioning manager's SL-UI for errors, go to the directory `%userprofile%\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 \[page 105\]](#).
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](#).

## 5.6.7 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 \[page 90\]](#).

## Procedure

1. Start the software provisioning manager from the command line as described in [Running Software Provisioning Manager \[page 91\]](#) 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:

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

More detailed information about the steps are available in the linked sections.

### Standard, Distributed, or High-Availability System

#### Note

In a standard system, all mandatory instances are installed on one host. Therefore, if you are installing a standard system, you can ignore references to other hosts.

1. If required, you [perform a full system backup \[page 133\]](#) immediately after the installation has finished.
2. You check whether you can [log on to the Application Server Java \[page 114\]](#).
3. If you have installed SAP Enterprise Portal or SAP Enterprise Portal Core Component, you check whether you can [log on to the SAP Enterprise Portal \[page 115\]](#).
4. If you have installed Development Infrastructure, you check whether you can [log on to the Development Infrastructure \[page 117\]](#).
5. You [provide access to the SAP NetWeaver Administrator \[page 118\]](#).
6. You [install the SAP license \[page 118\]](#).
7. You [configure the remote connection to SAP support \[page 119\]](#).
8. If required, you [set up symbolic links for application servers \[page 119\]](#).
9. For production systems it is highly recommended that you [connect the system to SAP Solution Manager \[page 120\]](#).
10. You [apply the latest kernel and Support Packages \[page 122\]](#).
11. If you have completed the installation of SAP Solution Manager 7.2 by installing *SAP Solution Manager 7.2 Java* or SAP Solution Manager 7.1 powered by SAP HANA by installing *SAP Solution Manager powered by SAP HANA Java*, you [configure your SAP Solution Manager system after installation \[page 124\]](#).
12. If you have completed the installation of an SAP Process Integration (PI) 7.5 system by installing *Application Server Java for SAP Process Integration*, you [configure your Process Integration system after installation \[page 124\]](#).
13. **PI-PCK, PI-AF, PI-AEX, PI-CP Only:** [PI-PCK, PI-AF, PI-AEX, PI-CP Only: System Configuration After the Installation \[page 125\]](#).
14. You [configure the user management \[page 127\]](#).



### 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 (see [Preparing an External ABAP System as Source for User Data \[page 70\]](#)). For SAP Process Integration 7.5 and SAP Solution Manager go to [PI 7.5: Configuring the Process Integration System After the Installation \[page 124\]](#) respectively [Configuring an SAP Solution Manager System \[page 124\]](#).

15. You [ensure user security \[page 128\]](#).
16. You [run automated configuration \[page 131\]](#).
17. If you have installed a non-central Advanced Adapter Engine as an optional standalone unit, you [clear the SLD Data Cache \[page 132\]](#).
18. You [perform a full system backup \[page 133\]](#).
19. If you chose to install an embedded SAP Web Dispatcher within the SCS instance, you [log on to the SAP Web Dispatcher Management Console \[page 134\]](#)
20. If you chose to install an embedded SAP Web Dispatcher within the SCS instance, you [configure the SAP Web Dispatcher \[page 135\]](#)
21. You check the Master Guide 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 whether you can [log on to the Application Server Java \[page 114\]](#).
2. If you have installed SAP Enterprise Portal or SAP Enterprise Portal Core Component on the primary application server instance, you check whether you can [log on to the portal \[page 115\]](#) from the additional application server instance host.
3. If you have installed Development Infrastructure on the primary application server instance, you check whether you can [log on to the Development Infrastructure \[page 117\]](#) from the additional application server instance host.
4. You [ensure user security \[page 128\]](#).
5. If required, you [set up symbolic links for application servers \[page 119\]](#).
6. You [perform a full system backup \[page 133\]](#).

## 6.2 Logging On to the Application Server Java

You need to check that you can log on to the Application Server Java with the appropriate administrator user, given in the table below.

### Prerequisites

- The SAP system is up and running.
- For the Application Server Java of an SAP Process Integration (PI) 7.5 system or SAP Solution Manager 7.2 system, you must have configured the connection to the ABAP system.

### Context

#### Note

In a distributed or high-availability system, you check whether you can log on to every instance of the SAP system that you installed.

Java User in a Dual-Stack System (SAP Process Integration (PI) 7.5 system or SAP Solution Manager 7.2 system only)

User	User Name Storage: ABAP System
Administrator	J2EE_ADMIN (default) or the name you gave this user during the installation process.

Depending on your SAP system installation, the administrator user can either reside in the database of your Java system or in an external ABAP system.

Java Standalone User

User	User Name Storage: Database	User Name Storage: External ABAP System
Administrator	Administrator	The user that you created manually in the external ABAP system. The recommended name is J2EE_ADM_<SAPSID_Java_System>

You access AS Java with a URL using a web browser from your client machines. To log on to the application server Java, proceed as follows:

## Procedure

1. Start a web browser and enter the following URL:

[http://<Hostname\\_of\\_AS\\_Java\\_Server>:5<Instance\\_Number>00](http://<Hostname_of_AS_Java_Server>:5<Instance_Number>00)

### Note

You must always enter a two-digit number for **<Instance\_Number>**. For example, do **not** enter **1** but instead enter **01**.

### Example

If you installed SAP NetWeaver Application Server for Java on host `saphost06` and the instance number of your SAP NetWeaver Application Server for Java is `04`, enter the following URL:

<http://saphost06:50400>

The start page of the SAP NetWeaver Application Server for Java appears in the web browser.

2. Log on by pressing the link of any of the provided applications, for example *SAP NetWeaver Administrator* or *System Information*.

## Related Information

[Preparing an External ABAP System as Source for User Data \[page 70\]](#)

## 6.3 Logging On to the SAP Enterprise Portal

You need to check that you can log on to the application server using the following standard users. This procedure applies when you have installed *EP Core - Application Portal* only and when you have installed it together with *Enterprise Portal (EP)*.

## Prerequisites

The SAP system is up and running.

## Context

Java Standalone User

User	User Name Storage: Database	User Name Storage: External ABAP System
Administrator	Administrator	The user that you created manually in the external ABAP system. The recommended name is <code>J2EE_ADM_&lt;SAPSID_Java_System&gt;</code>

You access the SAP Enterprise Portal with a URL using a web browser from your client machines.

The default URL consists of the installation host name and the port on which the portal is listening. You can use the HTTP or HTTPS protocol. HTTPS is relevant if you are using Secure Sockets Layer (SSL) communication.

## Procedure

1. Start a web browser and enter the following URL: `http://<Hostname_of_AS_Java_Server>:5<Instance_Number>00/irj`

### Note

You must always enter a two-digit number for `<Instance_Number>`. For example, do **not** enter `1` but instead enter `01`.

### Example

If you installed the SAP Enterprise Portal on host `saphost06` and the instance number of your Application Server Java is `04`, enter the following URL:

`http://saphost06:50400/irj`

2. Log on by entering the required user and password.

## 6.4 Logging On to the Development Infrastructure

If you have installed Development Infrastructure (DI), you have to log on to the services of the Development Infrastructure to check whether the installation of the DI was successful.

### Procedure

1. Start a web browser and enter the following URL: `http://<Hostname_of_AS_Java_Server>:5<Instance_Number>00/devinf`

#### Note

You must always enter a 2-digit number for `<Instance_Number>`. For example, do **not** enter `1` but instead enter `01`.

#### Example

If you installed SAP NetWeaver Application Server for Java with DI on host `saphost06` and the instance number of your SAP NetWeaver Application Server for Java is `04`, enter the following URL:

```
http://saphost06:50400
```

2. Log on with the `NWDI_ADM` user.

The start page *SAP NetWeaver Development Infrastructure* appears in the web browser.

The following links appear:

- [Design Time Repository](#)
- [Component Build Service](#)
- [Change Management Service](#)
- [System Landscape Directory](#)

3. Log on to these services one after another by clicking the appropriate link:
  - a. When you click [Design Time Repository](#), the *Design Time Repository* page with the *Repository Browser* overview appears.
  - b. When you click [Component Build Service](#), the *Component Build Service* page with the *CBS Buildspace Information* appears.
  - c. When you click [Change Management Service](#), the *Change Management Service* page with the *CBS Buildspace Information* appears.
  - d. When you click [System Landscape Directory](#), you should see the *System Landscape Directory* start page.

#### Note

The tables displayed on the pages might be empty. They are filled when you configure the development infrastructure either by running the Configuration Wizard or by configuring your system manually.

## 6.5 Providing Access to the SAP NetWeaver Administrator

To be able to log on the SAP NetWeaver Administrator, you must allow access to administration URLs of the NetWeaver Administrator in the Internet Communication Manager (ICM).

### Context

Due to security restrictions, the SAP NetWeaver Administrator can only be accessed **locally** via `http://<Hostname_of_AS_Java_Server>:5<Instance_Number>00/nwa` after the installation has finished.

### Procedure

Allow access to administration requests for the required network segments as described in SAP Note [1451753](#).

## 6.6 Installing the SAP License

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

### Context

#### ⚠ Caution

**Before** the temporary license expires, you must apply for a permanent license key from SAP.

We recommend that you apply for a permanent license key as soon as possible after installing your system.

Only valid for 'High Availability': HA (Windows)

**High Availability only:** If you do a failover of the SAP SCS instance from one cluster node to another node, and you do not have a permanent license on this node, the generated temporary license is only valid for 30 minutes. Java application servers automatically shut down after 30 minutes of operation. To avoid this, apply a permanent license key as soon as possible.

End of 'High Availability': HA (Windows)

#### 📌 Note

The license key is bound to the hardware key of the host where the message server is running.

### High Availability only:

In a high-availability system with Microsoft Failover Clustering, the message server is part of the SCS instance that can run on a different cluster node. Therefore you must install the SAP license on both nodes.

You have to do failover from the first cluster node where the SCS instance is installed to the second cluster node. Use the hardware key of the second cluster node for the installation of the second SAP license.

For more information about SAP license keys and how to obtain them, see <http://support.sap.com/licensekey>.

## Procedure

Install the SAP license as described in the SAP Library at:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>• <b>SAP Solution Manager 7.2 SR2 only:</b> SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></li><li>• SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li></ul>	<p>▶ <i>Application Help</i> ▶ <i>Function-Oriented View</i> ▶ <i>Solution Life Cycle Management</i> ▶ <i>SAP Licenses</i> ▶</p>

## 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.

For more information about configuring the remote connection to SAP Support, see the SAP Support Portal at <https://support.sap.com/remote-support.html>.

## 6.8 Creating Symbolic Links on Windows Server for Application Servers

### Use

On Windows Server you can create symbolic links for additional application server instances to simplify their administration.

Only valid for 'High Availability': HA (Windows)

In a high-availability system, you can additionally create symbolic links for the primary application server instance.

End of 'High Availability': HA (Windows)

Symbolic links for application servers let you access from your local host the `sys` directory that is located on the global host, without having to specify its UNC path. Instead you can browse, for example, in the Windows explorer on your local host to the `sys` directory and its subdirectories on the global host.

## Procedure

To create symbolic links, perform the following steps:

1. Open a PowerShell command in elevated mode, and enter the following PowerShell command in a single line:

```
cmd /c mklink /d <localdisk>:\usr\sap<SAPSID>\SYS \  
\<sapglobalhost>\sapmnt<SAPSID>\SYS
```

### Note

Enter a blank before `\\<sapglobalhost>\...`

2. If you use a central transport directory, you can also create the following link in PowerShell:

```
cmd /c mklink /d <localdisk>:\usr\sap\trans \\<trans_dir_host>\sapmnt\trans
```

### Note

The transport directory host `<trans_dir_host>` and the `<sapglobalhost>` can be identical.

### Caution

The command `mklink` creates the link without checking whether the link target exists or is accessible. If the link does not work after you created it, make sure that it exists and check the accessibility of the UNC path.

## 6.9 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*.

For more information, see *Handling Technical Systems' Data - System Landscape Directory* at <https://support.sap.com/en/tools/software-logistics-tools/landscape-management-process/system-landscape-directory.html>.

3. From the SLD, this information is regularly synchronized with **SAP Solution Manager** where it is managed in the Landscape Management Database (LMDB).

For more information, see the SAP Solution Manager Application Help:

- If your SAP Solution Manager release is 7.2:  
<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)* >
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)* > *Managing Technical System Information* >
- If your SAP Solution Manager release is 7.1:  
*Managing Technical System Information* and *Managing Product System Information* at <http://help.sap.com/solutionmanager> >> *Version 7.1 SPS <No>* > *Application Help (English)* > *SAP Solution Manager Operations* > *Managing System Landscape Information* >

## 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](#)

## 6.10 Applying the Latest Kernel and Support Package Stacks

We strongly recommend that you apply the latest kernel and Support Package Stacks before you start configuring your SAP system.

### Note

If you are using a Stack XML file (see [Installation Using a Stack XML File \[page 31\]](#)), you already downloaded the `MP_Stack_<Transaction ID>_<Generation Date>_.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

[2083594](#) - SAP Kernel Versions and SAP 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

#### 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>

#### Caution

If you install an SAP system based on SAP NetWeaver **7.5 Java**, follow the instructions in SAP Note [1680045](#) regarding the patch level of the `SAPJVM.SAR` archive you use for the installation.

- 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.

## 6.11 Configuring an SAP Solution Manager System

If you have completed the installation of SAP Solution Manager 7.2 by installing *SAP Solution Manager 7.2 Java* or SAP Solution Manager 7.1 powered by SAP HANA by installing *SAP Solution Manager powered by SAP HANA Java*, you run the SOLMAN\_SETUP transaction in *SAP Solution Manager 7.2 ABAP* respectively *SAP Solution Manager powered by SAP HANA ABAP*

### Note

You can skip this section if your newly installed SAP system is not itself an SAP Solution Manager system.

### Note

Configuring the user management with an external ABAP system is mandatory for SAP Process Integration 7.5. For more information, see [Preparing an External ABAP System as Source for User Data \[page 70\]](#).

Follow the instructions of section *Configuring SAP Solution Manager* of the *SAP Solution Manager Configuration Guide* at:

SAP Solution Manager Release and SAP Solution Manager Library Quick Link	SAP Library Path (Continued)
SAP Solution Manager 7.2 <a href="https://help.sap.com/viewer/product/SAP_Solution_Manager/">https://help.sap.com/viewer/product/SAP_Solution_Manager/</a>	<a href="#">▶ Version 7.2 &lt;latest version&gt; ▶ Use</a> <a href="#">▶ Configuration Guide ▶</a>
SAP Solution Manager 7.1 powered by SAP HANA <a href="https://help.sap.com/viewer/product/SAP_Solution_Manager/">https://help.sap.com/viewer/product/SAP_Solution_Manager/</a>	<a href="#">▶ Version 7.1 &lt;latest version&gt; ▶ Implement</a> <a href="#">▶ Configuration Guide ▶</a>

## 6.12 PI 7.5: Configuring the Process Integration System After the Installation

To configure your SAP Process Integration 7.5 (SAP PI 7.5) system after installation, execute the Central Technical Configuration (CTC) Wizard.

### Note

Configuring the user management with an external ABAP system is mandatory for SAP Process Integration 7.5. For more information, see [Preparing an External ABAP System as Source for User Data \[page 70\]](#).

## Procedure

To configure your SAP PI 7.5 system, execute the “SAP NetWeaver initial setup” CTC Wizard described in SAP Note [1309239](#).

### Note

The CTC Wizard automatically executes all required technical configuration steps.

For more details about all single configuration steps executed by the CTC Wizard and how to apply them manually, see the SAP Library at:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a>	<a href="#">Application Help</a> > <a href="#">Function-Oriented</a> <a href="#">View: English</a> > <a href="#">Process Integration</a> > <a href="#">Configuring Process Integration After Installation</a> > <a href="#">Configuring Process Integration (PI) Dual Usage Type</a> > <a href="#">Basic Configuration for SAP Process Integration (PI)</a>

## 6.13 PI-PCK, PI-AF, PI-AEX, PI-CP Only: System Configuration After the Installation

The CTC Wizards or Functional Unit Configurations execute automatically all required technical configuration steps.

### CTC Wizards or Functional Unit Configurations

SAP Note [1362909](#) collects all notes that describe the CTC Wizards or Functional Unit Configurations, which must be executed in each of the following systems after the installation:

- Composition Environment (CE)
- Advanced Adapter Engine Extended (PI-AEX)
- Advanced Adapter Engine (PI-AF)
- Partner Connectivity Kit (PI-PCK)
- Process Orchestration (PI-CP)

## SAP NetWeaver 7.30: Configuring the Partner Connectivity Kit (PI-PCK)

To configure your PI-PCK system after the installation, execute the “PI-PCK initial setup” CTC Wizard described in SAP Note [1319008](#).

For more information about all single configuration steps executed by the CTC Wizard and how to apply them manually, see the SAP Library at:

<http://help.sap.com/nw73> ► *Application Help* ► *Function-Oriented View* ► *Process Integration*  
► *Configuring Process Integration (PI) After Installation* ► *Basic Configuration (CTC Wizard-Assisted and Manual)*  
► *Configuring the Partner Connectivity Kit* ► *Wizard-Based Configuration for the PCK* ►

## Configuring the Adapter Engine (PI-AF)

To configure your PI-AF system after the installation execute “PI-AF initial setup” CTC Wizard described in SAP Note [1314855](#).

For more information about all single configuration steps executed by the CTC Wizard and how to apply them manually, see the SAP Library at:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a>	If you want to connect <b>PI-AF</b> to a <b>PI</b> system:  ► <i>Application Help</i> ► <i>Function-Oriented View</i> ► <i>Process Integration</i> ► <i>Configuring Process Integration After Installation</i> ► <i>Configuring Process Integration (PI) Dual Usage Type</i> ► <i>Basic Configuration for SAP Process Integration (PI)</i> ► <i>Configuring the Non-Central Advanced Adapter Engine (PI-AF)</i> ► <i>Manual Configuration of Non-Central Advanced Adapter Engine (PI-AF)</i> ►  If you want to connect <b>PI-AF</b> to a <b>PI-AEX</b> or <b>PI-CP</b> system:  ► <i>Application Help</i> ► <i>Function-Oriented View</i> ► <i>Process Integration</i> ► <i>Configuring Process Integration After Installation</i> ► <i>Configuring Advanced Adapter Engine Extended (PI-AEX)</i> ► <i>Basic Configuration for SAP PI Advanced Adapter Engine Extended</i> ► <i>Configuring the Non-Central Advanced Adapter Engine (PI-AF) for AEX</i> ►

## Configuring the Advanced Adapter Engine Extended (PI-AEX)

To configure your PI-AEX system after the installation, execute the “PI-AEX initial setup” CTC Wizard described in SAP Note [1414465](#).

