Installation of SAP Systems Based on the Application Server Java of SAP NetWeaver 7.02 on Windows: SAP Adaptive Server Enterprise
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Document History

Note

Before you start the implementation, make sure you have the latest version of this document, which is available at [https://support.sap.com/sitoolset](https://support.sap.com/sitoolset) » System Provisioning » Installation Option of Software Provisioning Manager ».

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

Table 1:

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>2012-12-17</td>
<td>First version for Software Provisioning Manager 1.0</td>
</tr>
<tr>
<td>1.1 - 1.3</td>
<td>2013-04-02 - 2013-10-28</td>
<td>Updated Versions: SL Toolset 1.0 SPS 07 - SPS 09</td>
</tr>
<tr>
<td>1.4</td>
<td>2014-03-17</td>
<td>Instead of a separate installation guide for each UNIX-based operating system, we now deliver a single installation guide for all UNIX-based operating systems. Sections that are only relevant for one or more operating systems are highlighted accordingly.</td>
</tr>
<tr>
<td>1.5 - 2.1</td>
<td>2014-07-07 - 2016-06-06</td>
<td>Updated Versions: SL Toolset 1.0 SPS 11 - SPS 17</td>
</tr>
</tbody>
</table>
| 2.2     | 2016-10-07 | Updated version for software provisioning manager 1.0 SP18 (SL Toolset 1.0 SP18):  
  - Support for synchronous, near-synchronous and asynchronous replication for SAP Business Suite on SAP ASE 16.0. For more information, see Disaster Recovery Setup with SAP Replication Server [page 116]. |
| 2.3     | 2017-02-06 | Updated version for software provisioning manager 1.0 SP19 (SL Toolset 1.0 SP19) |
| 2.4     | 2017-05-22 | Updated version for software provisioning manager 1.0 SP20 (SL Toolset 1.0 SP20)  
  - New Features:  
    - New SAPUI5-based user graphical interface (GUI) “SL Common GUI”, documented in: Prerequisites for Running the Installer, Running the Installer, Useful Information About the Installer |
<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>2017-09-11</td>
<td>Updated version for software provisioning manager 1.0 SP21 (SL Toolset 1.0 SP21)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• New Features:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Media Signature Check, documented in: New Features, Running the Installer, Preparing the Installation Media.</td>
</tr>
<tr>
<td>2.6</td>
<td>2018-01-15</td>
<td>Updated version for software provisioning manager 1.0 SP22 (SL Toolset 1.0 SP22)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• New Features:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Signature check for installation archives, documented in: New Features, Downloading SAP Kernel Archives (Archive-Based Installation) Archive-Based Installation for Diagnostics Agent, Downloading the SAP Kernel Archives Required for the Dual-Stack Split (Without Operating System and Database Migration), Downloading the SAP Kernel Archives Required for Operating System and Database Migration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ Installer Log Files Improvements, documented in: New Features, Useful Information about the Installer, Troubleshooting with the Installer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• New Features section restructured: As of SP22, a dedicated sub-section for each new SP has been created. New features below SP22 remain in a common table.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The Java SDT GUI - which was in the SP21 version still available in parallel to the SL Common GUI - has been deprecated with SP22. As of SP22, SL Common GUI is the only available installer GUI:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ The following sections which were explicitly related to Java SDT GUI were completely removed from this documentation: Performing a Remote Installation Remote Processing of the Installer (Java SDT GUI only), Starting the Java SDT GUI Separately, Running the Installer in Accessibility Mode (general accessibility information was moved to Useful Information About the Installer).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>○ The Java SDT GUI-specific information was removed from the common installer sections: Running the Installer, Useful Information About the Installer, Interrupted Processing of the Installer, Troubleshooting with the Installer, Deleting an SAP System or Single Instances</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• New section Using the Step State Editor (SAP Support Experts Only) added to section Additional Information About the Installer.</td>
</tr>
</tbody>
</table>
1 About this Document

This installation guide describes how to install an SAP system based on the application server Java of SAP NetWeaver 7.0 EHP2 using the installation tool Software Provisioning Manager 1.0 SP22 ("installer" for short), which is part of SL Toolset 1.0 SP22.

Note
SAP NetWeaver 7.0x Java Application Server reached end of maintenance by the end of 2017. SAP recommends upgrading to a more recent version. For more information, see SAP Note 1648480.

This guide covers the SAP system products and releases listed in SAP Note 1554717.

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

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 Virtualization Management. For more information, see SAP Note 1709155 and https://help.sap.com/lama.

Note
Note that for some products - such as SAP NetWeaver 7.0 - a complete system installation is only available for the highest support release. As for the lower support releases, only options for system copy and additional application server instances are provided.

Caution
Make sure you have read the Before You Start [page 10] section before you continue with this installation guide.

Related Information

Naming Conventions [page 9]
Constraints [page 10]
Before You Start [page 10]
SAP Notes for the Installation [page 10]
New Features [page 12]
1.1 Naming Conventions

- 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 53].
  This way, you automatically get the latest version with the latest fixes of the tool and supported processes. For more information about Software Provisioning Manager 1.0 as well as products and releases supported by it, see SAP Note 1680045 and http://scn.sap.com/docs/DOC-30236.
  “SAPinst” has been renamed to “Software Provisioning Manager” (“installer” for short) in this documentation, but the terms “SAPinst” and “sapinst” are still used in:
  - The name of the technical framework of Software Provisioning Manager. For more information about the SAPinst Framework, see SAP Note 2393060.
  - Texts and screen elements in the Software Provisioning Manager GUI
  - Names of executables, for example sapinst.exe
  - Names of command line parameters, for example SAPINST_USE_HOSTNAME
- “installer” refers to Software Provisioning Manager.
- “SAP system” refers to SAP system based on the application server of SAP NetWeaver 7.0 / 7.0 including Enhancement Package 1 / 7.0 including Enhancement Package 2 / 7.0 including Enhancement Package 3.
- “Java system” refers to SAP system based on the application server Java of SAP NetWeaver 7.0 / 7.0 including Enhancement Package 1 / 7.0 including Enhancement Package 2.
- “Diagnostics” refers to diagnostics in SAP Solution Manager.
- “Diagnostics Agent” refers to the agent of diagnostics in SAP Solution Manager.
- Operating System Names
  In this document, “Windows Server 2008 (R2) or Windows Server 2012 (R2)” – with (R2) written in parentheses – means that the information applies to both Windows Server 2008 and Windows Server 2008 R2, or Windows Server 2012 and Windows Server 2012 R2.

Profiling for High Availability

Only valid for ‘High Availability’: HA (Windows)

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

End of ‘High Availability’: HA (Windows)

Only valid for Microsoft Failover Clustering: As of Windows Server 2008 the cluster feature is called Failover Clustering. For practical reasons we are continuing to use the previous terminology Microsoft Cluster Service and abbreviation MSCS in some sections of this guide and the corresponding installation documentation of your release.
1.2 Constraints

You need to consider the following constraints before you start your installation:

- Your operating system platform must be 64-bit.
- The SAP Adaptive Server Enterprise Cluster Edition is not supported.
- Raw devices are not supported.
- Multiple SAP systems on one host are not supported.

1.3 Before You Start

Make sure that you have read the Master Guide for your SAP Business Suite application or SAP NetWeaver application and release 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 the Master Guide in your installation package or you can download the latest version from http://help.sap.com.

The following table lists the Master Guides of the SAP system applications for which you can use this installation guide, along with the available quick link or path to the appropriate download location:

<table>
<thead>
<tr>
<th>Title</th>
<th>Internet Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;Including Enhancement Package&gt;</td>
</tr>
<tr>
<td></td>
<td>Installation and Upgrade</td>
</tr>
</tbody>
</table>

1.4 SAP Notes for the Installation

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.
Table 3: SAP Notes for the Installation

<table>
<thead>
<tr>
<th>SAP Note Number</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1680045</td>
<td>Release Note for Software Provisioning Manager 1.0</td>
<td>Software provisioning manager 1.0 with installation and system copy for SAP NetWeaver-based systems</td>
</tr>
<tr>
<td>1718413</td>
<td>Inst. SAP Systems Based on SAP NetWeaver 7.0 incl. EHPs: Windows</td>
<td>Windows-specific information about the SAP system installation and corrections to this documentation.</td>
</tr>
<tr>
<td>1732161</td>
<td>SAP Systems on Windows Server 2012 (R2)</td>
<td>Windows Server 2012 (R2)-specific information for the SAP system installation</td>
</tr>
<tr>
<td>1554717</td>
<td>Planning Information for SAP Applications on SAP ASE</td>
<td>SAP release information for customers deploying SAP applications on SAP ASE</td>
</tr>
<tr>
<td>1558958</td>
<td>SYB: DBA Cockpit Correction Collection SAP Basis 7.02/7.03</td>
<td>The implementation of SAP Note 1558958 directly after the installation is strongly recommended.</td>
</tr>
<tr>
<td>1585981</td>
<td>SYB: Backup Instructions for SAP on SAP ASE</td>
<td>Information about backup and recovery</td>
</tr>
<tr>
<td>1650511</td>
<td>SYB: High Availability Offerings with SAP ASE</td>
<td>Information about high availability cluster solutions for SAP ASE</td>
</tr>
<tr>
<td>73606</td>
<td>Supported Languages and Code Pages</td>
<td>Information on possible languages and language combinations in SAP systems</td>
</tr>
<tr>
<td>737368</td>
<td>Hardware requirements of Java Development Infrastructure</td>
<td>Information on the hardware requirements for usage type Development Infrastructure (DI), which depends on the size of your development team.</td>
</tr>
<tr>
<td>1067221</td>
<td>Composite SAP Note for heterogeneous installation</td>
<td>This SAP Note and its related SAP Notes describe the released operating system and database combinations for heterogeneous SAP systems landscapes.</td>
</tr>
<tr>
<td>2384179</td>
<td>Planned support of Windows Server 2016 for SAP products</td>
<td>Support of Windows Server 2016 specific for SAP Products information for the SAP system information.</td>
</tr>
</tbody>
</table>
1.5 New Features

The sections below provide an overview of the new features in Software Provisioning Manager 1.0 (the “installer” for short).


New Features - Software Provisioning Manager 1.0 SP22 [page 12]
The table in this section provides an overview of the new features in Software Provisioning Manager 1.0 available as of SP22 (SL Toolset 1.0 SP22).

New Features - Software Provisioning Manager 1.0 SP21 and Lower [page 12]
The table in this section provides an overview of the new features in Software Provisioning Manager 1.0 available as of SP21 (SL Toolset 1.0 SP21) and lower.

1.5.1 New Features - Software Provisioning Manager 1.0 SP22

The table in this section provides an overview of the new features in Software Provisioning Manager 1.0 available as of SP22 (SL Toolset 1.0 SP22).


Table 4:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installer Log Files Improvements</td>
<td>Installer log files are now available immediately after the installer has been started, that is before a product has been selected on the Welcome screen. For more information, see Useful Information About the Installer [page 66] and Troubleshooting with the Installer [page 72].</td>
</tr>
</tbody>
</table>

1.5.2 New Features - Software Provisioning Manager 1.0 SP21 and Lower

The table in this section provides an overview of the new features in Software Provisioning Manager 1.0 available as of SP21 (SL Toolset 1.0 SP21) and lower.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media Signature Check</td>
<td>The signature of media is checked automatically by the installer during the</td>
<td>Software Provisioning Manager 1.0 SP21 (SL Toolset 1.0 SP21)</td>
</tr>
<tr>
<td></td>
<td><em>Define Parameters</em> phase while processing the <em>Media Browser</em> screens. As of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>now the installer only accepts media whose signature has been checked. See</td>
<td></td>
</tr>
<tr>
<td></td>
<td>also the description of this new security feature in SAP Note 2393060.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For more information, see <em>Preparing the Installation Media</em> [page 53] and</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Running the Installer</em> [page 62].</td>
<td></td>
</tr>
<tr>
<td>SL Common GUI with SAPINST 7.49</td>
<td>With the new installer framework version SAPINST 7.49, you can now use the</td>
<td>Software Provisioning Manager 1.0 SP20 (SL Toolset 1.0 SP20)</td>
</tr>
<tr>
<td></td>
<td>new SAPUI5-based graphical user interface (GUI) “SL Common GUI”. For</td>
<td></td>
</tr>
<tr>
<td></td>
<td>more information, see <em>Useful Information About the Installer</em> [page 66].</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Running the Installer</em> [page 62].</td>
<td></td>
</tr>
<tr>
<td>Verification of Integrity of</td>
<td>The integrity of data units extracted from the Software Provisioning Manager</td>
<td>Software Provisioning Manager 1.0 SP19 (SL Toolset 1.0 SP19)</td>
</tr>
<tr>
<td>Data Units in Software</td>
<td>archive is verified. For more information, see *Downloading and Extracting</td>
<td></td>
</tr>
<tr>
<td>Provisioning Manager</td>
<td>the Software Provisioning Manager 1.0 Archive* [page 54]. In addition, check</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAP Note 1680045 whether additional information is available.</td>
<td></td>
</tr>
<tr>
<td>Diagnostics Agent</td>
<td>The Diagnostics Agent is no longer installed automatically with the SAP</td>
<td>Software Provisioning Manager 1.0 SP10 (SL Toolset 1.0 SP16)</td>
</tr>
<tr>
<td></td>
<td>system. The <em>Install Diagnostics Agent</em> check box on the *Install Diagnostics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agent* screen is no longer available.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>You now have to install the Diagnostics Agent always separately. We</td>
<td></td>
</tr>
<tr>
<td></td>
<td>recommend that you install it prior to the installation of your SAP system(s).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For more information, see the Diagnostics Agent Installation Strategy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>attached to SAP Note 1365123, to SAP Note 1833501, and to SAP Note 1858920</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and the attached Diagnostics Agent Setup Guide.</td>
<td></td>
</tr>
<tr>
<td>Windows Domain Organizational</td>
<td>You can now specify an optional organizational unit (OU) within the Windows</td>
<td>Software Provisioning Manager 1.0 SP09 (SL Toolset 1.0 SP14)</td>
</tr>
<tr>
<td>Units</td>
<td>domain where you want the installer to create the SAP system accounts.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For more information, see <em>SAP System Parameters</em> [page 32]</td>
<td></td>
</tr>
<tr>
<td>Feedback Evaluation Form</td>
<td>SAP SE’s aim is to provide fast and efficient procedures. To evaluate the</td>
<td>Software Provisioning Manager 1.0 SP07 (SL Toolset 1.0 SP12)</td>
</tr>
<tr>
<td>available in the Software</td>
<td>procedure you just carried out, we need information generated by the tool</td>
<td></td>
</tr>
<tr>
<td>Provisioning Manager:</td>
<td>during process execution and your experience with the tool itself. A new</td>
<td></td>
</tr>
<tr>
<td></td>
<td>evaluation form contains a simple questionnaire and XML data generated during</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the procedure. Port 4239 is used for displaying the feedback evaluation form.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For more information, see the <em>Prerequisites</em> section in *Running the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Installer* [page 62].</td>
<td></td>
</tr>
</tbody>
</table>
2 Installation Options Covered by this Guide

This section shows the installation options covered by this 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.

Related Information

Central System [page 14]
Distributed System [page 15]
Dialog Instance [page 16]
SAP Host Agent as a Separate Installation [page 18]

2.1 Central System

You can install a central system on a single host.

**Note**

You can install the following optional standalone units only as a central system, but not as a distributed or high-availability system:

- Application Sharing Server
- J2EE Adapter Engine
- Partner Connectivity Kit

These are the following instances:

- Central services instance (SCS instance)
- Database instance (DB instance)
- Central instance

Additionally, you can install one or more dialog instances. For more information, see Dialog Instance [page 16].

The following figure shows an example of SAP instances in a central system.
2.2 Distributed System

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

These are the following instances:

- Central services instance (SCS instance)
- Database instance (DB instance)
- Central instance

Optionally, you can install one or more dialog instances. For more information, see Installation of a Dialog Instance [page 16].

**Note**

You can install the following **optional standalone units** only as a central system [page 14], but not as a distributed or high-availability system:

- Application Sharing Server
- J2EE Adapter Engine
- Partner Connectivity Kit

The following figure assumes the following:

- The central instance runs on a separate host.

**Note**

You can also install the central instance on the SAP global host.

- The SCS instance runs on the SAP global host.
- The transport directory resides on a separate SAP transport host.
2.3 High Availability System

This topic is only valid for ‘High Availability’: HA (Windows)

For more information about the system components you have to install and how to distribute them on the specific hosts, see System Configuration in Microsoft Failover Clustering (page 120).