For more information about all single configuration steps executed by the CTC Wizard and how to apply them manually, see the SAP Library at:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li></ul>	<p>▶ <i>Application Help</i> ▶ <i>Function-Oriented View</i> ▶ <i>Process Integration</i> ▶ <i>Configuring Process Integration After Installation</i> ▶ <i>Configuring Advanced Adapter Engine Extended (PI-AEX)</i></p>

## Configuring the Process Orchestration (PI-CP)

To configure your PI-CP system after the installation, execute the "PI-CP initial setup" CTC Wizard described in SAP Note [1548120](#).

For more information about all single configuration steps executed by the CTC Wizard and how to apply them manually, see the SAP Library at:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li></ul>	<p>▶ <i>Application Help</i> ▶ <i>Function-Oriented View</i> ▶ <i>Process Integration</i> ▶ <i>Configuring Process Integration After Installation</i> ▶ <i>Configuring Process Orchestration (PI-CP)</i></p>

## 6.14 Configuring the User Management

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

### 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 \[page 70\]](#).

For SAP Process Integration 7.5 and SAP Solution Manager go to [PI 7.5: Configuring the Process Integration System After the Installation \[page 124\]](#) respectively [Configuring an SAP Solution Manager System \[page 124\]](#).

## 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 \[page 70\]](#).

## Procedure

During the installation of your SAP system, you specified one of the following initial data sources of the User Management Engine (UME) (for more information, see [SAP System Parameters \[page 45\]](#)):

- Database of the Application Server Java
- External ABAP system

After the installation of your SAP system has finished, you can still change the data source of the UME. The following changes of data source are supported:

- From the database of the Application Server Java to user management of an external ABAP system
- From the database of the Application Server Java to a directory service

### ⚠ Caution

This is not valid for an Advanced Adapter Engine (AEX) installation.

For more information about changing the data source after installation and about related restrictions, see the SAP Library at:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>• <b>SAP Solution Manager 7.2 SR2 only:</b> SAP NetWeaver 7.4 <a href="https://help.sap.com/nw74">https://help.sap.com/nw74</a></li><li>• SAP NetWeaver 7.5 <a href="https://help.sap.com/nw75">https://help.sap.com/nw75</a></li></ul>	<p>▮ Security &gt; Identity Management &gt; User Management of SAP NetWeaver AS Java &gt; Configuring User Management &gt; UME Data Sources &gt; User Management of Application Server ABAP as Data Source ▮</p>

## 6.15 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 \[page 45\]](#) 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) 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:

Operating System and Database Users

User	User Name	Comment
Operating system user	<sapsid>adm	SAP system administrator
	SAPService<SAPSID>	User to run the SAP system

## SAP Host Agent User

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

## SAP System Users

Depending on the UME (User Management Engine) configuration that you specified during the installation, the following UME users are available after the installation:

- If you have chosen option [Use Java Database](#), UME users are stored in the database (Java UME) – see table *Users Stored in the Java Database* below.  
You can manage users and groups with the UME web admin tool and the SAP NetWeaver Administrator only.
- If you have chosen option [Use ABAP](#), UME users are stored in an external ABAP system (ABAP UME) – see table *Users Stored in an External ABAP System* below.  
For more information, see [Preparing an External ABAP System as Source for User Data \[page 70\]](#).

The following tables show these users together with recommendations on how you can ensure the security of these users:

### SAP System Users Stored in an External ABAP System

User	User Name Storage: External ABAP System	Comment
Application Server Java Administrator	The name that you gave this user when you created it manually in the external ABAP system (see <a href="#">Preparing an External ABAP System as Source for User Data [page 70]</a> )	<p>This user's password is stored in secure storage.</p> <p>Therefore, whenever you change the administrator's password, you must also change the password in secure storage with the Config Tool.</p> <div style="background-color: #e0e0e0; padding: 10px; border: 1px solid #ccc;"> <p><b>→ Recommendation</b></p> <p>We recommend that you use strong password and auditing policies for this user.</p> </div>

User	User Name Storage: External ABAP System	Comment
Application Server Java Guest	The name that you gave this user when you created it manually in the external ABAP system (see <a href="#">Preparing an External ABAP System as Source for User Data [page 70]</a> )	Lock this user for interactive logon.
Communication user for Application Server Java	The name that you gave this user when you created it manually in the external ABAP system (see <a href="#">Preparing an External ABAP System as Source for User Data [page 70]</a> )	Specify this user as a <i>Communications</i> user and not as a dialog user.  This user exists in at least the SAP system client that you specified during the installation.

#### SAP System Users Stored in the Database

User	User Name Storage: Database	Comment
Administrator	The name that you gave this user during the installation or the default name <code>Administrator</code>	This user's password is stored in secure storage. Therefore, whenever you change the administrator's password, you must also change the password in secure storage with the AS Java Config Tool.  <div style="background-color: #f0f0f0; padding: 5px; border: 1px solid #ccc;"> <p>→ Recommendation</p> <p>We recommend that you use strong password and auditing policies for this user.</p> </div>
Guest	The name that you gave this user during the installation or the default name <code>Guest</code>	This user is used for anonymous access.  Lock this user for interactive logon.

## 6.16 Performing Automated Configuration

This section provides references to documentation about how to run automated configuration tasks for the initial configuration of SAP NetWeaver functional units.

### ⚠ Caution

Do **not** use the functional unit configuration tool to configure functional units that have already been enabled after:

- Upgrade
- Update

- System copy

If you need to change the configuration of functional units that have already been enabled, then you must execute the configuration steps manually.

If you want to use a functional unit that has not previously been enabled, you can either use the functional unit configuration tool or execute the steps manually.

To initially configure an SAP NetWeaver functional unit, proceed as described in the SAP Library for the SAP NetWeaver release your application is based on:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
<ul style="list-style-type: none"> <li>• <b>SAP Solution Manager 7.2 SR2 only:</b> SAP NetWeaver 7.4  <a href="https://help.sap.com/nw74">https://help.sap.com/nw74</a></li> <li>• SAP NetWeaver 7.5  <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li> </ul>	<ul style="list-style-type: none"> <li>▶ <i>Application Help</i> ▶ <i>SAP NetWeaver Library: Function-Oriented View</i></li> <li>▶ <i>Solution Life Cycle Management</i> ▶ <i>SAP NetWeaver Configuration</i></li> <li>▶ <i>Configuration Wizard</i> ▶</li> </ul>

## 6.17 Clearing the SLD Data Cache after Installing a Non-central Advanced Adapter Engine (Optional Standalone Unit)

When you have installed a **non-central** Advanced Adapter Engine, you need to manually clear the SLD Data Cache in the *Integration Builder* to make it visible and selectable in the communication channels.

### Procedure

1. After SAPinst has finished, open the Integration Builder of your PI system at **http://<host>:<port>/dir/start/index.jsp** ▶▶ *Integration Directory* ▶ and logon as a user with the ABAP role `SAP_XI_CONFIGURATOR` assigned.
2. In the Integration Builder, choose *Environment*.
3. From the drop-down list, choose *Clear SLD Data Cache*.

## 6.18 Performing a Full System Backup

You must perform a full system backup, including the operating system disk, system state, and all other disks, after the configuration of your SAP system. If required, you can also perform a full system backup after the installation (recommended). In addition, we recommend you to regularly back up your database.

### Prerequisites

- You are logged on as user <sapsid>adm.
- You have shut down the SAP system and database.

### Procedure

For more information about backing up your SAP system on Windows, see the SAP Library at:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>• <b>SAP Solution Manager 7.2 SR2 only:</b> SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></li><li>• SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li></ul>	<p>▶ <i>Application Help</i> ▶ <i>Function-Oriented View</i> ▶ <i>Solution Life Cycle Management</i> ▶ <i>Backup and Recovery</i> ▶ <i>Backing Up and Restoring your SAP System on Windows</i> ▶</p>

For more information about backing up your SQL Server database, see the SAP Library at:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>• <b>SAP Solution Manager 7.2 SR2 only:</b> SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></li><li>• SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li></ul>	<p>▶ <i>Application Help</i> ▶ <i>Function-Oriented View</i> ▶ <i>Database Administration</i> ▶ <i>Database Administration for Microsoft SQL Server</i> ▶</p>

## 6.19 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 SCS instance.

You must log on to the SAP Web Dispatcher Management Console to do the following:

- Check whether the SAP Web Dispatcher was installed successfully,
- Change the password of the `webadm` user,
- Access monitoring and administration tools.

### Procedure

1. Open a web browser.
2. Enter the following URL, depending on whether you use HTTP or HTTPS:

```
http(s)://<Webdispatcher_Host>:<HTTP(S)_PORT>/sap/wdisp/admin/public/default.html
```

#### Example

```
https://plx282:44300/sap/wdisp/admin/public/default.html
```

3. Log on as user `webadm` with the password that you entered during the input phase of the installation.

The *SAP Web Dispatcher Monitor* screen appears.

4. We recommend that you change the password of `webadm` immediately after the installation for security reasons.

For more information on how to change passwords of existing users using the `Admin Handler`, see the SAP Library at:

### Related Information

[SCS Instance with Embedded SAP Web Dispatcher \[page 27\]](#)

## 6.20 SAP Web Dispatcher Configuration (Optional)

After installing SAP Web Dispatcher, you must configure it to be able to use it.

### Note

This step is only required if you chose to install an embedded SAP Web Dispatcher instance within the SCS instance.

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

SAP Release and SAP Library Quicklink	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>• <b>SAP Solution Manager 7.2 SR2 only:</b> SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></li><li>• SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li></ul>	<p>▶ <i>Application Help</i> ▶ <i>Function-Oriented View</i> ▶ <i>Application Server</i> ▶ <i>Application Server Infrastructure</i> ▶ <i>Components of SAP NetWeaver Application Server</i> ▶ <i>SAP Web Dispatcher</i></p>

### Related Information

[SCS Instance with Embedded SAP Web Dispatcher \[page 27\]](#)

# 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.

### 📌 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**.



## 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.

## Features

In the SAP environment, you can exploit the information stored in an Active Directory or generic LDAP directory by using:

- SAP Logon
- The SAP Microsoft Management Console (SAP MMC)  
For more information about the automatic registration of SAP components in LDAP directories and the benefits of using it in SAP Logon and SAP MMC, see the documentation *SAP System Information in Directory Services* at:  
<https://archive.sap.com/documents/docs/DOC-14384>
- The SAP Management Console (SAP MC)

## SAP Logon

Instead of using a fixed list of systems and message servers, you can configure SAP Logon in the `sapmsg.ini` configuration file to find SAP systems and their message servers from the directory. If you configure SAP logon to use the LDAP directory, it queries the directory each time *Server* or *Group* selection is chosen to fetch up-to-date information on available SAP systems.

To use LDAP operation mode, check that the `sapmsg.ini` file contains the following:

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

Distinguish the following cases:

- If you use an Active Directory, you must set `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

You can also use the SAP Management Console (SAP MC) for administering and monitoring SAP systems from a central location.

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:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li></ul>	<p>▶ <a href="#">Application Help</a> ▶ <a href="#">Function-Oriented View</a> ▶ <a href="#">Solution Life Cycle Management</a> ▶ <a href="#">SAP Management Console</a></p>

## 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](#) 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 `sap1dap`.
- 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 \[page 91\]](#) and choosing: **► Generic Installation Options > <Database> > Preparations > LDAP Registration > Active Directory Configuration >**.

#### Note

You have to configure the directory server only **once**. 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. 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 \[page 91\]](#) **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 SAP Directories

This section describes the directories that are available in an SAP system.

Only valid for 'High Availability': HA (Windows)

If you want to install a high-availability system, see also [Directories in a Microsoft Failover Cluster Configuration \[page 179\]](#).

End of 'High Availability': HA (Windows)

The software provisioning manager automatically creates the following directories during the installation:

- `\usr\sap`

This directory is created on the:

- **Global** host and **shared** with the network share `sapmnt`

Only valid for 'High Availability': non-HA

In a non-high-availability-system, you can install the primary application server instance or the (A)SCS instance on the global host or on any other host.

End of 'High Availability': non-HA

On global hosts, the `\usr\sap` directory contains general SAP software, global, and local (instance-specific) data.

For this, the software provisioning manager creates the global directory `usr\sap\<SAPSID>\SYS`, which physically exists only once for each SAP system. It consists of the following subdirectories:

- `global` – contains globally shared data
- `profile` – contains the profiles for all instances
- `exe` – contains executable replication directory for all instances and platforms

During the installation of an SAP system distributed over several hosts, you can now specify that the SAP Global directories are installed on a host different from the SCS instance host. For more information, see SAP Note [3349121](#).

- **Local** host and **shared** with the name `saploc`.

Only valid for 'High Availability': HA (Windows)

In a high availability system this directory is located on a local disk. You have at least two disk drives with a `usr\sap` directory structure.

End of 'High Availability': HA (Windows)

On local hosts, the `\usr\sap\<SAPSID>\<Instance_Name>` directory contains copies of the SAP software and local (instance-specific) data.

### Note

- Since SAP traces for the instance are created in `\usr\sap`, make sure that there is sufficient space available in this directory. Changes in SAP profiles can also affect the disk space.
- The executables on the local host are replicated from those on the global host every time the local instance is started. The SAP copy program `sapcpe` compares the binaries in the `<Platform>` directory on the global host and the binaries in the `exe` directory on the application server. If the binaries in the `exe` directory are older than those in the `<Platform>` directory, `sapcpe` replaces them with the newer version of the global host.

Other application servers access the global data using the Universal Naming Convention (UNC) path `\\<SAPGLOBALHOST>\sapmnt`. The SAP programs access their instance-specific data with the UNC path `\\<SAPLOCALHOST>\saploc`. If the UNC path points to a local directory, the local path (and not the UNC path) is used to access the directory.

The parameters `SAPGLOBALHOST` and `SAPLOCALHOST` have the **same** values on the global host.

Only valid for 'High Availability': HA (Windows)

### Note

In a high-availability system, file shares pointing to directories on shared disks are only visible or can be accessed with the virtual host name of the cluster group the shared disks belong to.

This lets you have several shares with the same name pointing to different disks (multi-SID).

End of 'High Availability': HA (Windows)

- `\usr\sap\trans`

The transport directory contains SAP software for the transport of objects between SAP systems. The software provisioning manager by default creates it on the `SAPGLOBALHOST`.

If you want to have it created on another host, or if you want to use an already existing transport host of your SAP system landscape, you can specify another host during the installation. In this case, you have to prepare that host to allow the new SAP system to use it as transport host. For more information, see [Preparing the SAP System Transport Host \[page 69\]](#).

## Directory Structure

The following figures show how the physical directory `\usr\sap` is shared on the global host in a standard and in a distributed system. In both cases, the UNC paths are used as follows:

- `\\<SAPGLOBALHOST>\sapmnt` to access global directories
- `\\<SAPLOCALHOST>\saploc` to access local instance-specific data

### Note

There are the following instance names available in an SAP system:

Central services instance: `SCS<Instance_Number>`

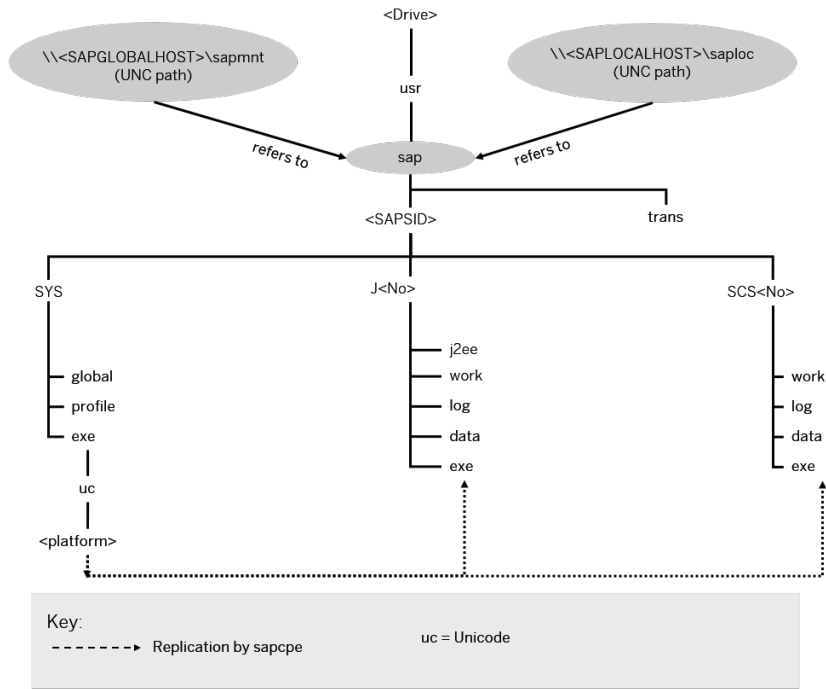
Primary application server instance: `J<Instance_Number>`

Additional application server instance: `J<Instance_Number>`.