Note

You can install the following optional standalone units only as a central system [page 14], but not as a distributed or high-availability system:

- Application Sharing Server
- J2EE Adapter Engine
- Partner Connectivity Kit

End of ‘High Availability’: HA (Windows)

2.4 Dialog Instance

You can install one or more dialog instances for an existing SAP system. Dialog instances are optional and can be installed on separate hosts.
A dialog instance can run on:

- The host of any instance of the existing SAP system
- On a dedicated host

**Note**

We do not recommend installing dialog instances on the SAP global host.

If you want to install a dialog 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].

**Note**

If you install a dialog instance in an existing non-Unicode system (that has been upgraded to the current release), the dialog instance is automatically installed as a non-Unicode instance. The installer determines if a non-Unicode system exists and chooses the correct executables for the system type.

### Dialog Instance for a Central System

The following figure shows dialog instances that are running on dedicated hosts.

![Figure 3: Dialog Instance for a Central Java System](image)

For more information, see Central System [page 14].

### Dialog Instance for a Distributed System

The following figure shows dialog instances that are running on dedicated hosts.
Dialog Instance for a High-Availability System

In a high-availability system, you require at least one dialog instance apart from the central instance. For more information about how to install and distribute the application servers in an HA configuration, see System Configuration in Microsoft Failover Clustering [page 120].

2.5 SAP Host Agent as a Separate Installation

Under certain circumstances you need to install SAP Host Agent separately.

SAP Host Agent is an agent that can accomplish several life-cycle management tasks, such as operating system monitoring, database monitoring, system instance control and provisioning. When you install a new SAP system or instance, the SAP Host Agent is in most cases installed automatically on the SAP system or instance host.

It is only required to install the SAP Host Agent separately if one of the following is true:

- There is no SAP system or instance on the host.
• The SAP system or instance running on the host has a kernel release lower than SAP kernel 7.20 and the host does not yet have an SAP Host Agent. During the installation of new SAP instances with SAP kernel 7.20 or higher, the SAP Host Agent is installed automatically (integrated installation).

• You have upgraded your SAP system to a release with a kernel release lower than SAP kernel 7.20 and the host of the upgraded system or instance does not yet have an SAP Host Agent.

The section Installing the SAP Host Agent Separately [page 163] describes how to perform the installation.
3  Planning

3.1  Planning Checklist

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

- Central, distributed, or high-availability system
- Dialog 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 10].
2. You have decided on your installation option (see Installation Options Covered by this Guide [page 14]).

Central, Distributed, or High-Availability System

Note

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

You can install the optional standalone units J2EE Adapter Engine, Partner Connectivity Kit, Application Sharing Server only as a central system.

1. You check the hardware and software requirements for each installation host.
2. You plan how to set up user and access management [page 30].
3. You identify Basic SAP System Installation Parameters [page 30].
4. You decide whether you want to perform a domain or local installation [page 43].
5. You plan the setup of your database layout.
6. You decide on the transport host to use [page 44].
7. 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 118].
End of ‘High Availability': HA (Windows)
8. Continue with Preparation [page 46].
**3.2 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](http://support.sap.com/pam) for supported operating system releases.
2. Check the hardware and software requirements using:
   - The Prerequisite Checker in one of two modes:
     - Standalone mode (optional) before the installation process
       For more information, see Running the Prerequisite Checker Standalone [page 22].
     - Integrated in the installer (mandatory) during the installation process
       For more information, see Running the Installer [page 62].
   - The hardware and software requirements tables in Requirements for the SAP System Hosts [page 23]
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:

**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

3.2.1 Running the Prerequisites Check in Standalone Mode (Optional)

When you install an SAP system, the installer automatically starts the prerequisites check, which 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 (OS) and the SAP instances before the actual installation.

Context

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 1.0 archive to a local directory and make the SAP kernel media available as described in Preparing the Installation Media [page 53].
2. Start the installer as described in Running the Installer [page 62].
3. On the Welcome screen, choose <Product> > Software Life-Cycle Options > Additional Preparation Options > Prerequisites Check.
4. Follow the instructions in the installer dialogs and enter the required parameters.

Note

For more information about each parameter, position the cursor on the parameter field and choose F1 in the installer.

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.

5. 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.

### 3.2.2 Requirements for the SAP System Hosts

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

- ABAP central services instance (ASCS)
- Enqueue Replication Server instance (ERS)
- Central services instance (SCS)
- Database instance
- Central instance
- Dialog instance

**Note**

The dialog instance is optional in a non-HA system, but mandatory in an HA system.

- SAP Host Agent

Only valid for ‘High Availability’: HA (Windows)

### General Requirements for a High-Availability System

- **Windows Server 2012 (R2) and higher:**
  1. Check that your cluster hardware is certified for Windows Server 2012 (R2) or Windows Server 2016 and has the Windows Server 2012 (R2) or Windows Server 2016 logo.
  2. 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.

- **Windows Server 2008 (R2):**
  1. Check that your cluster hardware is certified for Windows Server 2008 (R2) and has the Windows Server 2008 (R2) logo.
  2. You must validate your failover cluster configuration by running the *Validate a Configuration Wizard*, which is included in the *Failover Cluster Management* snap-in. This 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 shared disks that can be reached by the cluster nodes via a shared bus.**
The database software is stored on a shared disk. One of the shared disks must be used exclusively by the quorum (if a single quorum device cluster is used) that stores the cluster registry and records information about the state of the cluster. 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 127].

- 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.

---

**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.

- **i 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 Microsoft 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 and database versions for your SAP product, see the **Product Availability Matrix (PAM)** at: [http://support.sap.com/pam](http://support.sap.com/pam).
### Table 6: Hardware Requirements

<table>
<thead>
<tr>
<th>Hardware Requirement</th>
<th>Requirement</th>
<th>How to Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum disk space</td>
<td>• Central services instance (SCS) (not including paging file): 5 GB (x64)</td>
<td>To check disk space:</td>
</tr>
<tr>
<td></td>
<td>• Database instance</td>
<td>• Windows Server 2012 (R2) and higher:</td>
</tr>
<tr>
<td></td>
<td>For more information about the required disk space, see SAP Note 1799291</td>
<td>1. Open PowerShell in elevated mode, and enter the following command:</td>
</tr>
<tr>
<td></td>
<td>Only valid for ‘High Availability’: HA (Windows)</td>
<td>get-volume</td>
</tr>
<tr>
<td></td>
<td>High Availability only: Enqueue replication server instance (ERS) (not including paging file): 5 GB (x64)</td>
<td>2. Check the value SizeRemaining of the disk you want to install on.</td>
</tr>
<tr>
<td></td>
<td>End of ‘High Availability’: HA (Windows)</td>
<td>• Windows Server 2008 (R2):</td>
</tr>
<tr>
<td></td>
<td>• Central instance (not including paging file): 5 GB (x64)</td>
<td>1. Choose Start ➤ All Programs ➤ Administrative Tools ➤ Storage ➤</td>
</tr>
<tr>
<td></td>
<td>In addition, you require 4 GB (x64) per additional platform.</td>
<td>Computer Management ➤ Disk Management ➤</td>
</tr>
<tr>
<td></td>
<td>Up to 2 GB for each usage type or software unit you want to install.</td>
<td>2. Right-click the drive and choose Properties.</td>
</tr>
<tr>
<td></td>
<td>• Dialog instance (not including paging file): 2.5 GB (x64)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SAP Host Agent: 256 MB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Temporary disk space for every required installation medium that you have to copy to a local hard disk: Up to 6 GB</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardware Requirement</td>
<td>Requirement</td>
<td>How to Check</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------</td>
<td>--------------</td>
</tr>
</tbody>
</table>
| Minimum RAM           | ● All instances, except SAP Host Agent: 4 GB  
● SAP Host Agent: 0.5 GB | To check RAM:  
● Windows Server 2012 (R2) and higher:  
Open PowerShell in elevated mode, and enter the following command:  
`Get-WmiObject Win32_ComputerSystem`  
● Windows Server 2008 (R2):  
Choose "Start" > "Control Panel" > "System"  

**Note**  
If `System` is not visible, change `View by:` from `Category` into `Large icons`.  

If you want to install usage type BI Java, see SAP Note 927530 for current information on hardware sizing.
<table>
<thead>
<tr>
<th>Hardware Requirement</th>
<th>Requirement</th>
<th>How to Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paging file size</td>
<td>For more information, see SAP Note 1518419.</td>
<td>If you want to install usage type BI Java, see SAP Note 927530 for current information on hardware sizing. To check paging file size:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Windows Server 2012 (R2) and higher: For more information, see Checking and Changing the Paging File Settings on Windows Server 2012 (R2) [page 155]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If System is not visible, change View by: from Category into Large icons.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Choose Advanced system settings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. In section Performance, select Settings... &gt; Advanced.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. If required, in section Virtual memory, choose Change.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Do not select Automatically managed paging file size for all drives.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Only valid for 'High Availability': HA (Windows)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High Availability only: You must adjust the size of the paging file on all cluster nodes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>End of 'High Availability': HA (Windows)</td>
</tr>
<tr>
<td>Hardware Requirement</td>
<td>Requirement</td>
<td>How to Check</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Processing units</td>
<td>For application server instances and database instances:</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>The number of physical or virtual processing units usable by the operating system image must be equal to or greater than 2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For an SCS instance running on a separate host:</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>One physical or virtual processing unit usable by the operating system image might be sufficient.</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Examples of processing units are processor cores or hardware threads (multithreading).</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>In a virtualized environment, ensure that adequate processor resources are available to support the workloads of the running SAP systems.</td>
<td>–</td>
</tr>
<tr>
<td>Suitable backup system</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Software Requirement</td>
<td>Requirement</td>
<td>How to Check</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Windows operating system</td>
<td>● <strong>64-bit version</strong> of one of the following Windows Server Editions of a supported Windows operating system:</td>
<td>To check your Windows version:</td>
</tr>
<tr>
<td></td>
<td>○ Windows Server 2012 (R2) and higher:</td>
<td>• Windows Server 2012 (R2) and higher: Open PowerShell in elevated mode, and enter the following command: Get-WmiObject Win32_OperatingSystem</td>
</tr>
<tr>
<td></td>
<td>○ Windows Server Standard Edition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Windows Server 2008 (R2) Service Pack 1:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Only valid for &quot;High Availability&quot;: non-HA Windows Server Standard Edition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Only valid for &quot;High Availability&quot;: HA (Windows) Windows Server Datacenter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Windows Server Enterprise Edition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>○ Windows Server Datacenter Edition</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Caution</strong> Make sure that you install the <strong>English</strong> language pack so that your support requests can be handled quickly.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• For any version of Windows Server, you need the latest supported service pack</td>
<td></td>
</tr>
<tr>
<td>Windows regional settings</td>
<td><strong>English (United States)</strong> must be set by default. For more information about localized Windows versions, see SAP Note 362379.</td>
<td>Choose <strong>Start ➤ Control Panel ➤ Clock, Language, and Region ➤ Language</strong>.</td>
</tr>
<tr>
<td></td>
<td>You can install additional languages but the default setting for new users must always be <strong>English (United States)</strong>.</td>
<td></td>
</tr>
<tr>
<td>Minimum Web Browser</td>
<td>Make sure that you have at least one of the following web browsers installed on the host where you run the installer GUI:</td>
<td>Choose <strong>Start ➤ Control Panel ➤ Programs and Features</strong>.</td>
</tr>
<tr>
<td></td>
<td>● Microsoft Internet Explorer 11 or higher</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Microsoft Edge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Mozilla Firefox</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Google Chrome</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Always use the latest version of these web browsers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>You need a web browser to be able to run the SL Common GUI, and to display the Evaluation Form and send it to SAP.</td>
<td></td>
</tr>
</tbody>
</table>
3.3 Planning User and Access Management

You have to plan how you want to configure user and access management for your 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

**Note**

If you want to install the J2EE Adapter Engine as an optional standalone unit, you have to configure the User Management Engine (UME) for the ABAP UME of the SAP NetWeaver Process Integration (PI) system.

- Use an LDAP directory as the data source for user data.
  
  You cannot configure the AS Java to access an LDAP directory and an AS ABAP as the data source simultaneously. 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 60]

**More Information**

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


3.4 Basic Installation Parameters

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

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

- **Typical**
If you choose Typical, you perform the installation with default settings. This means that the installer prompts you only for a small selection of input parameters. These parameters include at least the following:

- SAP System ID and Database Connectivity Parameters
- SAP system profile directory – only for systems with instances on separate hosts
- Master password
- System Landscape Directory (SLD) destination

For more information about the 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.

**Recommendation**

If you want to configure the user management of your SAP system for an external ABAP system, as described in Preparing an External ABAP System as Source for User Data [page 157], we recommend that you select the Custom parameter mode. When you do this, you are prompted to select the appropriate option and to enter the required parameters.

If you do not choose the Custom parameter mode, you have to change the required 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 system parameters that you need to specify before installing your SAP system. For all other installation parameters, use the tool help on the installer screens.

**Related Information**

- SAP System Parameters [page 32]
- SAP System Database Parameters [page 43]
3.4.1 SAP System Parameters

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

Table 8: General Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unicode System</td>
<td>A Java standalone system is always a Unicode system.</td>
</tr>
<tr>
<td>SAP System ID &lt;SAPSID&gt;</td>
<td>The SAP System ID &lt;SAPSID&gt; identifies the whole SAP system.</td>
</tr>
</tbody>
</table>

⚠️ Caution

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

Make sure that your SAP system ID:

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

Example

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 <SAPSID> that is different from the <SAPSID> of the existing ABAP system. The <SAPSID> of a Java stack can only be equal to the <SAPSID> of an ABAP stack if they form a dual-stack system.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP System Instance Numbers</td>
<td>Technical identifier for internal processes. It consists of a two-digit number from 00 to 97. The instance number must be unique on a host. That is, if more than one SAP instance is running on the same host, these instances must be assigned different numbers. If you do not enter a specific value, the instance number is set automatically to the next free and valid instance number that has not yet been assigned to the SAP system to be installed or to SAP systems that already exist on the installation host.</td>
<td>Only valid for 'High Availability': HA (Windows) 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. 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.</td>
</tr>
<tr>
<td>SAP System Profile Directory</td>
<td>&lt;SAPGLOBALHOST&gt;\sapmnt&lt;SAPSID&gt;\SYS\profile The installer retrieves parameters from the SAP system profile directory of an existing SAP system. SAP profiles are operating system files that contain instance configuration information. The installer prompts you to enter the location of the profile directory when the installation option that you execute is not the first one belonging to your SAP system installation, for example if you are installing a distributed system or a dialog instance to an existing SAP system. See also the description of the parameters SAP System ID and Database ID.</td>
<td><strong>Caution</strong></td>
</tr>
<tr>
<td>Parameter</td>
<td>Definition</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Master Password</td>
<td>Common password for all users created during the installation:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>If a user already exists, you are prompted to confirm the password for this user.</td>
<td></td>
</tr>
<tr>
<td><strong>Basic Password policy</strong></td>
<td>The master password must meet the following requirements:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- It must be 8 to 14 characters long</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- It must contain at least one letter (a-z, A-Z)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- It must contain at least one digit (0-9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- It must not contain \ (backslash) or &quot; (double quote).</td>
<td></td>
</tr>
<tr>
<td><strong>Additional restrictions</strong></td>
<td>Depending on Windows:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- If a user already exists, you are prompted to confirm the password for this user.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Depending on the configuration of the password policy, additional restrictions might apply.</td>
<td></td>
</tr>
<tr>
<td><strong>Additional restrictions</strong></td>
<td>Depending on SAP Adaptive Server Enterprise:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- It must be at least 6 characters long</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- It can only contain the following characters: <code>a-zA-Z, 0-9, &lt;space&gt;, !#$%&amp;'()* +,-/:&lt;==&gt;?@[\]^_</code>{</td>
<td>}~`</td>
</tr>
<tr>
<td></td>
<td>Depending on the installation option, additional restrictions may apply.</td>
<td></td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td>The master password must not contain the name of a Java user created during the installation.</td>
<td></td>
</tr>
<tr>
<td><strong>Key Phrase for Secure Store</strong></td>
<td>This is a random word or phrase that is used to encrypt the secure store.</td>
<td></td>
</tr>
<tr>
<td>Settings</td>
<td>The J2EE engine uses this phrase to generate the key that is used to encrypt the data.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The uniqueness of the phrase you use contributes to the uniqueness of the resulting key.</td>
<td></td>
</tr>
<tr>
<td><strong>Recommendation</strong></td>
<td>Use a long key phrase that cannot be guessed easily. Use both uppercase and lowercase letters in the phrase and include special characters.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>If you choose Typical mode, the installer 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 Parameter Summary screen or after the installation has finished.</td>
<td></td>
</tr>
</tbody>
</table>
**Parameter** | **Definition**
--- | ---
**DNS Domain Name for SAP System**  
If you want to use HTTP-based URL frameworks such as Web Dynpro applications, you have to specify the DNS domain name for the SAP system.  
The DNS Domain Name is used to calculate the Fully Qualified Domain Name (FQDN), which is configured in profile parameter `SAPLOCALHOSTFULL`. FQDN is the fully qualified domain name for an IP address. It consists of the host name and the domain name: `<Host_Name>.<Domain_Name>`  
The DNS Domain Name is needed to define the URLs for the Java application servers. It is appended to the server name to calculate the FQDN.  
For more information, see SAP Note [654982](https://support.sap.com/).