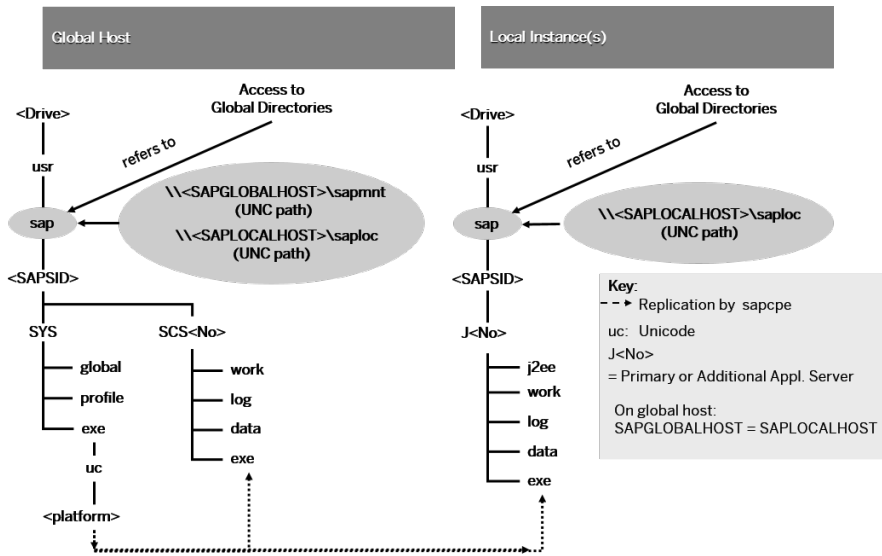
Only valid for 'High Availability': HA (Windows)

**High Availability only:** Enqueue Replication Server instance: `ERS<Instance_Number>`

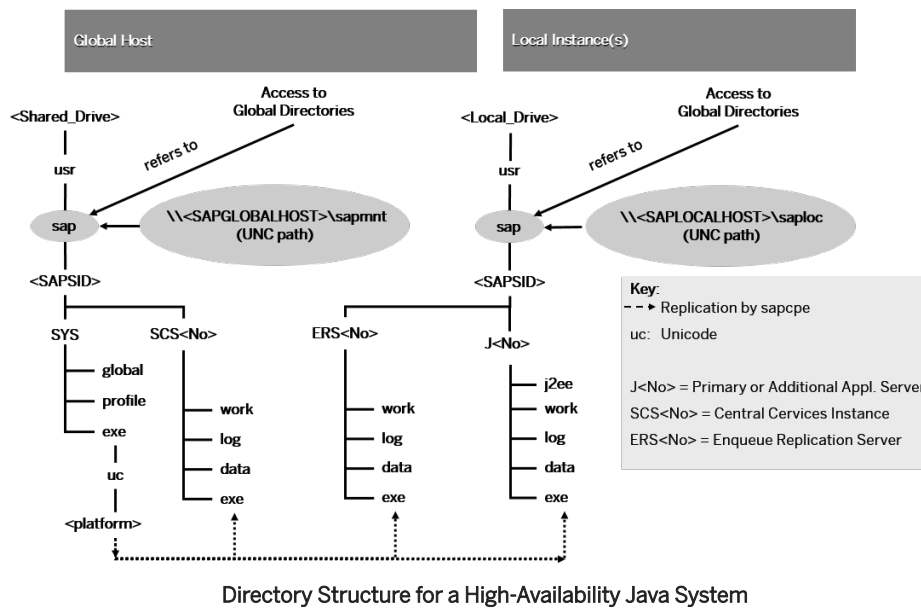
End of 'High Availability': HA (Windows)



Directory Structure on the Global Host in a Standard (Central) Java System



Directory Structure for a Distributed Java System



Directory Structure for a High-Availability Java System

### 7.3 Performing a Domain Installation Without Being a Domain Administrator

It is not required to perform the installation of the SAP system with a user who is a member of the `Domain Admins` group. For security reasons most customers do not provide this permission to SAP or database administrators. If the `Domain Admin` right has been granted, you can start any SAP installation because the user will have all necessary rights to install a standard, distributed, or high-availability system.

An alternative is to ask the domain administrator to grant the required permissions to the user which installs SAP or the database. This domain user must be a member of the local Administrators group. In most cases the domain administrator will define an OU (Organizational Unit) structure, where all SAP systems and their related domain objects belong to.

To perform the installation with a domain user, the user account must meet the following requirements:

1. Create/Delete/Modify Users and Groups within OUs only. Ask the AD administrator about the company's OU concept.
2. Create/Delete/Modify Computer Objects within this OU. This is required for users which install SAP or database applications in Failover Clusters, SAP Landscape Management environments or other high-availability (HA) environments.  
Optional rights might be necessary related to your company's security policy, for example:
3. Create/Delete/Modify DNS server records within a specific DNS zone, where the Windows hosts with SAP software belong to.
4. Create/Delete/Modify Organizational Unit objects within a specific OUs only.

For standard and distributed installations (not HA installations!) the domain administrator can prepare the user and group objects in the domain for you. In this case, the domain user which will be used for the installation does not need any of the above permissions.

The required objects in the domain are:

1. Domain group `SAP_<SAPSID>_GlobalAdmin`  
The group scope should be `GLOBAL`, the group type should be `SECURITY`.

2. Two new SAP system users `<sapsid>adm` and `SAPService<SAPSID>`.
3. The users `<sapsid>adm` and `SAPServiceSAPSID` must be members of the domain group `SAP_<SAPSID>_GlobalAdmin`.

### Note

The software provisioning manager creates the operating system user for the SAP Host Agent by default as a local user that is not

a member of the local Administrators group. If you want to create this user manually as a domain user, you must perform the following steps:

Creating the SAP Host Agent User and Group Manually

1. Create the new global group `SAP_GlobalAdmin`
2. Create the SAP system user `sapadm`.
3. Add the user `sapadm` to the newly created group `SAP_GlobalAdmin`.

However, for security reasons we strongly recommend that you create this user as a local user.

## 7.4 Checking and Changing the Paging File Settings on Windows Server

This section describes how to check and change the paging file size on Windows Server with PowerShell.

The PowerShell commands also work in previous Windows versions where PowerShell is available.

### Note

Some paging file operations require a reboot of the server to activate the changes you made. Wmi-commands do not indicate whether a reboot is required or not. Therefore, we recommend rebooting your system every time you change the paging file settings with PowerShell.

## Prerequisites

Always start the PowerShell in elevated mode (run as administrator).

## Procedure

### Checking the Size of a Paging File

1. Start Windows PowerShell.
2. Check whether the default value *Automatic manage pagefile size for all devices* is activated.



### Note

We do not support automatically managed page file sizes.

To check this, enter the following command:

```
(Get-WmiObject Win32_Pagefile) -eq $null
```

If *Automatic manage pagefile size for all devices* is enabled, the output value is *True*.

If necessary, disable *Automatic manage pagefile size for all devices* with the following command:

```
$sys = Get-WmiObject Win32_Computersystem -EnableAllPrivileges
$sys.AutomaticManagedPagefile = $false
$sys.put()
```

3. Check the size of the paging files with the following command:

```
Get-WmiObject WIN32_Pagefile | Select-Object Name, InitialSize, MaximumSize,
FileSize
```

The output looks like the following:

MaximumSize	Name	FileSize	InitialSize
-----	----	-----	-----
41943040000	C:\pagefile.sys		0
41943040000	E:\pagefile.sys	40000	80000

In this example, in the first line, the *InitialSize* and *MaximumSize* values of a paging file are 0, which means that the paging file size is *system managed* (not recommended).

In the second line, the paging file size has a minimum and a maximum size (recommended).

### Changing the Size of a Single Paging File

Changing the *InitialSize* and *MaximumSize* values of a paging file to a size other than 0, will automatically switch off *system managed size*.

In the following example, we change the size of the paging file on *C:* to the *InitialSize* of 40 GB and to the *MaximumSize* of 80 GB.

Use the following commands in a PowerShell:

```
$Pagefile = Get-WmiObject Win32_PagefileSetting | Where-Object {$_.name -eq
"C:\pagefile.sys"}

$Pagefile.InitialSize = 40000
$Pagefile.MaximumSize = 80000

$Pagefile.put()
```

Typically, you choose the same value for *InitialSize* and *MaximumSize*.

### Note

The sum of all paging files *InitialSize* values must be equal to or higher than the value recommended for your SAP system.

### Creating a Second Paging File on Another Disk

You might want to create a second or additional paging files to improve system performance, or if your disk does not have enough space.

To do so, enter the following commands in a PowerShell:

```
$Pagefile = Get-WmiObject Win32_PagefileSetting
$pagefile.Name = "E:\pagefile.sys"
$pagefile.Caption = "E:\pagefile.sys"
$pagefile.Description = "'pagefile.sys' @ E:\"
$pagefile.SettingID = "pagefile.sys @ E:"
$pagefile.InitialSize = 80000
$pagefile.MaximumSize = 80000
$pagefile.put()
```

#### Deleting a Paging File on a Specific Device

To delete a paging file, enter the following commands in a PowerShell:

```
$pagefile = Get-WmiObject Win32_PagefileSetting | Where-Object {$_.name -eq
"E:\pagefile.sys"}
$pagefile.delete()
```

## 7.5 Database Installation for Multiple Components with MS SQL Server

Each SAP system in your SAP environment needs its own database back end. With SQL Server you have the following options to distribute your systems across the available hardware resources. They differ with respect to hardware requirements, database administration, flexibility, and scalability, but all require careful hardware sizing to avoid performance bottlenecks and scalability problems.

- Exclusive database server  
In this system landscape, each database server (with or without a primary application server instance) hosts exactly one SAP database. From an installation planning perspective, this is the simplest solution. It is the most scalable setup, but it requires the most hardware. You typically use this option for medium-sized and large production and development systems.
- Named SQL Server instances  
With the use of named instances, you can install multiple, independent SQL Server instances on a single database server. These instances share CPU, memory, and disk resources, but are completely independent from each other in terms of administration.
- Multiple databases in an SQL Server instance  
SQL Server lets you operate multiple user databases in a single SQL Server instance. Contrary to named instances, the databases share the temporary system database `tempdb`, the SQL Server Windows process, and the SQL Server memory pool. Therefore, this setup is less scalable than named instances, but at the same time requires less system resources. It can be a flexible solution for small and medium-sized systems.

- **Multiple Components in One Database (MCOB)**  
Multiple database back ends are stored in the same database, each in its own database schema. For the database administrator, the database containing these multiple components looks similar to a single entity. While this approach is not as flexible as the other options, its simplicity makes it an attractive solution for small SAP environments.

## More Information

- [Default or Named MS SQL Server Instances \[page 147\]](#)
- [Multiple Components in One Database \(MCOB\) \[page 148\]](#)

## 7.5.1 Default or Named MS SQL Server Instances

When you install MS SQL Server, you can install two different types of instances:

- Default instance
- Named instance

When you plan your system configuration, you must decide which instance type you want to install. The following clarifies the difference between the two.

### Default Instance

A **default** instance is the most common form of an MS SQL Server installation in an SAP environment. Typically, one MS SQL Server instance is installed together with a single SAP database instance. In this configuration, all MS SQL Server components and functionality are exclusively available for the SAP database instance.

In a less frequently implemented configuration, a single MS SQL Server instance is installed together with more than one SAP database instance on the same computer. In this type of configuration, the MS SQL Server components such as executables, system database instances, and utilities **exist only once** and have to be shared by all SAP database instances. Since all the database instances on the computer have to be managed with a single copy of the MS SQL Server, certain administrative tasks on one database instance cannot be performed in isolation without affecting the other database instances.

#### → Recommendation

If you plan to install only one SAP database instance on a computer, we recommend that you use a default instance.

## Named Instance

The advantage of named instances is that you can set up several SAP database instances on the same machine and administer each one separately with its own copy of the MS SQL Server. The main components of the MS SQL Server are available exclusively for each instance and can be used only by that instance. Only a few resources such as client utilities have to be shared by all the instances because they are only installed once. During the installation, each named instance is given a name that is the same as the SAP system name, thus enabling a unique assignment of instances to SAP database instances.

A named instance is recommended, if you plan to install more than one SAP database instance on the same host. Several named instances and the default instance can coexist on the same computer and function in isolation of each other.

## 7.6 Database High-Availability with SQL Server Always On

SQL Server 2012 introduced a new feature called AlwaysOn. With Always On, you can use multiple SQL Servers to host one database.

For more information on installing SAP system on Always On, see SAP Note [1772688](#).

For more information about SQL Server Always On, Always On Groups and Always On Listener and Endpoints, see the following Microsoft KB articles:

- **Getting Started with Always On Availability Groups**  
<https://msdn.microsoft.com/en-us/library/gg509118.aspx>
- **Creation and Configuration of Availability Group**  
<https://msdn.microsoft.com/library/ff878265.aspx>
- **Database Mirroring Endpoints in Always On Nodes**  
<https://msdn.microsoft.com/en-us/library/ms179511.aspx>
- **Microsoft Blog**  
<https://blogs.msdn.microsoft.com/saponsqlserver/2012/02/07/sql-server-2012-alwayson-what-is-it/>

## 7.7 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 MCODE 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.

With MCOD we distinguish two scenarios:

- The installation of an SAP system in a new database
- The installation of an additional SAP system in an existing database (MCOD)

## Prerequisites

- For more information about MCOD and its availability on different platforms, see *Multiple Components in One Database (MCOD)* at: <https://wiki.scn.sap.com/wiki/pages/viewpage.action?pageId=448466580>.
- Since SAP does not support mixed solutions with MCOD, your SAP system must contain Unicode SAP instances only.
- Improved sizing required  
You calculate the CPU usage for an MCOD database by adding up the CPU usage for each individual SAP system. You can do the same for memory resources and disk space.  
You can size multiple components in one database by sizing each individual component using the `Quick Sizer` tool and then adding the requirements together. For more information about the `Quick Sizer`, see <http://sap.com/sizing>.

## Features

- Reduced administration effort
- Consistent system landscape for backup, system copy, administration, and recovery
- Increased security and reduced database failure for multiple SAP systems due to monitoring and administration of only one database

- Independent upgrade  
In an MCOD landscape, you can upgrade a single component independently from the other components running in the same database, assuming that the upgraded component runs on the same database version. However, if you need to restore a backup, be aware that all other components are also affected.

### Note

Special MCOD considerations and differences from the standard procedure are listed where relevant in the installation documentation.

## Constraints

- We **strongly recommend** that you test MCOD in a test or development system. We recommend that you run MCOD systems in the same context. We do not recommend that you mix test, development, and production systems in the same MCOD.
- In the event of database failure, all SAP systems running on the single database are affected.
- Automated support in an MCOD landscape for the following administrative tasks depends on your operating system and database:
  - Copying a single component from an MCOD landscape to another database at database level is **not** possible. You have to perform a homogeneous system copy with R3load instead.
  - 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/remotecconnection>.

Only valid for 'High Availability': HA (Windows)





You **cannot** install multiple components in one database with Microsoft Failover Clustering. For more information, see [High Availability with Microsoft Failover Clustering \[page 165\]](#).

End of 'High Availability': HA (Windows)

- For the first SAP system, the <DBSID> must be the same as the <SAPSID>.
- For the second SAP system, you must use the same <DBSID> as for the first SAP system.
- Since the software provisioning manager turns off database logging during the database load phase of the installation, you need to perform a full database backup afterwards.

## 7.8 Installation of Additional Product Instances in an Existing SAP System

You can install additional product instances (former “usage types” or “software units”) in an **existing** Java system using Software Update Manager (SUM).

The procedure how to do this is described in section *Installing Additional Usage Types (Technical Usages) in an Existing SAP System* of the documentation *Updating SAP Java Systems on <UNIX and Linux>: SAP MaxDB<Current\_Number>*, which is available at: <http://support.sap.com/sltoolset>  [System Maintenance](#)  [System Maintenance Scenarios](#)  [Software Update/Upgrade using SUM](#)  [Software Update/Upgrade with](#)

[SUM 1.1 SP <Current\\_Number>](#) > [User Guides for System Maintenance Tools](#) > [Software Update Manager](#)  
<Release> [SP <Current\\_Number>](#) > <Database> > <Operating System> > [Java](#) >

## 7.9 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 Windows - 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](#) >

## 7.10 Starting and Stopping the SAP System

You use this procedure to start and stop the SAP system or single instances after the installation with the **SAP Microsoft Management Console (SAP MMC)** or SAPControl.

### ⚠ Caution

Note the following restrictions about starting and stopping the database instance with the SAP MMC or SAPControl:

Only valid for 'High Availability': non-HA

In a non-high-availability system, you can use the SAP MMC or SAPControl to start the database instance. To stop the database instance, however, you must use the relevant database administration tools.

End of 'High Availability': non-HA

Only valid for 'High Availability': HA (Windows)

In a high-availability system, you can neither start nor stop the database instance with the SAP MMC or SAPControl. For more information, see [Starting and Stopping the SAP System in an HA Configuration \[page 193\]](#).

End of 'High Availability': HA (Windows)

## Prerequisites

The user who wants to start and stop the SAP system with the SAP MMC, must be a member of the local administrators group.

## Procedure

### Starting and Stopping the SAP System with the SAP MMC

With the SAP MMC, you can start or stop installed SAP instances – except the database instance – locally on the host that you are logged on to. If the SAP MMC is configured for central system administration, you can start or stop the entire system from a single host.

#### Note

- To stop the database instance you must use the relevant database administration tools.
- You can also start and stop a UNIX system with the SAP MMC.
- The SAP MMC is not available on Windows Server Core.

For more information about the SAP MMC, see the SAP Library at:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>• <b>SAP Solution Manager 7.2 SR2 only:</b> SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></li><li>• SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li></ul>	<p>▶ <a href="#">Application Help</a> ▶ <a href="#">Function-Oriented View</a> ▶ <a href="#">Solution Life Cycle Management</a> ▶ <a href="#">SAP Microsoft Management Console: Windows</a></p>

To start or stop the SAP system – except the database instance – with the SAP MMC, perform the following steps:

1. Start the SAP MMC on the SAP system host.
2. Right-click the SAP system node and choose *Start* or *Stop*.  
All SAP instances listed under the system node start or stop in the correct order.
3. To stop the database instance, use the relevant database administration tools.
4. If the SAP system is installed on multiple hosts, you have the following options to start or stop your system:
  - You start or stop the SAP instances – except the database instance – using the SAP MMC on each host.
  - You add the remote instances to the SAP MMC configuration to start or stop all instances from a single SAP MMC.  
To do so, do one of the following:
    - You configure the SAP MMC manually. For more information, see *Changing the Configuration of the SAP MMC* in the SAP MMC documentation.
    - You use the automatic LDAP registration. For more information, see *Configuring SAP MMC for Active Directory Services* in the SAP MMC documentation.

### Starting and Stopping the SAP System with SAPControl

To start or stop the SAP system – except the database instance – with SAPControl (`sapcontrol.exe`), perform the following steps:

- To start or stop the complete SAP system with SAPControl, open a PowerShell in elevated mode, and enter the following command:

```
sapcontrol -prot PIPE -nr <Instance_Number> -function StartSystem  
sapcontrol -prot PIPE -nr <Instance_Number> -function StopSystem
```



- To start or stop a single instance with SAPControl, open a PowerShell in elevated mode, and enter the following command:

```
sapcontrol -prot PIPE -nr <Instance_Number> -function Start  
sapcontrol -prot PIPE -nr <Instance_Number> -function Stop
```

- To stop the database instance, use the relevant database administration tools.