**Example**

If your application server host is called `kirk.wdf.sap.com`, the DNS Domain Name is `wdf.sap.com`.

| **Path to SAPCRYPT0.SAR** | The SAP Cryptographic Library is required to enable Secure Sockets Layer (SSL) encryption of HTTP connections. In most cases it is installed automatically from the kernel medium. In case it is not installed automatically and you are prompted for it during the installation, you can download it as described in SAP Note [455033](https://support.sap.com/).

This software product is subject to export control regulations in Germany as the country of origin and import regulations of your own country. SAP may not yet have a corresponding export license for your user or company. Contact the contract department in your local SAP company. To download the SAP Cryptographic Software from the SAP Service Marketplace, you need a customer user ID. Before any transfer of these software products to persons, companies or other organizations outside your company, in particular in the case of any re-export of the software products, authorization is required from the German export control authorities. This might also be required from your responsible national export control authorities. This also applies to transfers to affiliated companies. Corresponding laws and regulations in the recipient country may also exist which restrict the import or the use of these software products. |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java Message Server Port</td>
<td>☢️ Caution</td>
</tr>
<tr>
<td></td>
<td>The message server port number must be unique on the host where the message server for the SAP system is running. If there are several message servers running on one host, the message server ports must all be unique.</td>
</tr>
<tr>
<td></td>
<td>The SCS instance profile contains the configuration for the Java message server.</td>
</tr>
<tr>
<td></td>
<td>The Java message server port uses the parameter <code>rdisp/msserv_internal</code> with default value <code>39&lt;Instance_Number_Of_SCS_Message_Server_Instance&gt;</code>.</td>
</tr>
<tr>
<td></td>
<td>For more information about the parameters used for message server ports, see SAP Note 821875.</td>
</tr>
</tbody>
</table>
### Table 10: Operating System Users

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Password of Operating System Users</td>
<td>The passwords of the operating system users must comply with the Windows password policy. The installer processes the passwords of operating system users as follows:</td>
</tr>
<tr>
<td></td>
<td>• If the operating system users do not exist, the installer creates the following users:</td>
</tr>
<tr>
<td></td>
<td>○ <code>&lt;sapsid&gt;adm</code></td>
</tr>
<tr>
<td></td>
<td>This user is the SAP system administrator user and is a member of the local Administrators group.</td>
</tr>
<tr>
<td></td>
<td>○ <code>sapadm</code></td>
</tr>
<tr>
<td></td>
<td>The SAP Host Agent user <code>sapadm</code> is used for central monitoring services. The installer creates this user by default as a local user without being a member of the local Administrators group.</td>
</tr>
<tr>
<td></td>
<td>If required, you can change this user to become a domain user on the Parameter Summary screen. For more information, see Performing a Domain Installation Without Being a Domain Administrator [page 153].</td>
</tr>
<tr>
<td></td>
<td>For security reasons, however, SAP strongly recommends to create this user as a local user.</td>
</tr>
<tr>
<td></td>
<td>The installer sets the master password for these users by default. You can overwrite and change the passwords either by using the parameter mode Custom or by changing them on the Parameter Summary screen.</td>
</tr>
<tr>
<td></td>
<td>• If the operating system users already exist, the installer prompts you for the existing password, except if the password of these users is the same as the master password.</td>
</tr>
</tbody>
</table>

**Note**

This does not apply if the `<dasid>adm` user already exists. The installer prompts you for the password even if the password of this user is the same as the master password.

**Caution**

Make sure that you have the required user authorization [page 50] for these accounts before you start the installation with the installer.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows Domain Organizational Units</td>
<td>You can choose the organizational units (OUs) within the Windows domain where you want to create the SAP system accounts. By default, the installer creates the domain users SAPService(&lt;\text{SAPSID}&gt;), (&lt;\text{SAPSID}&gt;\text{adm}), and the domain group (\text{SAP}_{\langle\text{SAPSID}\rangle}\text{Globaladmin}) in the domain Users container. Here you can specify an optional organizational unit where the installer creates these domain users and group. The user who performs the installation needs read and write permissions to this organizational unit. The OU feature is only available when you select Custom mode in SWPM and choose Use Domain of current user. For more information, see SAP Note 2247673.</td>
</tr>
</tbody>
</table>
Table 11: User Management Engine Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>UME Configuration</td>
<td>You are prompted for how to configure the UME during the input phase of the installation. You can choose between the following options:</td>
</tr>
<tr>
<td></td>
<td>●  <strong>Use Java database (default)</strong></td>
</tr>
<tr>
<td></td>
<td>○ If you choose this option, administrators can manage users and groups with the UME Web admin tool and SAP NetWeaver Administrator only.</td>
</tr>
<tr>
<td></td>
<td>○ For LDAP, use this configuration for the installation and change the configuration to LDAP after the installation (see Configuring User Management to Use an LDAP Directory [page 85]).</td>
</tr>
<tr>
<td></td>
<td>●  <strong>Use ABAP</strong></td>
</tr>
<tr>
<td></td>
<td>○ 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 UME Web admin tool and SAP NetWeaver Administrator.</td>
</tr>
<tr>
<td></td>
<td>○ Make sure that you have created the required users manually on the external ABAP system before you choose this option (see Preparing an External ABAP System as Source for User Data [page 157]).</td>
</tr>
<tr>
<td></td>
<td><strong>Recommendation</strong> Select the <strong>Custom</strong> parameter mode. When you do this, you are prompted to select the appropriate option and to enter the required parameters.</td>
</tr>
<tr>
<td></td>
<td>If you do <strong>not</strong> choose the <strong>Custom</strong> parameter mode, you have to change the required parameters on the <strong>Parameter Summary</strong> screen.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong> If you want to install the <strong>J2EE Adapter Engine</strong> as an optional standalone unit, we recommend that you configure the User Management Engine (UME) for the ABAP UME of the SAP NetWeaver Process Integration (PI) system.</td>
</tr>
<tr>
<td></td>
<td>For more information about supported UME data sources and change options, see SAP Note 718383.</td>
</tr>
</tbody>
</table>

**Using the Java Database:**
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java Administrator User and Password</td>
<td>The installer sets the user name Administrator and the master password by default. This user has administrative permissions for user management.</td>
</tr>
<tr>
<td>Java Guest User and Password</td>
<td>The installer sets the user name Guest and the master password by default. This user is used for anonymous access.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Server Number</td>
<td>This is the instance number on the application server of the central ABAP system to which you want to connect the Application Server Java. To find out the number on the host of the central instance, look under the SAP directory \usr\sap&lt;SAPSID&gt;\DVEBMGS&lt;Instance_Number&gt;. The value &lt;Instance_Number&gt; is the number assigned to the SAP system.</td>
</tr>
<tr>
<td>Application Server Host</td>
<td>This is the host name of the relevant application server instance. To find out the host name, enter hostname at the command prompt of the host running the central instance.</td>
</tr>
<tr>
<td>Communication User and Password</td>
<td>This is the name and password of the existing ABAP communication user. You must have created this user manually on the external ABAP system.</td>
</tr>
<tr>
<td>SDM Password</td>
<td>This user is used for the Software Deployment Manager (SDM). The installer sets the master password by default.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator User and Password</td>
<td>This is the name and password of the administrator user that you must have created on the external ABAP system. This user has administrative permissions for user management.</td>
</tr>
<tr>
<td>Administrator Role</td>
<td>The role SAP_J2EE_ADMIN must exist on the external ABAP system.</td>
</tr>
</tbody>
</table>
### Parameter Definitions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guest User and Password</td>
<td>This is the name and password of the guest user that you must have created on the external ABAP system. This user is used for anonymous access.</td>
</tr>
<tr>
<td>Guest Role</td>
<td>The role <strong>SAP_J2EE_GUEST</strong> must exist on the external ABAP system.</td>
</tr>
<tr>
<td>Communication User and Password</td>
<td>This is the name and password of the existing ABAP communication user. You must have created this user manually on the external ABAP system.</td>
</tr>
<tr>
<td>SDM Password</td>
<td>This user is used for the Software Deployment Manager (SDM). The installer sets the master password by default.</td>
</tr>
</tbody>
</table>

### Table 12: System Landscape Directory

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
</table>
| SLD Destination | The System Landscape Directory (SLD) is designed for registering the systems (along with the installed software) of your whole system landscape. The usual case is to configure one SLD for your complete system landscape. You can choose between the following options:  
- **Register in existing central SLD**  
  Choose this option to register the SAP system you are installing in an existing SAP System Landscape Directory (SLD) by specifying the SLD connection parameters listed below in this table.  
- **No SLD destination**  
  Choose this option if you do not want to register the SAP system you are installing in an existing SAP System Landscape Directory (SLD). You then have to configure the SLD destination manually after the installation has finished.  
- **Configure a local SLD**  
  Choose this option if you want to have a local SLD on the SAP Java system that you are installing. Then the SAP system you are installing is the SLD server.  