## 7.11 Configuring the Windows Server Firewall after SAP installation

### Use

In Windows Server the firewall is configured to allow only a small set of Windows-specific inbound IP connections.

Therefore, we recommend that you do **not** turn on the Windows firewall after you have installed your SAP system. Instead, we recommend that you secure network access to your SAP system with the physical firewall or a router Access Control List (ACL) within your datacenter.

If, for some reason, you want to use the Windows Server firewall, you have to configure the Windows firewall and define a set of *Inbound Rules* for the TCP/IP port numbers that are used by your system. Otherwise, your SAP system might not operate.

For more information about the port numbers used, see the documentation *TCP/IP Ports of All SAP Products* at: <https://help.sap.com/viewer/ports>.

Ports listed with the default value *Not active* in this document are not configured.

Only valid for 'High Availability': HA (Windows)

#### ⚠ Caution

In a high-availability system, you have to configure the firewall on **all** cluster nodes.

End of 'High Availability': HA (Windows)

### SQL Server Ports and Client Connections

This section provides general information about the client connections and ports used with SQL Server. This information helps you to correctly configure the Windows Server firewall for the SQL Server ports, as described below.

With SQL Server you have the following instance types:

- Default instance  
The default instance uses TCP port 1433 by default to connect to the database server.
- Named instance)  
Named instances use a random port. This port is fixed while the SQL Server service is running, but might change when the SQL Server service starts.

## Note

If you use a firewall, we strongly recommend you to use fixed port numbers for named instances. You can set up fixed port numbers for named instances in the [SQL Server Configuration Manager](#). For more information, see the [SQL Server Books Online](#).

If an SQL Server client connects to the database server, it uses:

- The same SQL Server instance port on the server side
- A separate but random port on the client side

To find out the server port number from the client side, you have the following options:

- You use SQL Server Browser, which uses UDP port 1434. This port tells the client which SQL Server port is used.
- If you do not use SQL Browser, look for the port number in the SQL Server error log. Add the port number to the connection string of the instance profile as shown in the following example:

## Example

This example shows how the connection string looks before and after the change for a default and named instance:

- **Connection string before change:**  
Default instance: <hostname>  
Example: SAPSQLSERVER  
Named instance: <hostname>\<instancename>  
Example: SAPSQLSERVER\PRD
- **Connection string after change with added port number:**  
Default instance: tcp:<hostname>,<port>  
Example: tcp:SAPSQLSERVER,1433  
Named instance: tcp:<hostname>\<instancename>,<port>  
Example: tcp:SAPSQLSERVER\PRD,1500

We recommend you to use the following best practices with SQL Server for Windows Server firewall settings:

- Use a default instance.  
Define the inbound rules for TCP port 1433.
- If you use a named instance, we recommend you to set up a fixed port number in the [SQL Server Configuration Manager](#) and to use SQL Server Browser.  
Define the inbound rules for this fixed TCP number, as well as for UDP port 1434, which is used by SQL Server Browser.

## Prerequisites

You turn on the [disabled firewall \[page 64\]](#) as follows:

- Open Windows PowerShell in elevated mode, and enter the following command:  
**Set-NetFirewallProfile "public","domain","private" -enabled true**

- You turn on the disabled firewall as follows:  
Open Windows PowerShell in elevated mode, and enter the following command:  
`Set-NetFirewallProfile "public","domain","private" -enabled true`

## Procedure

This procedure provides an example how to set *Inbound Rules* for the ports of an ABAP server that was installed with the following settings:

<i>Instance number</i>	00
<i>Port type</i>	TCP
<i>Ports</i>	3200, 3300, 4800, 8000, 3600, 50013, 1433, 1434

- Open Windows PowerShell in elevated mode, and enter the following command:  
`New-NetFirewallRule -DisplayName "SAP ABAP Server 00" -Direction Inbound -Protocol TCP -LocalPort 3200,3300,4800,8000,3600,50013,1433,1434 -Action Allow`
- You turn on the disabled firewall as follows:  
Open Windows PowerShell in elevated mode, and enter the following command:  
`Set-NetFirewallProfile "public","domain","private" -enabled true`

### Note

Port 1433 is only required if programs running on other hosts must access SQL Server using TCP/IP, such as when you have installed additional SAP application server instances, or you run SQL Server Management Studio on a remote computer.

### Note

If you want to use, for example, a different IP scope for port 50013, which is used by the connection SAP Start Service – SAP Management Console, you can restrict the IP access to a small number of SAP administrators. Then delete this port from the SAP ABAP Server 00 rule and create a new rule for port 50013 with a more restrictive scope.

## 7.12 SAP System Security on Windows

In a standard SAP system installation, the software provisioning manager automatically performs all steps relevant for security. Although the software provisioning manager makes sure that the system is protected against unauthorized access, you must still check that no security breaches can occur.

For central and straightforward administration of the SAP system, you have to install distributed SAP systems with multiple application servers in a Windows **domain**. This section describes the user accounts and groups that the software provisioning manager creates during a domain installation and shows how these are related to the SAP directories.

## User Accounts

The software provisioning manager creates the following accounts for SAP system administration:

User account	Description
<sapsid>adm	This is the SAP system administrator account that enables interactive administration of the system.
SAPService<SAPSID>	<p>This is the user account that is required to start the SAP system. It has the local user right to log on as a service.</p> <p>The advantage of the additional SAPService&lt;SAPSID&gt; account is that it does not allow interactive logon, which prevents abuse of the account. Therefore, you do not need to set an expiration date for the password and you do not have to set the option <i>user must change password at next logon</i>.</p>
sapadm	<p>This is the user for the SAP Host Agent. By default it is a local user and not a member of the local Administrators group. You can change this user into a domain user on the <i>Parameter Summary</i> screen. For security reasons, however, SAP strongly recommends to create this user as a local user.</p> <p>The SAP Host Agent contains all of the required elements for centrally monitoring any host with the Alert Monitor or the SAP NetWeaver Administrator.</p>

## Domain and Local Groups

The only function of a domain group is to group users at the domain level so that they can be placed in the appropriate local groups.

Only local groups are created and maintained on each local host. A local group can only be given permissions and rights to the system where it is located. The system is part of a particular domain, and the local group can contain users and domain (global) groups from this domain.

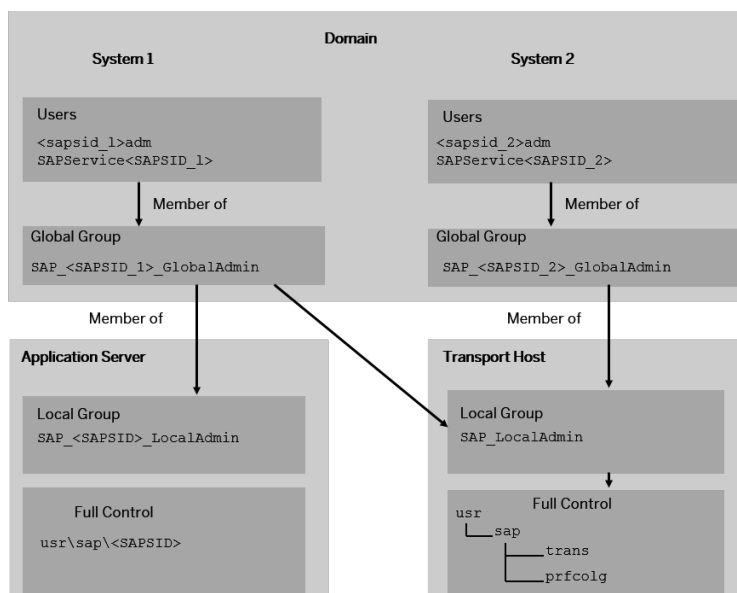
During a domain installation, the software provisioning manager creates the following domain and local groups:

Group	Description
SAP_LocalAdmin	<p>This local group is created on all hosts, but is particularly important for the transport host. Members of the group have full control over the transport directory (\usr\sap\trans) that allows transports to take place between systems.</p> <p>The SAP_&lt;SAPSID&gt;_GlobalAdmin groups of all the SAP systems that are part of the transport infrastructure are added to the SAP_LocalAdmin group. Therefore, the users &lt;sapsid&gt;adm and SAPService&lt;SAPSID&gt; of all systems in the transport infrastructure are members of the SAP_LocalAdmin group and have the required authorizations necessary to initiate and execute transports.</p>

## SAP Directories

The software provisioning manager protects the SAP directories under \usr\sap\<SAPSID> by only granting the group SAP\_<SAPSID>\_LocalAdmin full control over these directories.

The following graphic illustrates the users and groups that are created by the software provisioning manager for the <sapsid>adm and SAPService<SAPSID> users in a system infrastructure consisting of two SAP systems.



User Groups and Accounts

### Note

SAP\_An access control list (ACL) controls access to SAP system objects. For maximum security in the SAP system, only the following are members of **all** SAP system object ACLs:

- Local group SAP\_<SAPSID>\_LocalAdmin
- Group Administrators
- User SYSTEM

## More Information

[Automatic Creation of Accounts and Groups \[page 157\]](#)

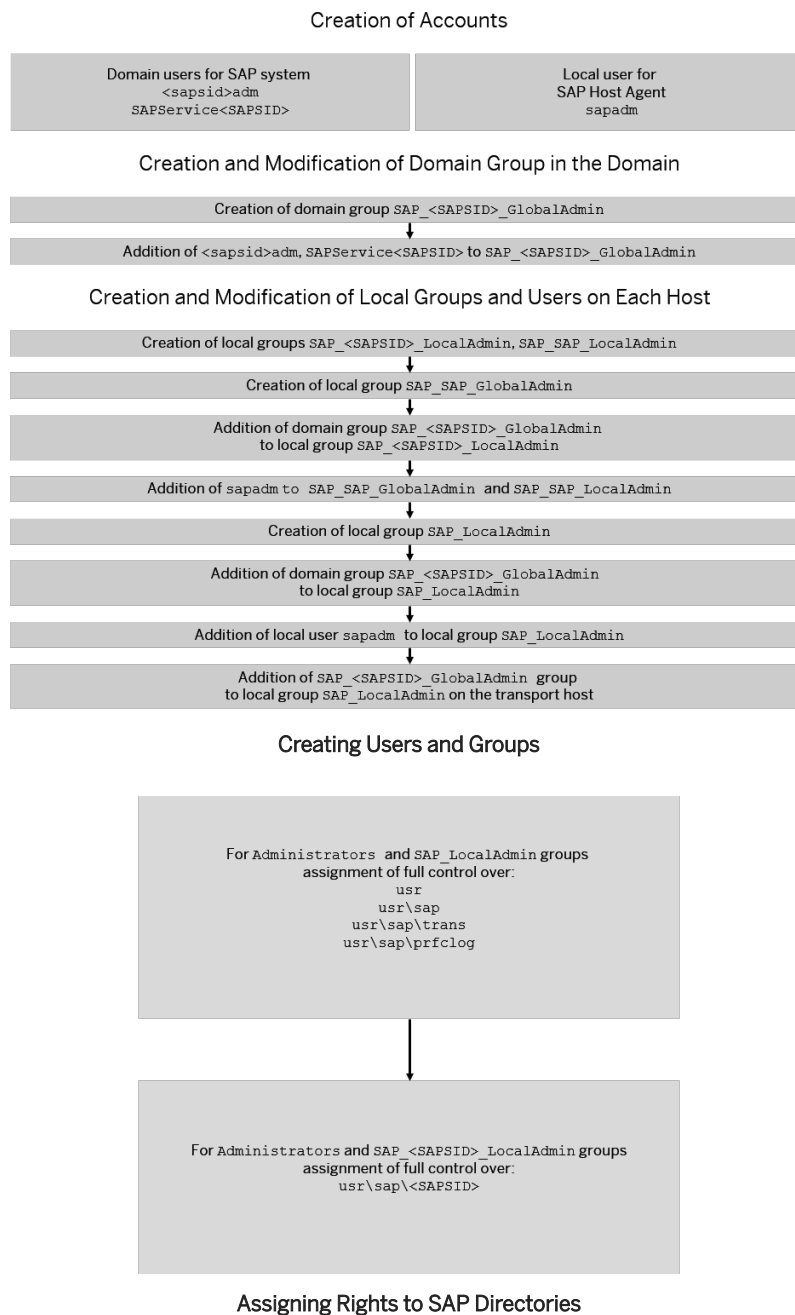
## 7.13 Automatic Creation of Accounts and Groups

The software provisioning manager automatically creates the accounts and groups required for the secure operation of the SAP system with Windows during the installation, as described in [SAP System Security on Windows \[page 155\]](#).

## Features

The following figures show the steps that the software provisioning manager performs to create the users and groups and assign the required rights to SAP directories.

The first figure shows the users that are created during a domain installation, with the SAP Host Agent operating system users being local users.



## 7.14 Troubleshooting for SAP Enterprise Portal Installation

This section applies both when you install *EP Core - Application Portal* only and when you install it together with *Enterprise Portal*.

### Context

If the `views` are not displayed correctly, or if the portal does not launch, the reason might be that the portal was not deployed completely.

To check the deployment of the portal, proceed as follows:

### Procedure

1. Open a new console with the user `<sapsid>adm`.
2. Go to the directories `deployment`, `pcd`, and `pcdContent`, in the following paths:
  - `<drive>:\usr\sap\<SAPSID>\J<Instance_Number>\j2ee\cluster\server0\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\deployment`
  - `<drive>:\usr\sap\<SAPSID>\J<Instance_Number>\j2ee\cluster\server0\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\deployment\pcd`
  - `<drive>:\usr\sap\<SAPSID>\J<Instance_Number>\j2ee\cluster\server0\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\deployment\pcdContent`
  - `<drive>:\usr\sap\<SAPSID>\J<Instance_Number>\j2ee\cluster\server0\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\deployment\pcdContent\no_overwrite`
3. Look for files with the extension `*.err`.
4. Do one of the following:
  - If error and log files do not appear, the portal installation has been completed successfully and you can continue.
  - Rename the `*.err` files:
    1. Remove the `err` extension; so the extensions of the files become `*.ept` or `*.par`.
    2. Restart AS Java, using the commands `stopsap` and `startsap`, to change the files to `*.bak`.

## 7.15 Uninstalling an SAP System or Single Instances

Uninstalling an SAP system or single instances is described in this section. It includes prerequisites, manual steps, and recommendations for deleting the system or instances using the software provisioning manager. It also provides information on deleting database content and other related considerations.

## Prerequisites

- You have installed your SAP system with standard SAP tools according to the installation documentation.
- You are logged on with a user account that has the required authorization to run the software provisioning manager and the SAP system. For more information, see [Required User Authorization for Running Software Provisioning Manager \[page 66\]](#).

### ⚠ 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.

### ℹ 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

### ℹ Note

With this software provisioning manager option you do **not** delete the database software.

Note the following when deleting an SAP system or single instances:

- 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.
- If you uninstall an SAP instance and you plan to install another SAP instance with the same System ID, first reboot the Windows host to clear all user cached information. For more information, see SAP Note [2296310](#).



## Procedure

1. Start the software provisioning manager as described in [Running Software Provisioning Manager \[page 91\]](#).
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

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.

Deletion of	Remarks
Standard system	You can delete a standard system (where all instances reside on the same host) in one software provisioning manager run.

Deletion of	Remarks
Distributed or high-availability system	<p>If you want to delete a distributed or high-availability system, you have to run the software provisioning manager to delete the required instances <b>locally</b> on each of the hosts belonging to the SAP system in the following sequence:</p> <div data-bbox="560 472 1402 734" style="border: 1px solid orange; padding: 5px;"> <p><b>⚠ Caution</b></p> <p>Only select checkbox <i>Uninstall all instances of the SAP system from this host</i> when removing the last remaining instance of the SAP system. Otherwise the contents of mounted global directories under <code>\&lt;sapglobalhost&gt;\&lt;sapmnt&gt;\&lt;SAPSID&gt;</code> / such as instance profiles and kernel executables, are also deleted.</p> </div> <ol style="list-style-type: none"> <li>1. Additional application server instances, if there are any</li> <li>2. Primary application server instance If the software provisioning manager stops responding while trying to delete the primary application server instance, close the software provisioning manager with <i>Cancel</i> and <i>Exit</i>. Log off and log on again. To complete the uninstall process of the primary application server instance, restart the software provisioning manager.</li> <li>3. Database instance Choose whether you want to drop the entire database instance or only one or more database schemas. Since the software provisioning manager only stops local instances automatically, make sure that before deleting the database instance of a distributed system, you stop all remaining instances. You must stop the instance with the message server only after having entered all software provisioning manager parameters for the deletion of the database instance.</li> <li>4. Central services instance (SCS)</li> </ol>
Additional application server	<p>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 <b>locally</b> on each additional application server instance host.</p>
Standalone SAP Host Agent	<p>The SAP Host Agent is automatically uninstalled from a host together with the last remaining SAP system instance.</p> <p>If you want to uninstall a <b>standalone</b> SAP Host Agent, deselect <i>Profiles Available</i> and select <i>Uninstall Standalone SAP Host Agent</i> on the <i>General SAP System Parameters</i> screen.</p>

4. When you have finished, delete the relevant directory structure on the global host.
5. Delete the SQL Server database software using the SQL Server Uninstaller, which you can find on Windows at [Add/Remove Programs](#).
6. Delete the local user group `SAP_<SAPSID>_LocalAdmin` manually as follows:
  - Open a PowerShell in elevated mode and enter the following command:  
`net localgroup SAP_<SAPSID>_LocalAdmin /delete`
7. If required, you can delete the directory `\usr\sap\trans` and its contents manually.

The software provisioning manager does not delete `\usr\sap\trans` because it might be shared.

- To remove obsolete SLD data, see the following document: <https://wiki.scn.sap.com/wiki/display/SL/More+on+System+Landscape+Directory>  [How-to Manage House-Cleaning in the System Landscape Directory - Duplicate System Entries](#) 
- If the following directories and files exist, delete them by entering the following command:

#### **WRKLNKSAP**

- `/usr/sap/trans/cofiles/*<SAPSID>*`
- `/usr/sap/trans/data/*<SAPSID>*`
- `/usr/sap/trans/log/*<SAPSID>*`
- `/usr/sap/trans/buffer/*<SAPSID>*`

Choose **4** (*Remove*) on every file that is found by the command **WRKLNKSAP**.