  **Note**  
  The usual case is to configure one central SLD for your whole system landscape outside the SAP Solution Manager. However, we strongly recommend that you check the Master Guide for recommendations about which option to choose.  
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SLD HTTP Host</td>
<td>The host name of the existing central SLD.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Definition</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SLD HTTP Port</td>
<td>HTTP port of the SAP system based on AS Java on which the System Landscape Directory (SLD) resides. The following naming convention applies: 5&lt;Central_Instance_Number&gt;00.</td>
</tr>
<tr>
<td></td>
<td><strong>Example</strong></td>
</tr>
<tr>
<td></td>
<td>If the central instance number of the AS Java on which the System Landscape Directory (SLD) resides is 01, the SLD HTTP Port is 50100.</td>
</tr>
<tr>
<td>SLD Data Supplier User and password</td>
<td>The existing SLD Data Supplier user and password of the existing central SLD</td>
</tr>
<tr>
<td>SLD ABAP API User and password</td>
<td>The existing SLD ABAP API user and password of the existing central SLD</td>
</tr>
<tr>
<td><strong>Configure a local SLD</strong></td>
<td></td>
</tr>
<tr>
<td>SLD Data Supplier User and password</td>
<td>Specify the name of the SLD Data Supplier user to be created. This user is used to send the self-registration data of your system to the SLD.</td>
</tr>
<tr>
<td></td>
<td><strong>Recommendation</strong></td>
</tr>
<tr>
<td></td>
<td>We recommend that you name this user SLDDSUSER.</td>
</tr>
<tr>
<td>Object Server Name</td>
<td>The Object Server Name together with the CIM namespace identifies the absolute location of your System Landscape Directory. If you do not have a prefix reserved on SAP Market Place for Object Server Name, or if you just want to install a test or development system, enter the central instance host of your system. For more information about the Object Server Name parameter, see SAP Note 935245.</td>
</tr>
</tbody>
</table>
3.4.2 SAP System Database Parameters

Table 13:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database ID &lt;DBSID&gt;</td>
<td>The &lt;DBSID&gt; identifies the database instance. The installer prompts you for the &lt;DBSID&gt; when you are installing the database instance. The &lt;DBSID&gt; can be the same as the &lt;SAPSID&gt;</td>
</tr>
<tr>
<td><strong>Caution</strong></td>
<td>Choose your database ID carefully. Renaming is difficult and requires that you reinstall the SAP system.</td>
</tr>
<tr>
<td>• If you want to install a new database, make sure that your database ID:  ○ Is unique throughout your organization ○ Consists of exactly three alphanumeric characters ○ Contains only uppercase letters ○ Has a letter for the first character ○ Does not include any of the reserved IDs listed in SAP Note 1979280</td>
<td></td>
</tr>
<tr>
<td>Java Database User (SAPSR3DB)</td>
<td>The user name corresponds to the owner of the database tables.</td>
</tr>
<tr>
<td>Database user for database system administration (sapsa)</td>
<td>This is the default user for database monitoring and administration.</td>
</tr>
<tr>
<td>Database user for database system security tasks (sapss0)</td>
<td>This is the default user for security relevant tasks such as user creation and password setup.</td>
</tr>
</tbody>
</table>

3.5 Domain or Local Installation

Use

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 by all hosts in the system.
You have to perform a domain installation if one of the following applies:

- You install a system distributed over several hosts.
- You install a high-availability system with Microsoft Failover Clustering. (Only valid for '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 (central 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

**More Information**

Required User Authorization for the Installation [page 50]

**3.6  SAP System Transport Host**

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

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

- Use the transport directory that the installer creates during the installation of the SAP system by default on the global host in `<Drive>:\usr\sap\trans`.
- Use a transport directory located on a host other than the global host (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 52].
More Information

- SAP Directories [page 146]
- See the SAP Library:
  http://help.sap.com/nw
4 Preparation

4.1 Preparation Checklist

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

- Central, distributed, or high-availability system
- Dialog instance

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

Central, Distributed, or High-Availability System

**Note**

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

You can install optional standalone units **J2EE Adapter Engine, Partner Connectivity Kit, Application Sharing Server** only as a central system.

1. Windows Server 2008 (R2) or higher: you disable the Windows Server firewall [page 47] on each host.
2. You perform basic preparations on Windows [page 48].
3. You check that you have the required user authorization for running the installer [page 50].
4. If required, you set up virtual host names [page 51].
5. If required, you prepare the SAP system transport host [page 52] for your SAP system.
6. You check that the required installation media [page 53] are available on each host.
7. **Only valid for ‘High Availability’: HA (Windows)**
   
   To install a high-availability system with Microsoft Failover Clustering, you also perform the **HA-specific preparation tasks [page 118]**.

End of ‘High Availability’: HA (Windows)

8. Continue with Installation [page 59].

The following preparation is **optional**:

**Preparing an External ABAP System as Source for User Data [page 157]**
Dialog Instance

You have to perform the following preparations on the host where you install the dialog instance:

1. Windows Server 2008 (R2) or higher: You disable the Windows Server firewall [page 47] on each host.
2. You perform basic preparations on Windows [page 48].
3. You check that you have the required user authorization for running the installer [page 50].
4. If required, you prepare the SAP system transport host [page 52] for your SAP system.
5. You check that the required installation media [page 53] are available on the dialog instance host.
6. If you upgraded the SAP system to which you want to install a new dialog instance, you might have to update instance profiles of the existing system [page 160].
7. Continue with Installation [page 59].

4.2 Disabling the Windows Server Firewall on Windows Server 2008 (R2) and Higher

Use

The Windows firewall – which is turned on by default as of Windows Server 2008 (R2) – 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 default firewall settings are valid for the out-of-the-box installation of Windows Server 2008 (R2) and higher. These 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 installer. 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)

i Note

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

End of 'High Availability': HA (Windows)

- Windows Server 2012 (R2) and higher:
  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:

- 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

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. As of Windows Server 2012 R2, 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:

- Windows Server 2012 R2 and higher:
  1. Open PowerShell in elevated mode, and enter the following command: `get-volume`
  2. Check that the value `FileSystem` is ReFs or NTFS.
- Windows Server 2008 (R2) and Windows Server 2012:
  1. Open the Windows Explorer.
  2. Select the relevant disk.
     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.

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 installer 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 installer 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 installer does not create OUs. The installer does not move existing domain users or groups. The installer 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 SWPM.
4.4 Required User Authorization for Running the Installer

Use

Although the installer automatically grants the required rights 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 has not 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 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 and the domain Admins group of the domain involved. 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 can be accessed by all hosts in the system.

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

Caution

- Only valid for 'High Availability': HA (Windows)
  In a Microsoft failover cluster configuration, you always have to perform a domain installation.

- For performance and security reasons, SAP does not support an SAP system installation on a domain controller.
- If for any reason, the account used for the installation is not a member of the domain Admins group, you can perform the installation with a domain user who is a member of the local Administrators group. However, the domain administrator has to prepare the system appropriately for you.

For more information, see Performing a Domain Installation without being a Domain Administrator [page 153].

For a domain installation, you need to:

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

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.

**Caution**

Do not use the Windows built-in account Administrator or the renamed built-in account to install your SAP system with the installer. The built-in account only has restricted network access rights that are required by the installer. 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 153]

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 without having to reinstall or reconfigure.

**Caution**

- 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 installer with the command line parameter `SAPINST_USE_HOSTNAME=<virtual hostname>` on failover cluster nodes.

End of 'High Availability': HA (Windows)

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](#).

Procedure

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

4.6 Preparing the SAP System Transport Host

Use

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

When you install an SAP system, the installer 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:
   1. Create the directory `\usr\sap\trans` on the host to be used as the transport host.
   2. 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 installer 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 with the installer 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 installer assigns the appropriate rights with the help of an additional SAP_LocalAdmin group.