#### Example

For example, for directory `/usr/sap/trans/data`, enter the following command:

```
WRKLNKSAP DIR('/usr/sap/trans/data/*<SAPSID>*')
```

Choose **4** (*Remove*) on the listed files.

#### Note

To limit the command **WRKLNKSAP**, choose **Subset** (in the upper right part on the screen).

- If the following directories exist, delete them by entering the following commands:

```
RMVDIR DIR('/sapmnt/<SAPSID>') SUBTREE(*ALL)
```

```
RMVDIR DIR('/usr/sap/trans/config/<SAPSID>') SUBTREE(*ALL)
```

#### Note

If you are removing a system from an independent ASP also delete the contents from the following directories:

```
RMVDIR DIR('/<IASP_Name>/usr/sap/<SAPSID>') SUBTREE(*ALL)
```

```
RMVDIR DIR('/<IASP_Name>/sapmnt/<SAPSID>') SUBTREE(*ALL)
```

- If the library `SAPSLT<SAPSID>` still exists, you must delete it. The library `SAPSLT<SAPSID>` is a leftover of an SAP upgrade.

It should have been deleted after the SAP upgrade, already. Use the following command to delete the library `SAPSLT<SAPSID>`, now:

```
DLTLIB LIB(SAPSLT<SAPSID>)
```

## Results

The SAP system is now deleted. If you want to reinstall an SAP system, you can use the same <SAPSID> as the one of the SAP system you deleted.

# 8 High Availability with Microsoft Failover Clustering

You can install a high-availability SAP system with *Microsoft Failover Clustering*. The Failover Clustering software improves the availability of the system and protects it against failure and unplanned downtime, enabling 24-hour operation, 365 days a year.

With high availability, you enable critical system components, known as “Single Points of Failure (SPOFs)”, to be automatically switched from one machine to the other, if hardware or software problems arise on one machine. With the help of this switchover – or failover – the system can continue functioning.

Apart from enabling failover when hardware problems occur, you can also use Failover Clustering to avoid downtime when you perform essential system maintenance. If you need to maintain one host (failover cluster node), you can deliberately switch the cluster resources to the other host (failover cluster node) and temporarily operate it there while maintenance is in progress. When maintenance work is finished, you can easily move the resources back to their original node and continue operating them there.

When you are setting up the SAP system with Microsoft Failover Clustering, you combine standard installation steps, described earlier in this documentation, with cluster-specific steps, described here.

You have the following options to install a high-availability SAP system with Microsoft Failover Clustering:

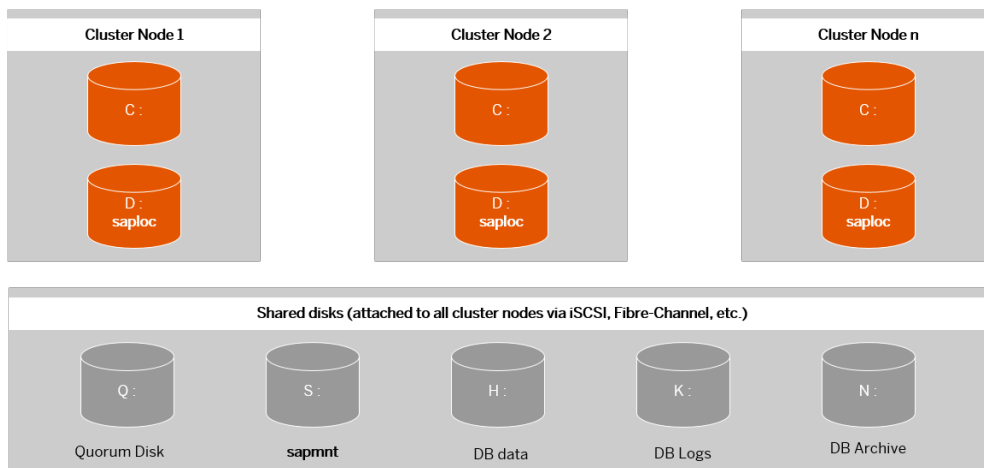
- You install the SAP related parts (for example: SCS instance, additional standalone Gateways, Web Dispatcher instance, etc.) in **one** Microsoft Failover Cluster.
- You install the SAP related parts (for example: SCS instance, additional standalone Gateways, Web Dispatcher instance, etc.) in **two** Microsoft Failover Clusters.
- You install **several** SAP systems in **one** or **more** Microsoft Failover Clusters with two or more Microsoft Failover Cluster nodes.

You have the following options to install a Microsoft Failover Cluster:

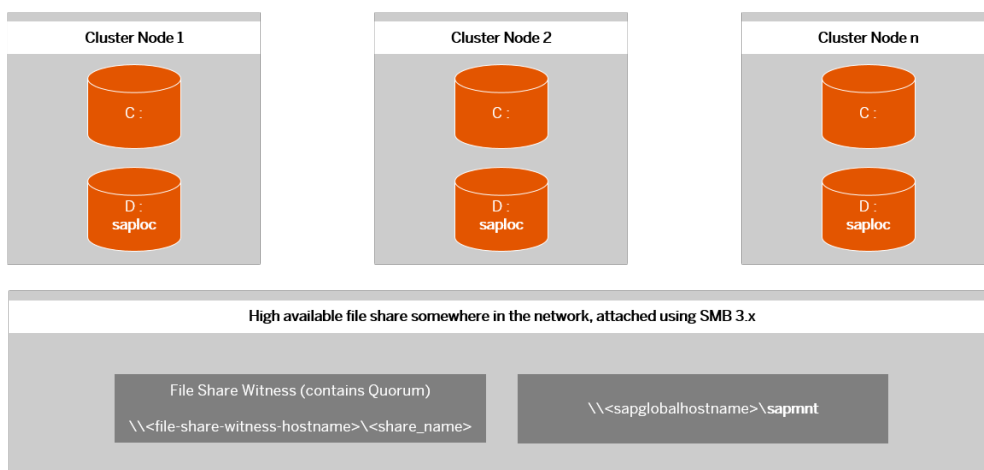
- CSD (Cluster Shared Disks)
  - A Failover Cluster which contains shared disks.  
A database can be optionally installed in this Cluster in its own cluster group.
- FSC (File Share Cluster)
  - A Failover Cluster which does not contain shared disks and uses a remote file share instead.  
A database cannot be installed in this cluster because databases need shared disks. One exception: MS SQL using “AlwaysOn” option.

- **Note**

The user starting the software provisioning manager must have full access rights on the file share \\<sapglobalhost>\sapmnt.



Landscape of a Cluster using Shared Disks



Landscape of a File Share Cluster

You have the following options to install the database instance with a high-availability SAP system:

- You install the database instance on a different host or cluster on either the same or a different operating system.
- You use third-party high-availability solutions to improve the availability of your database instance.

## Important Information

To install a new SAP system with Microsoft Failover Clustering, you have to perform a number of extra steps specially required for the cluster and configure the SAP system so that it can take advantage of the cluster functionality:

- Since the correct configuration of network addresses is absolutely essential for the cluster to function properly, you have to perform a number of additional steps that are necessary to set up and check address resolution.
- You install the SQL Server Failover Cluster on all cluster nodes of the database instance host.

- Since the cluster hardware has at least two nodes that have access to all local and shared storage devices, you have to install some components on all nodes and pay attention to special rules for distributing components to local disks, shared disks, or external file shares.
- You have to install and configure the SCS instance to run on two cluster nodes in one Microsoft Failover Cluster.

### Note

If you have an existing SAP system and plan to migrate to a failover cluster with new hardware, you install the SAP system using a **system copy**.

For more information about the system copy, see the *System Copy Guide* for your SAP system at:

<http://support.sap.com/sltoolset> ► [System Provisioning](#) ► [System Copy Option](#) ►

The system copy guide does **not** include the cluster-specific information, which is described here.

## Terminology

- In this documentation the hosts in a Microsoft Failover Cluster are referred to as first cluster node and additional cluster node(s):
  - The **first** cluster node is the cluster node where you perform the general installation of an SAP system, for example where the database or SCS instance is to be installed.
  - The **additional** cluster node is the node where you configure the already installed SAP instances to run in Microsoft Failover Clustering.

## 8.1 Checklist for a High-Availability System

This section includes the steps that you have to perform for your SAP system using Microsoft Failover Clustering. Detailed information about the steps is available in the relevant section.

### Planning

1. You decide how to [set up your SAP system components in an HA configuration \[page 169\]](#).
2. You decide how to [distribute SAP system components to disks for HA \[page 176\]](#).
3. You read [Directories in an HA Configuration \[page 179\]](#).
4. You read [IP Addresses in an HA Configuration \[page 180\]](#).
5. You [obtain IP addresses for HA \[page 183\]](#).

### Note

The user starting the software provisioning manager must have full access rights on the file share `\<sapglobalhost>\sapmnt`.

## Preparation

1. You check that you have completed the same [preparations \[page 63\]](#) as for a non-HA system.
2. To make sure that all preparation steps have been correctly performed, check that the storage resources are available to all cluster nodes. If you want to run the CSD option, check if you can move the disk resources from one cluster node to another so that they are accessible from a single node at any time. If you want to run the FSC option, check if the external file share is accessible by your installation user from all cluster nodes.

## Installation

1. You make sure that:
  1. You are logged on as a domain administrator user or a domain user, who has the necessary rights on all cluster nodes. For a list of the required permissions, see [Performing a Domain Installation without being a Domain Administrator \[page 143\]](#).

### Note

In Failover Cluster configurations, make sure that the account of the cluster (<clustername>\$) has full rights in the OU (Organizational Unit) on which your Domain administrator configures the SAP users and the SAP group.

If these rights are missing, the software provisioning manager will try to add the cluster network name resource to the SAP cluster group. However, because the cluster itself has no rights to add the related computer object (CNO) to the OU, the software provisioning manager will stop and show the error message `<access denied>`.

2. You do **not** use the user `<sapsid>adm` unless specified.
3. If you are prompted during the installation process, log off and log on again.
2. On **all** cluster nodes of the host where the database instance is to run, you [install the MS SQL Server failover cluster \[page 186\]](#).
3. You [configure the first cluster node \[page 186\]](#).
4. You [install the database instance on the first cluster node \[page 187\]](#) of the host where the database instance is to run.
5. You [configure the additional cluster node \[page 188\]](#).
6. You [install the primary application server instance \[page 189\]](#).
7. You [install at least one additional application server instance \[page 190\]](#).

## Post-Installation

1. You install the permanent SAP licenses on all cluster nodes.
2. You perform the post-installation checks for the enqueue replication server.
3. You perform the same [post-installation steps \[page 112\]](#) as for a non-HA system.



## Additional Information

- [Moving Cluster Groups, or Services and Applications, or Roles \[page 193\]](#)
- [Starting and Stopping the SAP System in a HA Configuration \[page 193\]](#).

## 8.2 Planning

The following sections provide information about how to plan the installation of the SAP system for Microsoft Failover Clustering. For a complete list of all steps, see section *Planning* in the [Installation Checklist for a High-Availability System \[page 167\]](#).

### 8.2.1 System Configuration with Microsoft Failover Clustering

The following chapters provide information about the configuration of your SAP system with Microsoft Failover Clustering. It describes the components you have to install for an SAP system running in a Microsoft Failover Cluster, and how to distribute them on the specific host. For more information, see:

- [SAP System Components in a Microsoft Failover Cluster \[page 169\]](#)
- [Multiple SAP Systems in One Microsoft Failover Cluster \[page 173\]](#)
- [Multiple SAP Systems in Multiple Microsoft Failover Clusters \[page 174\]](#)
- [Enqueue Replication Server in a Microsoft Failover Cluster \[page 175\]](#)

#### 8.2.1.1 SAP System Components in a Microsoft Failover Cluster

In a Microsoft Failover Cluster configuration, you have the following mandatory components for your SAP system:

SAP System Components in an Failover Cluster Configuration

Component	Number of Components per SAP System	Single Point of Failure
SCS instance (message services and enqueue services)	1	yes
Database instance (*)	1	yes

Component	Number of Components per SAP System	Single Point of Failure
Application server instance (primary application server, additional application server)	1-<n>	no

(\*) the database instance can also be installed outside the Microsoft Failover Cluster.

- To protect the SPOFs (SCS instance and database instance), you have to use Microsoft Failover Clustering. If a hardware or software problem occurs on the first cluster node, the clustered SCS instance and the clustered database automatically fail over to another node. If you need to maintain the cluster node where the SCS instance and database are running, you can switch these instances to another node. When maintenance work is finished, you move the SCS and database instance back to the original node.
- To protect system components that are non-SPOFs, for example application servers, you have to install them as multiple components. In this case, you must install at least two application servers (the primary application server instance and one additional application server instance) on two different hosts. You have the following options:
  - You install the primary application server and the additional application server instance on the cluster nodes of a Microsoft Failover Cluster. You install them on a **local** disk or external file share. Any additional application server instances are installed on hosts outside of the Microsoft failover cluster. If you have to maintain a cluster node, you have to stop the primary application server or the additional application server instance on that node. When you have finished maintenance, you restart the instances.

#### Note

If you install the primary application server and the additional application server instance on the cluster nodes, you must perform the hardware sizing for the failover cluster host, as in this case the application server is always running on this host. This increases system load and might impact performance.

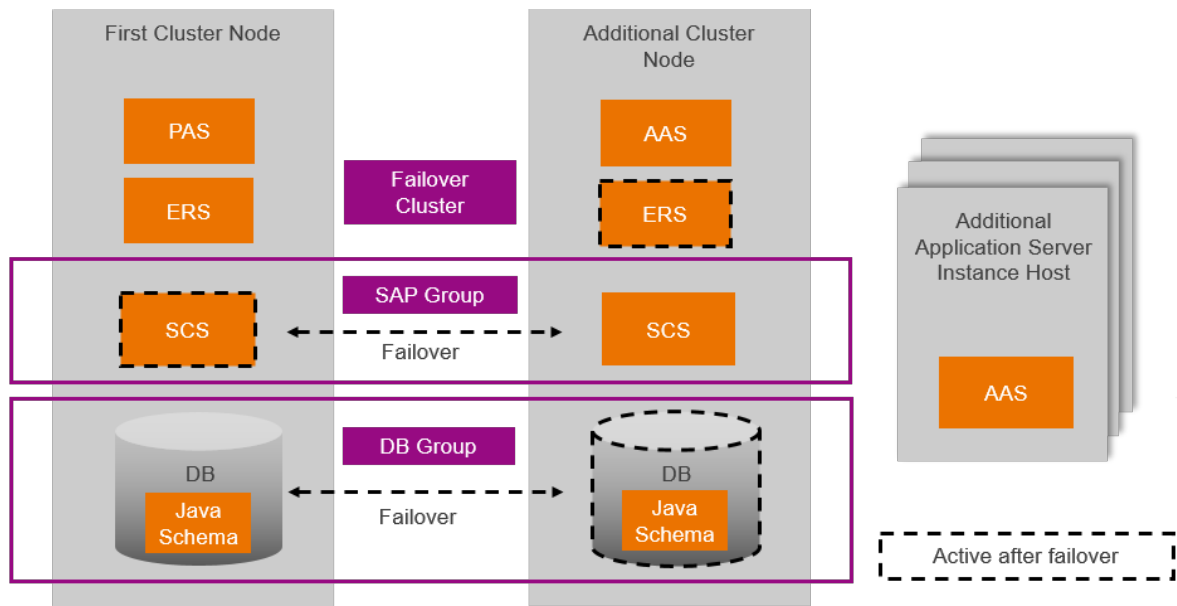
Note that, as usual in a failover cluster setup, the SCS and database instances also switches to run on the failover cluster host in the event of failover, which temporarily also increases system load.

- You install the primary application server and all additional application server instances on hosts, which are not part of a Microsoft Failover Cluster.

## SAP System Components in One Microsoft Failover Cluster

The following figures show examples for the installation of SPOFs and non-SPOFs of an SAP system in one Microsoft Failover Cluster with two nodes.

The first figure shows an Microsoft Failover Cluster configuration where the non-SPOFs components (primary application server instance, additional application server instance) are installed locally on the cluster nodes. Any additional application server instances are installed outside the Microsoft Failover Cluster on separate hosts.

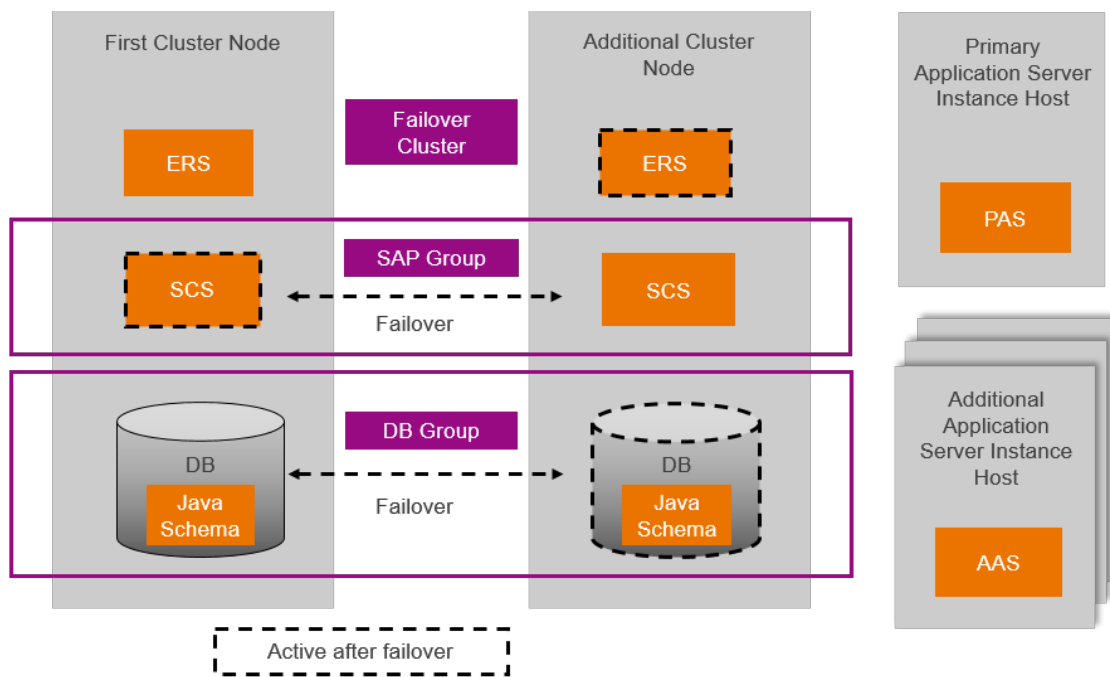


PAS = Primary Application Server Instance  
 AAS = Additional Application Server Instance  
 DB = Database Instance

ERS = Enqueue Replication Server Instance  
 SCS = Central Services Instance

#### Java System

The following figure shows an HA configuration, where the non-SPOFs components (primary application server instance, additional application server instance) are installed on separate hosts that are not part of the failover cluster.