For more information, see Automatic Creation of Accounts and Groups [page 179].

### 4.7 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 installer. You always have to download the latest version of the Software Provisioning Manager 1.0 archive.

- The media containing the software to be installed, which are available as follows:
  - You normally obtain the physical installation media as part of the installation package.
  - You can also download the installation media apart from the Software Provisioning Manager 1.0 archive from [https://launchpad.support.sap.com/#/softwarecenter](https://launchpad.support.sap.com/#/softwarecenter), as described at the end of this section.

**Note**

The signature of media is checked **automatically** by the installer during the *Define Parameters* phase while processing the *Media Browser* screens. As of now the installer only accepts media whose signature has been checked. See also the description of this new security feature in SAP Note 2393060.[1](#)

**Related Information**

- [Downloading and Extracting the Software Provisioning Manager 1.0 Archive][54]
- [Using the Physical Media from the Installation Package][55]
- [Downloading Installation Media][57]
4.7.1 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.

Context

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

Procedure

1. Download the latest version of the Software Provisioning Manager 1.0 archive

   70SWPM10SP<Support_Package_Number>_.<Version_Number>.SAR from:

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

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

   Note

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

   Proceed as follows to get the latest version of SAPCAR:

   a. Go to https://launchpad.support.sap.com/#/softwarecenter ➔ SUPPORT PACKAGES & PATCHES ➔ and search for “sapcar”.

   b. Select the archive file for your operating system and download it to an empty directory.

   c. To check the validity of the downloaded executable, right-click the executable and choose Properties. On the Digital Signatures tab you can find information about the SAP signature with which the executable was signed.

   d. Rename the executable to sapcar.exe.

   For more information about SAPCAR, see SAP Note 212876.

3. Using the latest version of SAPCAR, you can verify the signature of the downloaded 70SWPM10SP<Support_Package_Number>_.<Version_Number>.SAR archive as follows:

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

      1. Go to https://launchpad.support.sap.com/#/softwarecenter ➔ SUPPORT PACKAGES & PATCHES ➔ and search for “sapcryptolib”.

   Installation of SAP Systems Based on the Application Server Java of SAP NetWeaver 7.02 on Windows: SAP Adaptive Server Enterprise

   Preparation
2. Select the archive file for your operating system and download it to the same directory where you have put the SAPCAR executable.

3. Use the following command to extract the SAPCRYPTOLIB archive to the same directory where you have put the SAPCAR executable:

   `sapcar -xvf sapcryptolibp_84..sar -R <target directory>`

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

b. Verify the signature of the downloaded 7OSWPM10SP<Support Package Number>_<Version Number>.SAR archive by executing the following command:

```plaintext
<Path to SAPCAR>\sapcar.exe -tvVf<Path to Download Directory> \7OSWPM10SP<Support Package Number>_<Version Number>.SAR -crl<file name of revocation list>
```

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

```plaintext
<Path to SAPCAR>\sapcar.exe -xvf <Path to Download Directory> \7OSWPM10SP<Support Package Number>_<Version Number>.SAR <Path to Unpack Directory>
```

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

- **Note**
  Make sure that all users have read permissions for the directory where you want to unpack the installer.

- **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.

### 4.7.2 Using the Physical Media from the Installation Package

This section describes how you use the physical installation media as part of the installation package.

**Context**

The signature of media is checked **automatically** by the installer during the Define Parameters phase while the Media Browser screens are processed (see also Running the Installer [page 62]). The installer only accepts media whose signature has been checked. For more information, see SAP Note 2393060.
Procedure

1. Identify the required media for your installation as listed below.

The following table shows the required media for the installation of an SAP system based on SAP NetWeaver application server Java:

<table>
<thead>
<tr>
<th>Required Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ Software Provisioning Manager 1.0 archive</td>
</tr>
<tr>
<td>○ UC Kernel (folder K_&lt;Version&gt;<em>U</em>&lt;OS&gt;) where U means Unicode.</td>
</tr>
<tr>
<td>○ Java Components</td>
</tr>
<tr>
<td>○ Software Provisioning Manager 1.0 archive</td>
</tr>
<tr>
<td>○ UC or NUC Kernel (folder K_&lt;Version&gt;<em>N or U</em>&lt;OS&gt;) where U means Unicode</td>
</tr>
<tr>
<td>○ Java Components</td>
</tr>
<tr>
<td>○ Software Provisioning Manager 1.0 archive</td>
</tr>
<tr>
<td>○ UC Kernel (folder K_&lt;Version&gt;<em>U</em>&lt;OS&gt;) where U means Unicode.</td>
</tr>
<tr>
<td>○ Java Components</td>
</tr>
<tr>
<td>○ Software Provisioning Manager 1.0 archive</td>
</tr>
<tr>
<td>○ RDBMS</td>
</tr>
</tbody>
</table>

**Note**

For a central system, where all mandatory instances reside on one host, you need the installation media that are required for the central instance, central services instance, and database instance.

**Note**

For more information about which kernel version to use, see SAP Note 1680045. In addition, check the Product Availability Matrix at http://support.sap.com/pam.

**Table 14:**

<table>
<thead>
<tr>
<th>SAP Instance Installation</th>
<th>Required Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central instance</td>
<td>○ Software Provisioning Manager 1.0 archive</td>
</tr>
<tr>
<td></td>
<td>○ UC Kernel (folder K_&lt;Version&gt;<em>U</em>&lt;OS&gt;) where U means Unicode.</td>
</tr>
<tr>
<td></td>
<td>○ Java Components</td>
</tr>
<tr>
<td>Database instance</td>
<td>○ Software Provisioning Manager 1.0 archive</td>
</tr>
<tr>
<td></td>
<td>○ UC or NUC Kernel (folder K_&lt;Version&gt;<em>N or U</em>&lt;OS&gt;) where U means Unicode</td>
</tr>
<tr>
<td></td>
<td>○ Java Components</td>
</tr>
<tr>
<td></td>
<td>○ Software Provisioning Manager 1.0 archive</td>
</tr>
<tr>
<td></td>
<td>○ UC Kernel (folder K_&lt;Version&gt;<em>U</em>&lt;OS&gt;) where U means Unicode.</td>
</tr>
<tr>
<td></td>
<td>○ Java Components</td>
</tr>
<tr>
<td>Dialog instance</td>
<td>○ Software Provisioning Manager 1.0 archive</td>
</tr>
<tr>
<td></td>
<td>○ UC Kernel (folder K_&lt;Version&gt;<em>U</em>&lt;OS&gt;) where U means Unicode.</td>
</tr>
<tr>
<td></td>
<td>○ Java Components</td>
</tr>
</tbody>
</table>

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

a. Download and unpack the latest version of Software Provisioning Manager as described in Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 54].

b. Make the installation media containing the software to be installed 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.
Note

Depending on your installation type, one or more instances can reside on the same host. You need to keep this in mind when you make the required installation media available on each installation host.

For a central system, you need to make all required installation media available on the single installation host.

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 and commas.

○ 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.

Related Information

Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 54]

4.7.3 Downloading Installation Media

This section describes how you download installation 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 54].
2. Create a download directory on the host on which you want to run the installer.
3. Identify all download objects that belong to one installation medium according to the following criteria:

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:

You can download installation media from the SAP Software Download Center using one of the following paths:

○ To download the kernel media, go to https://support.sap.com/sltoolset System Provisioning Software Provisioning Manager 1.0 SP<Current Version> Download Kernel
To download all media required for your SAP product, you can use one of the following navigation paths:

- [https://launchpad.support.sap.com/#/softwarecenter](https://launchpad.support.sap.com/#/softwarecenter) > INSTALLATIONS & UPGRADES > By Category > SAP NETWEAVER AND COMPLEMENTARY PRODUCTS > <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:
<br>
*Example*

51031387_1
51031387_2
...

Title
All objects that are part of a medium have the same title, such as <Solution><Media_Name><OS> or <Database>RDBMS<OS> for RDBMS media.

4. Download the objects to the download directory.

5. To correctly recombine 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](https://launchpad.support.sap.com/).

**Caution**

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

### Related Information

[Downloading Installation Media](#)
5 Installation

5.1 Installation Checklist

This section includes the installation steps for the following:

- Central system
- Distributed system
- High-availability system
- Dialog instance

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

Note

SAP ASE is installed silently as part of the installation of the respective SAP product. Do not install the database software separately prior to the SAP installation.