PAS = Primary Application Server Instance  
 AAS = Additional Application Server Instance  
 DB = Database Instance

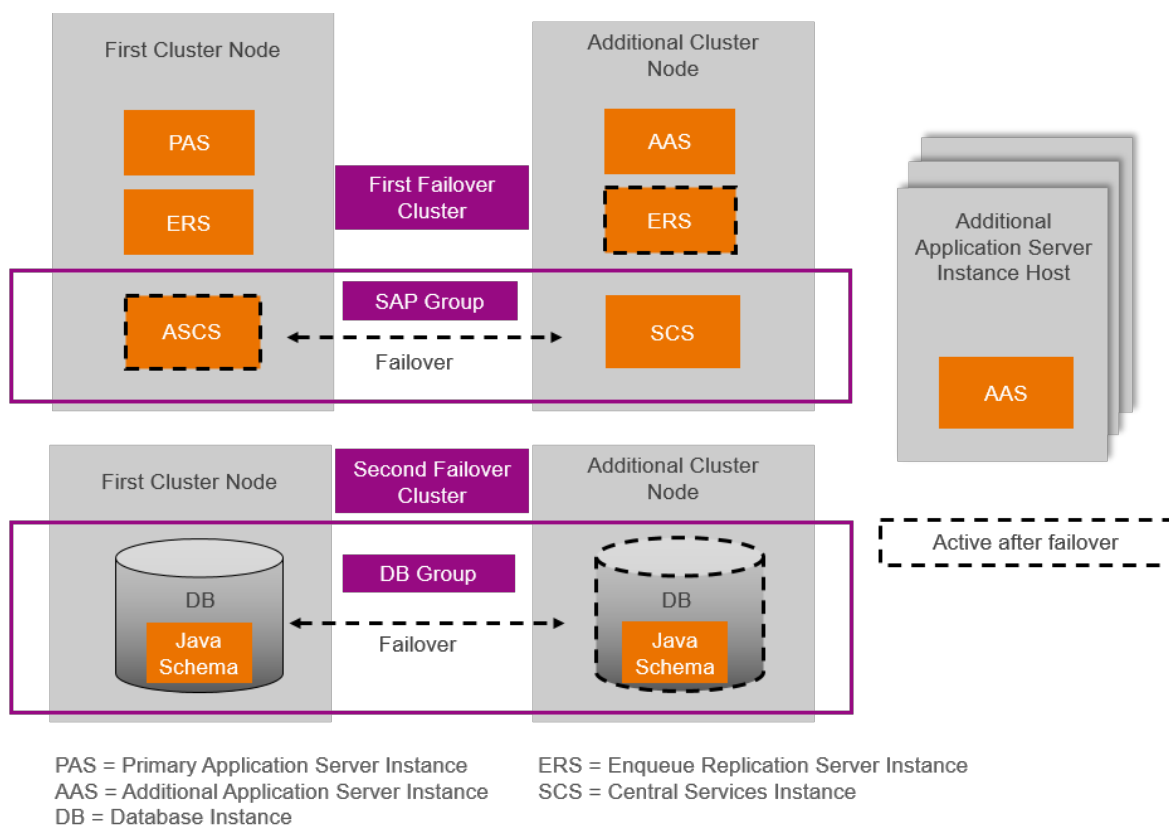
ERS = Enqueue Replication Server Instance  
 SCS = Central Services Instance

#### Java System

### SAP System Components in Two Microsoft Failover Clusters

Besides installing your SAP system in one Microsoft Failover Cluster, you can also set up two failover clusters and distribute the SPOF system components on these clusters to protect them against system failure.

The following figure shows an example where the database instance for the SAP system is installed in one Microsoft Failover Cluster, and the SCS instance is installed on the second failover cluster. The application servers (primary application server instance, additional application server instance) can either be installed on a local disk on the cluster nodes or on separate hosts that are not part of the Microsoft Failover Cluster.



Java System

## 8.2.1.2 Multiple SAP Systems In One Microsoft Failover Cluster

Before SAP NetWeaver 7.0, SAP only supported the installation of **one** clustered SAP system in **one** Microsoft Failover Cluster with two cluster nodes. The reason was that the cluster share `sapmnt` resource could only be assigned to **one** cluster group and could only point to one shared drive.

The solution was to rename the cluster share `sapmnt` resource into `sapmnt<SAPSID>`, and use junctions, which pointed to the local disk. This is no longer required.

### ⚠ Caution

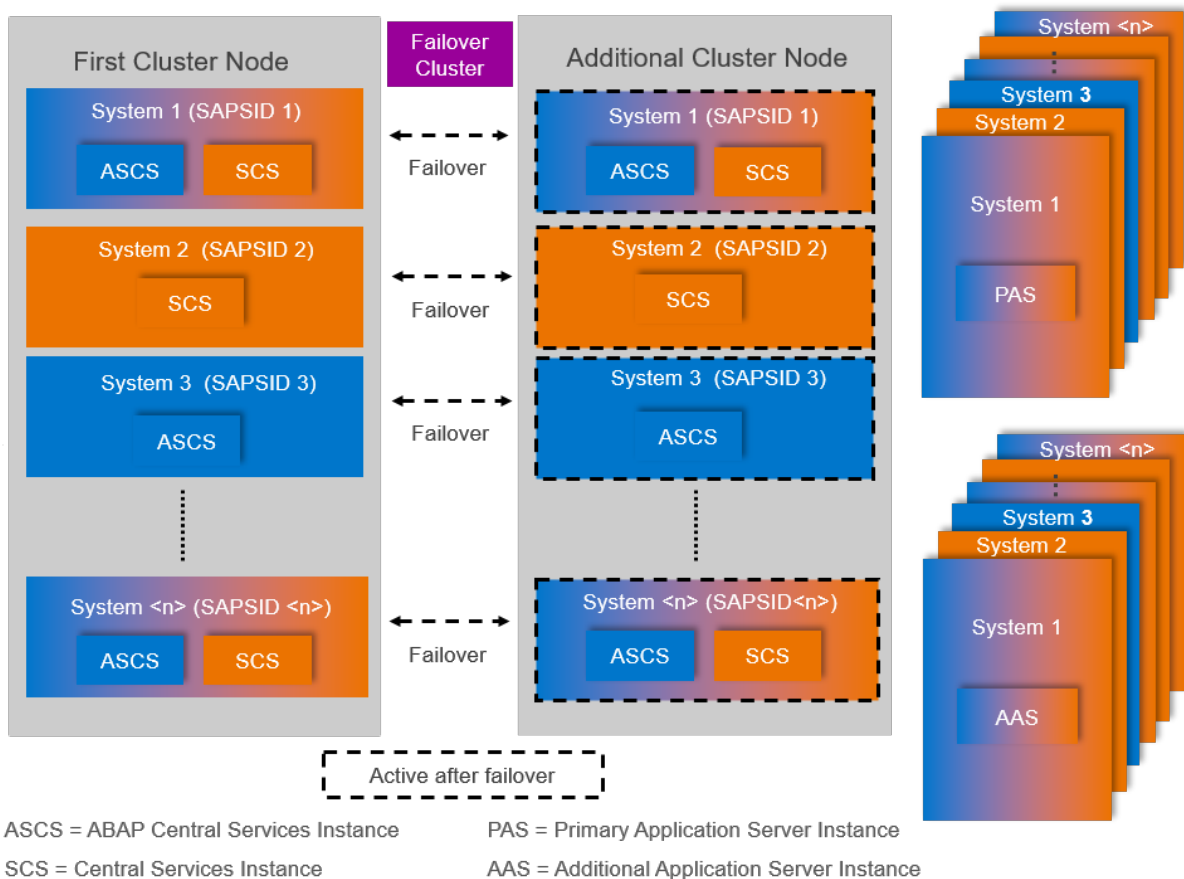
All local instances such as an enqueue replication server, primary or additional application server and the local part of the SCS when you use a file share cluster are installed on the local disk where the `saploc` share is pointing to. Make sure that you have enough space on this local disk.

Every SAP system is placed in a separate cluster group with the unique name `SAP <SAPSID>`. Each SAP cluster group has its own IP address, network name, as well as the SAP service resource (or generic service resource), and the SAP instance resource. If you use the CSD option, the cluster group also contains a shared disk and a `sapmnt` share. In case of the FSC option, the group does not contain a shared drive and the `sapmnt` share is located on a file share.

If you have an HA configuration with three or more cluster nodes, the following restrictions apply:

- The SCS instance must be configured to be able to perform a fail over between two cluster nodes in one Microsoft Failover Cluster.  
For more information, see SAP Note [1634991](#).
- If the database supports the installation on several cluster nodes, the database instance can be installed on more than two cluster nodes in one Microsoft Failover Cluster.

The following figure shows the installation of multiple SAP systems in one Microsoft Failover Cluster. For each SAP system you have to install one primary and at least one additional application server.



Multiple SAP Systems in one Microsoft Failover Cluster

### 8.2.1.3 Multiple SAP Systems In Multiple Microsoft Failover Clusters

Besides installing multiple SAP systems in one Microsoft Failover Cluster, you can also install multiple SAP systems in several Microsoft Failover Clusters with two or more cluster nodes.

For this failover cluster configuration, the following restrictions apply:

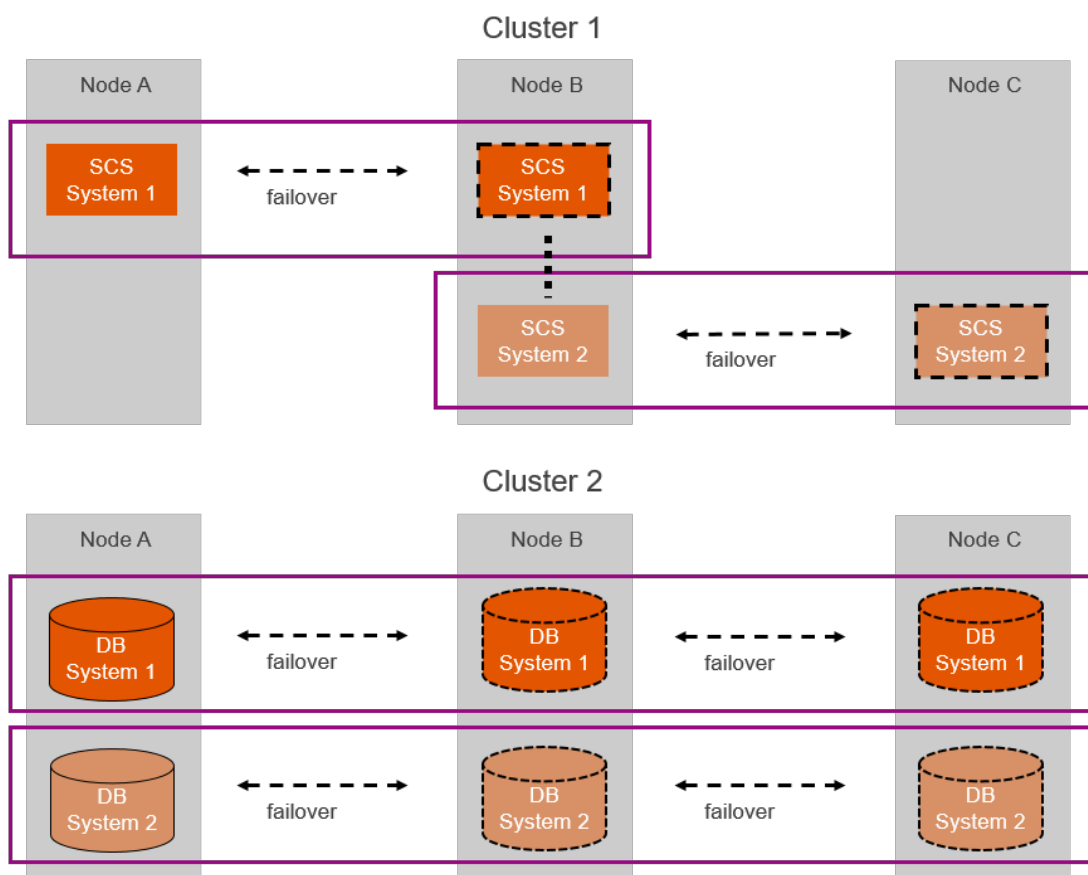
- The SCS instance must be configured to run on two cluster nodes in one Microsoft Failover Cluster.  
For more information, see SAP Note [1634991](#).
- If the database supports the installation on several cluster nodes, the database instance can be installed on more than two cluster nodes in one Microsoft Failover Cluster.

The following figure shows the installation of multiple SAP systems in two Microsoft Failover Clusters with three cluster nodes, called Node A, B, and C. In this example, the SCS instances are installed in the first Microsoft Failover Cluster, and the database instances for the two SAP systems are installed on the second Microsoft Failover Cluster. The application servers can be either installed on a local disk on the cluster nodes or outside the Microsoft Failover Cluster on separate hosts.

### Note

If you use an enqueue replication server, you must configure the enqueue replication server, and the SCS instance on **two** nodes.

For more information, see SAP Note [1634991](#).



Multiple SAP Systems in Two Microsoft Failover Clusters

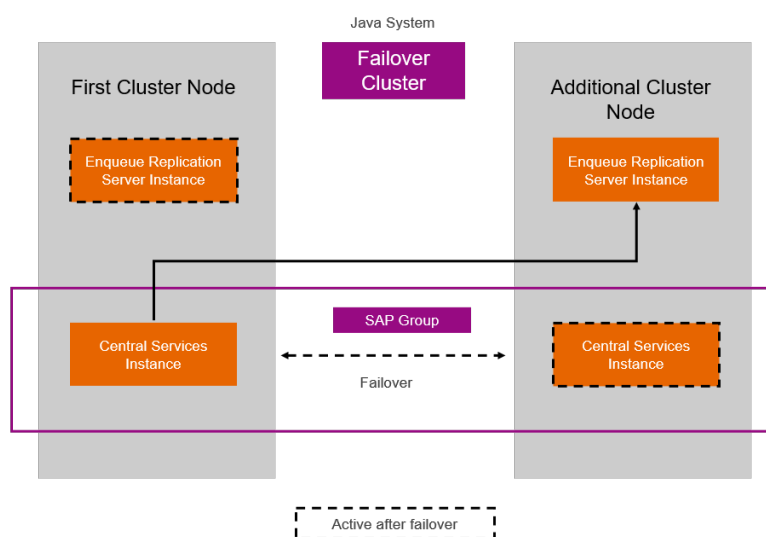
## 8.2.1.4 Enqueue Replication Server in a Microsoft Failover Cluster

The enqueue replication server contains a replica of the lock table (replication table) and is an essential component in a high-availability setup. It is installed on the two cluster nodes where the SCS instance is installed and configured to run, even if you have more than two cluster nodes.

In normal operation the enqueue replication server is always active on the host where the SCS instance is **not** running.

If an enqueue server in a Microsoft Failover Cluster with two nodes fails on the first cluster node, the enqueue server on the additional cluster node is started. It retrieves the data from the replication table on that node and writes it in its lock table. The enqueue replication server on the first cluster node then becomes inactive. If the first cluster node is available again, the enqueue replication server on the second cluster node becomes active again.

The following figure shows the enqueue replication server mechanism in an Microsoft failover cluster configuration with two nodes:



Enqueue Replication Server Mechanism on One Microsoft Failover Cluster with Two Nodes

## 8.2.2 Distribution of SAP System Components to Disks for Failover Clustering

When planning the Microsoft Failover Cluster installation, keep in mind that the cluster hardware uses different storage resources:

- Local Resources
  - Local disks that are connected directly to the cluster nodes
- Shared Storage Resources
  - Shared disks that can be accessed by all cluster nodes via a shared interconnect if CSD option is used

### Note

Shared disk is a synonym for the cluster *Resource type* `Physical disk`.

- An external file share if the FSC option is used

You need to install the SAP system components in both the following ways:

- Separately on all cluster nodes to use the local storage on each node
- You have two options to distribute the shared files which are used by all cluster nodes:
  - You install the following on **different** shared disks:
    - Database instance files, if the database instance is installed in the failover cluster
    - Database shared binaries

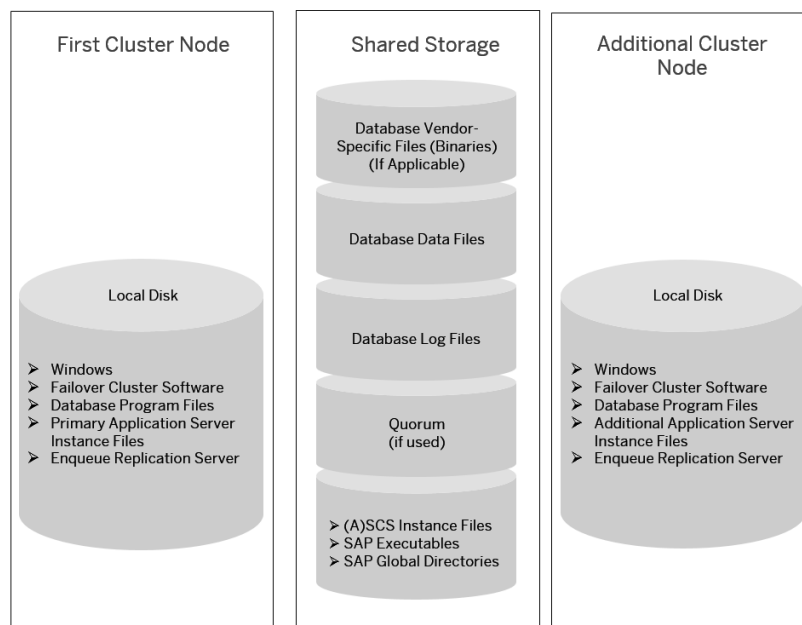


- SCS instance
- Single quorum device, if used
- On an external file share that is made accessible to all cluster nodes:
  - All database files are installed on an external host, or an additional cluster in this scenario
  - If a quorum is used, it is configured as a file share quorum on the file share host

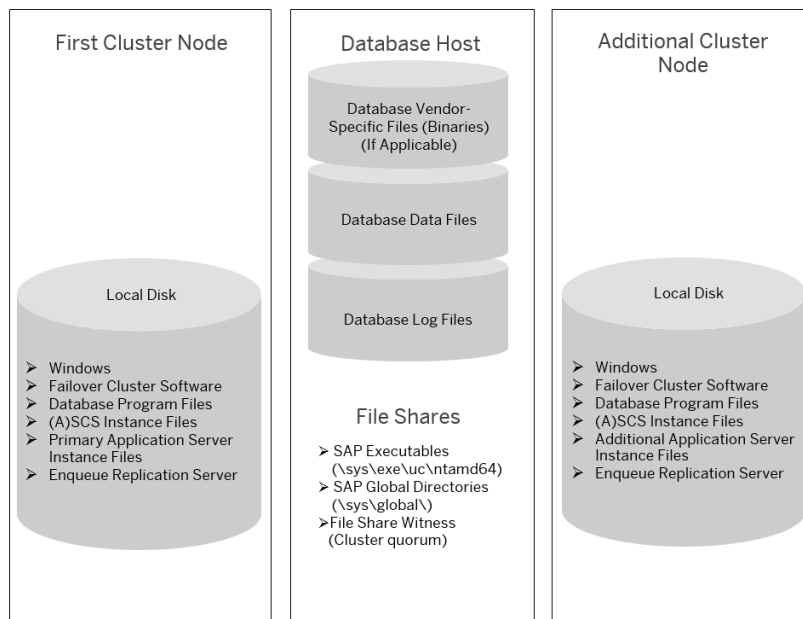
### ⚠ Caution

You **must not** install any SAP or database components on the quorum disk.

The following figure shows a cluster configuration for an SAP system, where the (A)SCS and database instance are installed in the same cluster. It illustrates how to distribute the database data files, the SAP system executables, and the quorum resource (if used) to **different** disks. Only with this distribution of files to distinct disks is it possible to move the SAP system and database as separate entities in a failover situation.



Distribution of SAP System Components for an SAP System in a Failover Cluster with Shared Disks (CSD)



Distribution of SAP System Components for an SAP System in a Failover Cluster with an External File Share (FSC)

## Quorum Configurations on Windows

On Windows, there are several quorum configurations available. The configuration to use mainly depends on the cluster setup, such as the number of cluster nodes, the storage type (single or distributed), the distribution to shared disk and file share, and the number of data centers. For more information, see the Windows documentation.

If the number of cluster nodes is odd, you need no quorum. For a cluster with an even number of nodes you can configure a disk quorum, a file share quorum, or a cloud quorum.

The default quorum configuration is called *Node and Disk Majority* for clusters with more than two nodes.

With a quorum configuration, each node and the witness maintain its own copy of the cluster configuration data. This ensures that the cluster configuration is kept running even if the active node fails or is offline.

### ⚠ Caution

If you do not use the default quorum configuration for your operating system, contact your hardware partner, who can help you to analyze your needs and set up your cluster model. SAP supports these configurations if they are part of a cluster solution offered by your Original Equipment Manufacturer (OEM), or Independent Hardware Vendor (IHV).

## Geographically Dispersed Cluster (Geospan)

The standard cluster configuration consists of two cluster nodes and a shared storage with all technical components located in the same data center. In a geographically dispersed cluster, also known as a geospan cluster, the cluster nodes are distributed across at least two data centers to avoid the full outage of a data center in the event of disaster.

A geospan configuration requires a more sophisticated storage architecture since a standard shared storage can only be located in one data center and might therefore be a single point of failure (SPOF). To prevent the disk storage becoming a SPOF, you have to configure the storage system in each data center and to replicate its content to the storage system of the other data center.

Replication can either be synchronous or asynchronous, depending on the:

- Functionality of the storage subsystem
- Acceptable amount of data loss during a failover
- Physical layout of the storage area network  
This includes the distance between the storage systems, signal latency, capacity, and speed of the network connection.
- Customer budget
- Functionality supported by the database vendor

The database components in geospan configurations are often no longer part of the cluster and the database is replicated by pure database techniques, such as shadow database, log shipping, and mirrored database.

## 8.2.3 Directories in a Microsoft Failover Cluster Configuration

The following tables show the directories where the main software components for a high-availability system are stored:

Directories on Local Disks on Cluster Nodes

Component	Default Directory
A supported <a href="#">operating system</a> [page 36]	%windir%
Microsoft Failover Clustering software	%windir%\Cluster
Only if FSC option is used: SCS instance	<Local_Drive>:\usr\sap\<SAPSID>\SCS<Instance_Number>
Application server	<Local_Drive>:\usr\sap\<SAPSID>\<Instance>
Enqueue replication server	<Local_Drive>:\usr\sap\<SAPSID>\ERS<Instance_Number>
Diagnostics Agent (optional)	<Local_Drive>:\usr\sap\<DASID>\SMDA<Instance_Number>
SAP Host Agent	%Program Files%\SAP\hostctrl

Directories on Shared Disks

Component	Default Directory
Cluster <a href="#">quorum resource</a> (if used)	<Drive>:\Cluster

Component	Default Directory
SAP global and instance directories	<Drive>:\usr\sap ...
<p>During the installation of an SAP system distributed over several hosts, you can now specify that the SAP Global directories are installed on a host different from the SCS instance host. For more information, see SAP Note <a href="#">3349121</a>.</p>	
tempdb databases	<Drive>:\TEMPDB
msdb, model, master, shared binaries	<Drive>:\mssql
SAP data files	<Drive>:\<SAPSID>DATA0 <Drive>:\<SAPSID>DATA1 <Drive>:\<SAPSID>DATA2 <Drive>:\<SAPSID>DATA3 ... <Drive>:\<SAPSID>DATA<N>
SAP log files	<Drive>:\<SAPSID>log<N>

## 8.2.4 Hostnames in a Failover Cluster Configuration

A part of the installation process that is unique to Microsoft Failover Clustering is the configuration of host names and IP addresses in the network. This is a particularly important task because the addressing plays a key role in the switchover procedure. Addressing must be set up correctly so that the system can take advantage of the cluster functionality and switch between nodes when hardware problems arise.

This section explains the different types of IP addresses and their function in the switchover mechanism of **one** Microsoft Failover Cluster with **two** cluster nodes.

### Types of IP Addresses

In a properly configured cluster with at least two nodes, there are at least seven IP addresses and corresponding host names for your SAP system. You have two IP addresses for each cluster node, one IP address for the cluster, one address for the SAP cluster group and one for the database cluster group.

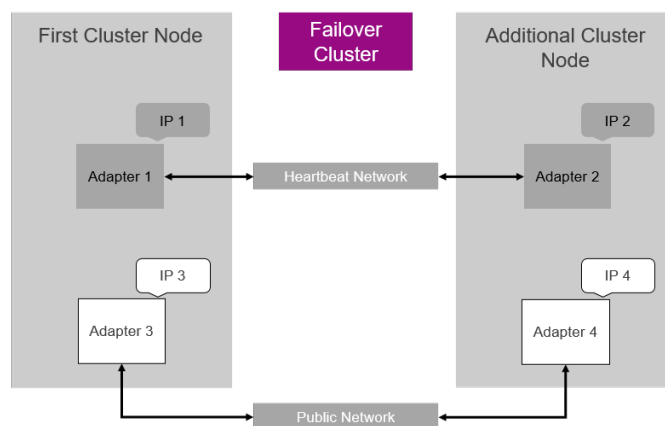
Some of the addresses are assigned to the **network adapters** (network interface card, NIC) whereas others are virtual IP addresses that are assigned to the **cluster groups**.

## Physical IP Addresses Assigned to Network Adapters

A Microsoft Failover Cluster configuration has at least two networks:

- A public network that is used for the communication between the primary application server, additional application servers, and the LAN.
- A private network that is used internally for communication between the nodes of the cluster, also called heartbeat.

The following figure shows a Microsoft Failover Cluster with two nodes and illustrates the adapters required for the public and private networks, and their corresponding physical IP addresses. A physical IP address, in contrast to a virtual one, is stationary and permanently mapped to the same adapter.



Adapters and IP Addresses Required for Public and Private Networks in an Microsoft Failover Cluster with Two Nodes

## Host Names Assigned to Network Adapters

Each of the physical IP addresses of the network adapters must have a corresponding host name. For example, on the left-hand node in the figure above, you might assign the IP addresses of the public and private network adapters as follows:

IP Addresses and Host Names

Network Adapter	IP Address	Host Name
Adapter 1 (private network)	10.1.1.1	clusA_priv
Adapter 3 (heartbeat network)	192.168.1.1	clusA

### ⚠ Caution

- The IP address and host name of the **public** network adapter is also the IP address and name of the machine. In our example, this means that the machine that is the cluster node on the left in the figure has the name `clusA`.
- Do **not** confuse the **host name** with the **computer name**. Each node also has a computer name, which is usually the same as the host name. The computer name is displayed in the node column of the *Failover Cluster Management*. However, it is **not** required for the TCP/IP communication in the cluster. When you configure IP addresses and

corresponding names, keep in mind that it is the **host names** that are important for the cluster, not the computer names.

## Virtual IP Addresses Assigned to Cluster Groups

After you have installed the SAP system and fully configured the cluster, the critical system resources are bound together in three different **groups**.

Each of these groups requires a virtual IP address and network name that is permanently mapped to the group and not to a particular node. The advantage of this is that, whenever a group is moved between nodes, its IP address and network name move together with the group.

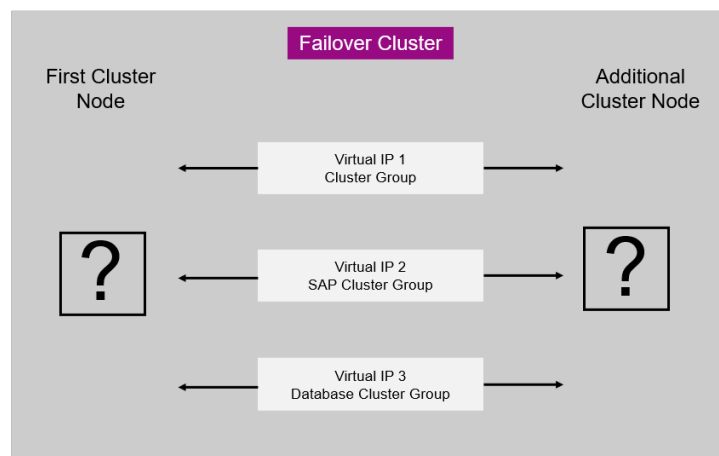
### ⚠ Caution

If you have more SAP systems in the same Microsoft Failover Cluster, you need for each system an extra IP address and network name for the SAP and database cluster group.

An HA configuration has the following groups:

- SAP cluster group for each clustered SAP system
- Database cluster group for each clustered SAP system
- Cluster group

The following figure illustrates how the virtual IP addresses of the database group and SAP group can move from one node to the other during a failover.



Failover of Virtual IP Addresses

## 8.2.5 Obtaining IP Addresses for a Microsoft Failover Cluster Configuration

This chapter describes how to obtain the IP addresses for the network adapters (cards) that are required to install and run your high-availability system.

### Context

For a clustered system, you have to configure IP addresses correctly. During the installation procedure you have to assign at least seven IP addresses and host names. You normally obtain these names and addresses from the system administrator.

### Procedure

Ask the system administrator to give you the addresses and host names listed in the tables below, which show an example for a configuration with one Microsoft failover cluster with two nodes. You need to enter the addresses and host names later during the installation process.

The column *Defined During* indicates at which stage of the installation of the operating system and the SAP system the addresses are defined in the system.

#### ⚠ Caution

Use the names **exactly** as specified by the system administrator.

#### ℹ Note

In the following tables we are still using the terminology cluster group, and not the Windows Server terminology Roles.

Physical IP Addresses

Component	Example for Physical IP Address	Example for Physical Host Name	Purpose	Defined During
First cluster node: adapter for heartbeat network	10.1.1.1	clusA_priv	Address for internode communication on the heartbeat network	Windows installation

Component	Example for Physical IP Address	Example for Physical Host Name	Purpose	Defined During
First cluster node: adapter for public network	129.20.5.1	clusA	Address of the first cluster node for communication with application servers and LAN (this is the same as the address of the first cluster node)	Windows installation
Additional cluster node: adapter for heartbeat network	10.1.1.2	clusB_priv	Address for internode communication on the heartbeat network	Windows installation
Additional cluster node: adapter for public network	129.20.5.2	clusB	Address of the additional cluster node for communication with application servers and LAN (this is the same as the address of the additional cluster node)	Windows installation

#### Virtual IP Addresses

Component	Example for Virtual IP Address	Example for Host Name	Purpose	Defined During
Cluster group	129.20.5.3	clusgrp	Virtual address and name of the cluster group. It identifies the cluster and is used for administration purposes.	Failover cluster software configuration
Database cluster group	129.20.5.4	dbgrp	Virtual address and name for accessing the group of database resources, regardless of the node it is running on	Execution of HA-wizard or database-specific cluster scripts
SAP cluster group	129.20.5.5	sapgrp	Virtual address and name for accessing the group of SAP resources, regardless of the node it is running on	Configuration of SAP system for high availability with the software provisioning manager on the first node



## 8.3 Preparation

This section provides information about how to prepare the installation of the SAP system for Microsoft Failover Clustering. For a complete list of all steps, see section *Preparation* in the [Installation Checklist for a High-Availability System \[page 167\]](#).

1. You check that you have completed the same [preparations \[page 63\]](#) as for a non-HA system.
2. To make sure that all preparation steps have been correctly performed, check that the storage resources are available to all cluster nodes. If you want to run the CSD option, check if you can move the disk resources from one cluster node to another so that they are accessible from a single node at any time. If you want to run the FSC option, check if the external file share is accessible by your installation user from all cluster nodes.

## 8.4 Installation

The following sections provide information about how to install the SAP system in a high-availability environment. For a complete list of all steps, see section *Installation* in the [Installation Checklist for a High-Availability System \[page 167\]](#).

You have the following options to install the database instance:

- CSD (Cluster Shared Disk)
  - You use a high available database outside the cluster used for the SCS instance. This scenario requires a shared disk for the SCS instance and requires an additional cluster used for the database which may also require shared disks.
  - You install the database on a shared disk in the same cluster used for the SCS instance.
- FSC (File Share Cluster)
  - You use a high available database outside the cluster used for the SCS instance. This scenario does not require shared disks for the SCS instance and requires an additional cluster used for the database which may require shared disks.
  - You install the MS SQL database using the AlwaysOn method on the same cluster used for the SCS instance. This doesn't require shared disks.

### Note

The user starting the software provisioning manager must have full access rights on the file share `\<sapglobalhost>\sapmnt`.

## 8.4.1 Clustering the SQL Server Database Server Software

### Use

If you use a high-availability system with Microsoft Failover Clustering, you have to cluster the SQL Server database software.

### Procedure

For more information about how to cluster the SQL Server database software for a high-availability SAP system, see section “Clustering the SQL Server <Release> Database Server Software” in *Upgrade to and Installation of SQL Server <Release>*, which you can find using the SAP NetWeaver Guide Finder at <https://help.sap.com/viewer/nwguidefinder>.

## 8.4.2 Configuring the First Cluster Node

At the beginning of the installation with software provisioning manager, you will be asked to choose between FSC and CSD installation option. For more information, see [Installation \[page 185\]](#).

When you run the *First Cluster Node* option, the software provisioning manager:

- Creates the `saploc` share, pointing to a local disk
- Creates the `sapmnt` share, pointing to a local disk if the CSD option is used, or to the external file share if the FSC option is used
- Installs the central services instance (SCS) and prepares this host as the SAP global host
- Creates the SAP cluster group and adds the SCS instance to the SAP cluster group
- Installs the enqueue replication server instance (ERS instance) for the SCS instance
- Installs the SAP Host Agent

#### Caution

When you reboot during the conversion to Failover Clustering, resources fail over to the other cluster node. Therefore, after each reboot you have to return the system to the state it was in before the reboot.

### Prerequisites

- You are logged on to the first cluster node as domain administrator or as a domain user who has the required administration rights. For a list of the required permissions, see [Performing a Domain Installation without being a Domain Administrator \[page 143\]](#).
- CSD: You must install the SCS instance on a shared disk, and the ERS instance and SAP Host Agent on a local disk.

FSC: You must install the SCS instance on a local disk, like ERS instance and SAP Host Agent.

#### Note

If you are installing SAP NetWeaver 7.5 Process Integration (PI) system, it is mandatory to use different shared disks for the SCS instance if you're using a shared disk cluster. In case you use a File Share Cluster, you have to use different `sapmnt` shares for both instances.

- If you select the FSC option at the beginning of the installation, the global parts of a SAP system are stored on an external file share. The SCS instance, the ERS instance, and SAP Host Agent are installed on a local disk.

## Procedure

1. Run the software provisioning manager [page 91] and on the *Welcome* screen, choose **>> <Product>**  
**> <Database>** **> SAP Systems** **> <System>** **> High-Availability System** **> First Cluster Node**.

#### Note

If the software provisioning manager prompts you to log off from your system, log off and log on again.

2. Enter the required parameter values.

#### Note

- For more information about the input parameters, position the cursor on a parameter and press **F1** in the software provisioning manager.
- If you have a Microsoft cluster configuration with more than two nodes in one cluster, apply SAP Note [1634991](#).

## More Information

[Moving Cluster Groups, or Services and Applications, or Roles \[page 193\]](#)

### 8.4.3 Installing the Database Instance

This procedure describes how to install the database instance on the first cluster node.

## Prerequisites

- The SAP cluster group is *Online* on the first cluster node.

- The DB cluster group is *Online* on the first cluster node.
- The *shared disks* that are used to install the SAP Data files, Transaction Logs, and Tempdb database files are included in the *MSSQL Group*.
- You have created the dependency on these shared disks for the *SQL Server* or *SQL Server(<Named\_Instance>)* resource.

## Procedure

Perform the following steps on the **first** cluster node.

1. Run the software provisioning manager [page 91] and on the *Welcome* screen, choose ► *<Product>* ► *<Database>* ► *SAP Systems* ► *<System>* ► *High-Availability System* ► *Database Instance* ►.
2. Follow the instructions in the software provisioning manager dialogs and enter the required parameter values.
  1. For the profile directory you have to use the UNC path of the **virtual** SCS host name, for example:  
`\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile.`  
 In an HA-system, the virtual host name of the SCS instance is the same as the SAP global host name.
  2. For the `tempdb` database, specify shared disks that are included in the *MSSQL* group.
  3. Distribute the transaction logs and SAPdata files to at least two different shared disks that are included in the *MSSQL* group. For more information, see: [Distribution of Components to Disks for Microsoft Failover Clustering \[page 176\]](#)

### Note

For more information about the input parameters, position the cursor on a parameter and press the **F1** key in the software provisioning manager.

## 8.4.4 Configuring the Additional Cluster Node

### Prerequisites

- You are logged on to the **additional** cluster node as domain administrator or as a domain user who has the required administration rights. For a list of the required permissions, see [Performing a Domain Installation without being a Domain Administrator \[page 143\]](#).
- You have already performed the [First Cluster Node \[page 186\]](#) option.

### Context

When you run the *Additional Cluster Node* option it:

- Configures the additional cluster node to run the SAP cluster group

- Creates the `saploc` share, pointing to a local disk
- If you chose the FSC option:  
Installs the SCS instance
- Installs the enqueue replication server instance (ERS) for the SCS instance
- Installs the SAP Host Agent

#### ⚠ Caution

You must install the instances and SAP Host Agent on a local disk.

## Procedure

1. [Run the software provisioning manager \[page 91\]](#) and on the *Welcome* screen, choose **>> <Product>**  
**> <Database> > SAP Systems > <System> > High-Availability System > Additional Cluster Node >**.

#### 📘 Note

If the software provisioning manager prompts you to log off from your system, log off and log on again.

2. Enter the required parameter values.

#### 📘 Note

For more information about the input parameters, position the cursor on the parameter and press **F1** in the software provisioning manager.

#### ⚠ Caution

Do not accept default values, as they may come from SAP systems that already exist on the cluster.

## Related Information

[Moving Cluster Groups, or Services and Applications, or Roles \[page 193\]](#)

## 8.4.5 Installing the Primary Application Server Instance

### Use

You have the following options to install the primary application server instance:

- You install the primary application server instance on a cluster node.
- You install the primary application server instance on a host outside of Microsoft Failover Cluster.

In this case, you have to install the database client software on this host.

## Procedure

1. Run the software provisioning manager [page 91] and on the *Welcome* screen, choose ► <Product> ► <Database> ► *SAP Systems* ► <System> ► *High-Availability System* ► *Primary Application Server Instance* ►.
2. If the software provisioning manager prompts you to log off, choose *OK* and log on again.
3. Follow the instructions in the software provisioning manager dialogs and enter the required parameter values.

### Note

- For more information about the input parameters, position the cursor on a parameter and press **F1** in the software provisioning manager.
- If you install the primary application server instance on a cluster node, make sure that on the screen *General SAP System Parameters* for the:
  - *Profile Directory*, you use the **UNC** path (not the local path) of the SAPGLOBALHOST host name, for example:, for example:  
\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile.  
If CSD option is used, the virtual host name of the SCS instance is the same as the SAPGLOBALHOST host name.  
If FSC option is used the virtual host name of the SCS instance is different from the SAPGLOBALHOST host name.

### Note

If you are installing a SAP NetWeaver 7.5 Process Integration (PI) system, make sure that the virtual host names for the ASCS instance and the SCS instance are different.

- *Installation Drive*, you choose the local disk where you want to install the primary application server instance.

4. Check that the primary application server instance is running.

## 8.4.6 Installing the Additional Application Server Instance

You have to install at least one additional application server instance for Microsoft Failover Clustering.

You have the following options, to install the additional application server instance:

- You install the additional application server instance on a cluster node.
- You install the additional application server instance on a host outside of the failover cluster.  
In this case, you have to install the database client software on this host.

## Procedure

1. Run the software provisioning manager [page 91] and on the *Welcome* screen, choose ► <Product> ► <Database> ► *SAP Systems* ► <System> ► *High-Availability System* ► *Additional Application Server Instance* ►.
2. If the software provisioning manager prompts you to log off, choose *OK* and log on again.
3. Follow the instructions in the software provisioning manager dialogs and enter the required parameter values.

### Note

- For more information about the input parameters, position the cursor on a parameter and press **F1** in the software provisioning manager.
- If you install the additional application server instance on a cluster node, make sure that on the screen *General SAP System Parameters* for the:
  - *Profile Directory*, you use the **UNC** path (not the local path) of the `SAPGLOBALHOST` host name, for example:  
`\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile.`  
If CSD option is used, the virtual host name of the SCS instance is the same as the `SAPGLOBALHOST` host name.  
If FSC option is used, the virtual host name of the SCS instance is different from the `SAPGLOBALHOST` host name.
  - *Installation Drive*, you choose the **local** disk where you want to install the additional application server instance.
  - *Additional application server instance*, you enter the **same** instance number as for the primary application server.

4. When you have finished, change the instance profile of the additional application server instance so that the number of its work processes equals the number of work processes of the primary application server instance.
5. If required, install more additional application server instances outside of the failover cluster.

### Note

Make sure that on the screen *General SAP System Parameters* for the *Profile Directory*, you use the UNC path of the **virtual** SCS host name, for example:

```
\\<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile.
```

In a HA-system, the virtual host name of the SCS instance is the same as the SAP global host name.

## 8.5 Post-Installation

To complete and check the installation of the SAP system for a high-availability configuration, you need to perform the following steps:

1. You install the permanent SAP licenses on all cluster nodes.
2. After a new installation of a clustered SCS instance, make sure that you update the `saprc.dll` (part of the `NTCLUST.SAR`) package in `c:\windows\system32` as soon as possible. For more information, see SAP Note [1596496](#).
3. For information about Rolling Kernel Switch on Windows Failover Clusters, see SAP Note [2199317](#).
4. You perform the post-installation checks for the enqueue replication server.  
For more information, see the SAP Library at:

SAP Release and SAP Library Quick Link	SAP Library Path (Continued)
<ul style="list-style-type: none"><li>• SAP NetWeaver 7.3 <a href="http://help.sap.com/nw73">http://help.sap.com/nw73</a></li><li>• SAP NetWeaver 7.3 including Enhancement Package 1 <a href="http://help.sap.com/nw731">http://help.sap.com/nw731</a></li></ul>	<p>▶ <i>Application Help</i> ▶ <i>Function-Oriented View</i> ▶ <i>Application Server</i> ▶ <i>Application Server Infrastructure</i> ▶ <i>Standalone Enqueue Server</i> ▶ <i>Installing the Standalone Enqueue Server</i> ▶ <i>Replication Server: Check Installation</i> ▶</p>
<ul style="list-style-type: none"><li>• SAP NetWeaver 7.4 <a href="http://help.sap.com/nw74">http://help.sap.com/nw74</a></li><li>• SAP NetWeaver 7.5 <a href="http://help.sap.com/nw75">http://help.sap.com/nw75</a></li></ul>	<p>▶ <i>Application Help</i> ▶ <i>Function-Oriented View</i> ▶ <i>Application Server</i> ▶ <i>Application Server Infrastructure</i> ▶ <i>Components of SAP NetWeaver Application Server</i> ▶ <i>Standalone Enqueue Server</i> ▶ <i>Installing the Standalone Enqueue Server</i> ▶ <i>Replication Server: Check Installation</i> ▶</p>

5. If required, you perform the general [post-installation steps \[page 112\]](#) listed in this guide.

## 8.6 Additional Information

The following sections provide additional information about:

- [Moving Cluster Groups, or Services and Applications, or Roles \[page 193\]](#)
- [Starting and Stopping the SAP System in a Microsoft Failover Cluster Configuration \[page 193\]](#).



## 8.6.1 Moving Cluster Groups, or Services and Applications, or Roles

### Use

When you reboot during the conversion to Microsoft Failover Clustering, cluster resources fail over to the other cluster node. Therefore, you have to return the system to the state it was in before the reboot, and move the resources back to the original node.

To move the database, or SCS from one cluster node to the other, you use the following:

To move the database, or ASCS from one cluster node to the other, you use either the Failover Cluster Manager tool or PowerShell.

#### Note

Microsoft changed the term “cluster groups” in the Failover Cluster Manager tool to Roles. If you use PowerShell, the term “cluster group” is still used for all cluster operations.

### Procedure

#### Moving Roles, or Services and Applications, or Groups

To move the roles or services and applications, proceed as follows:

- 1. To move a role, open PowerShell in elevated mode, and enter the following command:  
`move-clustergroup "<role name>"`
- 2. Repeat these steps for each role that you want to move.
- **Moving Roles or Cluster Groups**  
To move the roles proceed as follows:
  1. To move a role, open PowerShell in elevated mode, and enter the following command:  
`move-clustergroup -name "<role name>"`
  2. Repeat these steps for each role that you want to move. If you have more than 2 nodes in your cluster, you can specify the specific cluster node for the move:  
`move-clustergroup -name "<role name>" -Node "<cluster node name>" -Wait 0`

## 8.6.2 Starting and Stopping the SAP System in a Microsoft Failover Cluster Configuration

An SAP System in an HA configuration is typically configured into two HA groups: one cluster resource group contains the database resources, the other group contains the SAP SCS instance.

#### Note

When starting a whole SAP system, you first need to start the database instance and then the remaining SAP instances.

When stopping a whole SAP system, you first need first to stop all SAP instances and then the database instance.

With the *SAP MMC*, or *SAPControl* you can start and stop all SAP instances whether they are clustered or not, except the database instance.

With certain HA administration tools (*Cluster Administrator*, *Failover Cluster Manager*, or *PowerShell*), you can only start or stop clustered SAP instances, such as the SCS instance, or the database instance.

## Procedure

### Starting and Stopping a Complete System or a Single Instance with SAP MMC or SAPControl

With the *SAP MMC*, or the command line tool *SAPControl*, you can start or stop the complete SAP system or a single clustered or non-clustered SAP instance, except the database instance.

To start or stop the database instance, you have to use the tools described in "Starting and Stopping the clustered SCS and Database Instance".

For more information about *SAP MMC* or *SAPControl*, see [Starting and Stopping the SAP System \[page 151\]](#).

#### Note

- To use *SAP MMC* or *SAPControl* for starting or stopping a clustered SAP instance, the "SAP <SAPSID> <Instance\_Number> Service" resource of the clustered instance must be online. Therefore, SAP recommends keeping the "SAP <SAPSID> <Instance\_Number> Service" cluster resource always online, and using the *SAP MMC* or *SAPControl* to start or stop a clustered instance.
- You can also start *SAPControl* in the *PowerShell*.

### Starting and Stopping the clustered SCS and Database Instance

With certain HA administration tools, such as *PowerShell*, or *Failover Cluster Manager*, you can only start or stop clustered SAP instances, such as the SCS instance or the database instance. For all other non-clustered instances, such as additional application server instances or the primary application server instance, you must use the SAP MMC or *SAPControl*.

- Using *PowerShell*

To start or stop the clustered SCS instance or the database instance with *PowerShell* do the following:

1. To start the clustered database instance, open *PowerShell* in elevated mode, and enter the following command:  
**start-clusterresource <database resource>**
2. To start the clustered SCS instance, open *PowerShell* in elevated mode, and enter the following command:  
**start-clusterresource "SAP <SAPSID> <Instance\_Number> Instance"**
3. To stop the clustered SCS instance, open *PowerShell* in elevated mode, and enter the following command:  
**stop-clusterresource "SAP <SAPSID> <Instance\_Number> Instance"**
4. To stop the clustered database instance, open *PowerShell* in elevated mode, and enter the following command:  
**stop-clusterresource <database resource>**

- Using the *Failover Cluster Manager*  
 With the *Failover Cluster Manager*, you can only start or stop clustered instances such as the SCS instance or the database instance.  
 For all other non-clustered instances, such as additional application server instances or the primary application server instance, you must use the *SAP MMC* or *SAPControl*.  
 To start or stop the clustered SCS instance or the database instance with the *Failover Cluster Manager* do the following:
  1. Start the *Failover Cluster Manager* by choosing **Start > Administrative Tools > Failover Cluster Manager**.
  2. To start the database instance, right-click the database instance <Database\_Resource>, and choose *Bring this resource online*.
  3. To start the SCS instance, select the relevant service and application *SAP <SAPSID>*. In the right-hand pane, under *Other Resources*, right-click the resource *SAP <SAPSID> <Instance\_Number> Instance*, and choose *Bring this resource online*.
  4. To stop the SCS instance, select the relevant service and application *SAP <SAPSID>*. In the right-hand pane, under *Other Resources*, right-click the resource *SAP <SAPSID> <Instance\_Number> Instance*, and choose *Take this resource offline*.
  5. To stop the database instance, right-click the database instance <Database\_Resource>, and choose *Take this resource offline*.

# A Appendix

## A.1 Online Information from SAP

More information is available online as follows:

## A.2 Using PowerShell

SAP uses Windows PowerShell to run and describe Windows commands.

For Windows Server, SAP only uses Windows PowerShell to run and describe Windows commands.

Windows PowerShell is a powerful tool integrated in the Windows operating system. It uses object-oriented methodology, which allows fast and stable script development.

For more information about the Windows PowerShell, see:

<http://technet.microsoft.com/en-us/scriptcenter/dd742419.aspx> ➔

There you can find links to the online help, online documentation, scripting repository, downloads, and blogs.

If you want to use the PowerShell feature, note the following:

- Windows Server 2022  
Windows Server 2022 contains PowerShell 5.1  
You can update to PowerShell 5.1 (search the internet for *Windows Management Framework 5.1*).  
For more information, see SAP Note [3143497](#) ➔ and [Windows Management Framework \(WMF\) 5.x Release Notes](#) ➔
- Windows Server 2019  
Windows Server 2019 contains PowerShell 5.0  
You can update to PowerShell 5.0 (search the internet for *Windows Management Framework 5.0*).
- Windows Server 2016  
Windows Server 2016 contains PowerShell 5.0  
You can update to PowerShell 5.0 (search the internet for *Windows Management Framework 5.0*).
- Windows Server 2012 R2  
Windows Server 2012 R2 contains PowerShell 4.0.
- Windows Server 2012  
Windows Server 2012 contains PowerShell 3.0.  
You can update to PowerShell 4.0 (search the internet for *Windows Management Framework 4.0*).

## How to Work with PowerShell

Most commands that are used in `cmd.exe` are also available in the PowerShell (defined as aliases).

You can use well-known commands, such as `cd`, `type`, `copy`, `move`, `mkdir`, `delete`, `rmdir`. There is also online help available, which you can access by typing the command: `help` (or `help <command>`).

This is a list of differences between PowerShell and `cmd.exe`:

- Before you can run PowerShell scripts (text files with the file extension `.ps1` that contain PowerShell statements), you might have to change the default security setting to allow the execution of non-signed scripts as follows:  
`set-executionpolicy ("unrestricted")`
- By default, when double-clicking PowerShell scripts (`.ps1` files) in the Windows explorer, this does not execute the script as is the default for `.cmd` files, but opens the script in an editor. If you want to activate automatic script execution after a double-click, you have to change the value `HKEY_CLASSES_ROOT\Microsoft.PowerShellscript.1\Shell\Open\Command` from `notepad.exe` to the full path of the PowerShell executable.
- The output of PIPE commands is not just a stream of characters (strings) but a stream of objects. You can easily access the properties and methods for these objects (see the process list DLL example below).
- The current working directory is not part of the directory search path that the PowerShell looks at for scripts and programs. The PowerShell only searches directories listed in the environment variable `path`. Therefore, you might have to run a local program with `./sapcontrol.exe` or specify its full path.
- You can use the UNIX-like directory delimiters, such as `cd /usr/sap/C11`.
- You can have your current working directory in a UNC path (`cd \\sapglobalhost\sapmnt`).
- The shell distinguishes between environment variables and shell variables:
  - Use of shell variables:  
Definition: `$x="hello"`  
Reference: `write-host $x`
  - Use of an environment variable:  
Definition: `$env:x="hello"`  
Reference: `write-host $env:x`
- The PowerShell has an interesting container concept called `ps-drives`. Within `ps-drives` you can navigate in other objects, such as the registry or shell internal lists in the same way as you typically navigate in a file system (`cd`, `dir`, `del`, and so on).  
`dir env`: to get a list of environment variables  
`dir variable`: to get the list of shell variables  
`dir HKLM`: to get a list of registry keys in `HKEY_LOCAL_MACHINE`  
`get-psdrive` to get a list of available `ps-drives`
- Windows PowerShell has full access to the .NET runtime. You can directly access missing functions in the PowerShell via .NET.
- With Windows PowerShell, you can create GUI-class user interfaces using Windows forms.

## PowerShell Commands

The following table lists some PowerShell commands::



Command	Explanation
<code>stop-service sap*</code>	Stops all Windows services with service name starting with "SAP"
<code>get-process</code>	Lists currently started processes on your system
<code>get-process   sort starttime   select -last 1</code>	Lists the last started process on your computer
<code>get-process   sort starttime   select -last 1   format-list -proper *</code>	Lists all properties of the last started process
<code>get-process   sort starttime   select -last 1   get-member</code>	Lists all process class members (properties and methods) of the last started process
<code>get-process   % {\$_ .name; "-----"; \$_ .modules}</code>	Lists all processes, and the executables and DLLs the processes loaded
<code>\$processes = (get-process   sort starttime)</code>	Defines a shell variable <code>\$processes</code> , which contains an array of process objects
<code>\$processes.length</code>	The number of processes in the array (is equivalent to the number of processes on your computer)
<code>\$processes[\$processes.length-1].kill()</code>	Invokes the kill method (terminate process) of the last started process
<code>(dir a.txt).set_attributes("readonly")</code>	Sets the file <code>a.txt</code> to "read-only"

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