Central System

1. You check the prerequisites [page 61] and run the installer [page 62] on the central system host with option Central System to install the SAP system.
2. You continue with Post-Installation [page 74].

Distributed System

1. On the SCS instance host, you check the prerequisites [page 61] and run the installer [page 62] to install the central services instance and to prepare this host as the SAP global host.
2. On the database instance host, you check the prerequisites [page 61] and run the installer [page 62] to install the database instance.
3. On the central instance host, you check the prerequisites [page 61] and run the installer [page 62] to install the central instance.
4. If required, you install one or more dialog instances on the chosen hosts as described in subsection Dialog Instance of this section.
5. You continue with Post-Installation [page 74].
High-Availability System

1. To install a high-availability system with Microsoft Failover Clustering, you perform the HA-specific installation tasks [page 118].
2. You continue with Post-Installation [page 74].

Dialog Instance

You perform the following steps on the host where you install the dialog instance.

1. You check the prerequisites [page 61] and run the installer [page 62] to install the dialog instance.
2. You continue with Post-Installation [page 74].

5.2 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 30].

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 32]).

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 85].

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 157].
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 32]**).

3. After the installation has finished, you can no longer change this configuration of the UME. For more information, see **Configuring User Management [page 85]**.

**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 85]**.

**5.3 Prerequisites for Running the Installer**

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

- For the SL Common GUI, make sure that the following web browser requirements are met:
  - You have one of the following supported browsers on the device where you want to run the SL Common GUI: Google Chrome, Mozilla Firefox, Microsoft Edge, or Microsoft Internet Explorer 11. Always use the latest version of these web browsers.

  ➤ **Recommendation**

  We recommend using Google Chrome.

  - If you copy the SL Common GUI URL manually in the browser window, make sure that you open a new Web browser window in private browsing mode (Internet Explorer), incognito mode (Chrome) or private browsing mode (Firefox). This is to prevent Web browser plugins and settings from interfering with the SL Common GUI.

  For more information about the SL Common GUI, see **Useful Information About the Installer [page 66]**.

- Make sure that you use an account with the required user authorization to run the installer [page 50].

- Make sure that you have specified the most important SAP system parameters as described in **Basic SAP System Installation Parameters [page 30]** before you start the installation.

- Check that your installation hosts meet the requirements for the installation options that you want to install. For more information, see **Running the Prerequisite Checker [page 22]**.

- If you want to install a dialog instance to 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_JC20_wsi6408_12` to `<Drive>:\usr\sap\S14\SYS\profile\S14_JC20_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 installer and the SL Common GUI.
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 installer processing.
The filled-out evaluation form is then sent to SAP using HTTPS.
If this port cannot be used, you can assign a free port number by executing sapinst.exe with the following command line parameter:
SAPINST_HTTP_PORT=<Free Port Number>

5.4 Running the Installer

This section describes how to run the installation tool Software Provisioning Manager (the “installer” for short).

Prerequisites

For more information, see Prerequisites for Running the Installer [page 61].

Context

Software Provisioning Manager (the “installer” for short) has a web browser-based GUI named “SL Common GUI of the Software Provisioning Manager” - “SL Common GUI” for short.
This procedure describes an installation where you run the installer and use the SL Common GUI, that is you can control the processing of the installer from a browser running on any device.
For more information about the SL Common GUI, see Useful Information About the Installer [page 66].

Procedure

1. Log on to the installation host using an account with the required user authorization to run the Installer [page 50].

⚠️ Caution
Do not use an existing <sapsid>adm user.

If your security policy requires that the person running the installer 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 have to 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 53].

3. Start the installer by double-clicking `sapinst.exe` from the directory to which you unpacked the Software Provisioning Manager archive.

   By default, the SL Common GUI uses the default browser defined for the host where you run the installer. However, you can also specify another supported web browser available on the host where you start the installer. 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 want to use a virtual host name, open a command prompt or PowerShell window in elevated mode and change to the directory to which you unpacked the Software Provisioning Manager archive.

   Start the installer 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 51].

4. The installer is starting up.

   The installer now starts and waits for the connection with the SL Common GUI. If you have a supported web browser (see Prerequisites for Running the Installer [page 61]) installed on the host where you run the installer, the SL Common GUI starts automatically by displaying the **Welcome** screen.

   If the SL Common GUI does not open automatically, you can find the URL you require to access the SL Common GUI at the bottom of the **Program Starter** window of the installer. 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>]
   ************************************************************************
   ...
   ```

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

   **Note**

   Before you reach the **Welcome** screen, your browser might warn you that the certificate of the `sapinst` process on this computer could not be verified. Accept this warning to inform your browser that it can trust this site, even if the certificate could not be verified.

5. On the **Welcome** screen, choose the required option:
○ Install an SAP system
  Install an SAP system or an optional standalone unit:
  ○ To install an SAP system based on SAP NetWeaver Application Server for Java, choose
    \(<Product> \rightarrow \text{SAP Application Server Java} \rightarrow \text{Database} \rightarrow \text{System Variant}\).  
  ○ To install an optional standalone unit – that is an Application Sharing Server, J2EE Adapter Engine, or an SAP Partner Connectivity Kit – choose one of the following:
    ○ Application Sharing Server
      \(<Product> \rightarrow \text{SAP NetWeaver 7.0} \rightarrow \text{Support Release or Enhancement Package} \rightarrow \text{Optional Standalone Units} \rightarrow \text{Application Sharing Server} \rightarrow \text{Database} \rightarrow \text{Application Sharing Server Installation}\).  
    ○ J2EE Adapter Engine
      \(<Product> \rightarrow \text{SAP NetWeaver 7.0} \rightarrow \text{Support Release or Enhancement Package} \rightarrow \text{Optional Standalone Units} \rightarrow \text{J2EE Adapter Engine} \rightarrow \text{Database} \rightarrow \text{J2EE Adapter Engine Installation}\).  
    ○ SAP Partner Connectivity Kit
      \(<Product> \rightarrow \text{SAP NetWeaver 7.0} \rightarrow \text{Support Release or Enhancement Package} \rightarrow \text{Optional Standalone Units} \rightarrow \text{Partner Connectivity Kit} \rightarrow \text{Database} \rightarrow \text{Partner Connectivity Kit Installation}\).  
  ○ Perform other tasks or install additional components
    Go to \(<Product> \rightarrow \text{Software Life-Cycle Options}\) and choose the required task.

6. Choose \textit{Next}.

\begin{itemize}
  \item \textbf{Note}
    
    If there are errors during the self-extraction process of the installer, you can find the log file \texttt{dev_selfex.out} in the temporary directory.
  \item \textbf{Note}
    
    If there are errors during the self-extraction process of the installer, you can find the log file \texttt{dev_selfex.out} in the temporary directory.
  \item \textbf{Note}
    
    To find more information on each parameter during the \textit{Define Parameters} phase, position the cursor on the required parameter input field, and choose either \texttt{F1} or the \textit{HELP} tab. Then the available help text is displayed in the \textit{HELP} tab.
\end{itemize}

\begin{itemize}
  \item \textbf{Note}
    
    To find more information on each parameter during the \textit{Define Parameters} phase, position the cursor on the required parameter input field, and choose either \texttt{F1} or the \textit{HELP} tab. Then the available help text is displayed in the \textit{HELP} tab.
  \item \textbf{Note}
    
    \textbf{J2EE Adapter Engine only}
    
    \begin{itemize}
      \item Make sure you use the \textit{Custom} parameter mode.
      \item On the \textit{UME Configuration} screen, we recommend that you choose \textit{Use ABAP}.
    \end{itemize}
  \item \textbf{Caution}
    
    The signature of media is checked \textbf{automatically} during the \textit{Define Parameters} phase while processing the \textit{Media Browser} screens.
\end{itemize}
Keep in mind that this automatic check is only committed once and not repeated if you modify artefacts 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 signature is not checked again.

See also the description of this new security feature in SAP Note 2393060.

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

10. To start the installation, choose Next.

The installer starts the installation and displays the progress of the installation.

When the installation option has finished successfully, the installer displays the message Execution of <Option Name> has completed.

**i Note**

**Enterprise Portal only:** During the last restart of Application Server Java performed by the installer, 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 installer or Application Server Java during this phase.

11. If required, install a dialog instance for a central system or distributed system.

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

   %userprofile%\sapinst\n
13. If you copied installation media to your hard disk, you can delete these files when the installation has successfully completed.

## 5.5 Additional Information About the Installer

The following sections provide additional information about the installer.

- [Useful Information About the Installer](#)
  - This section contains some useful technical background information about the installer and the installer GUI.
- [How to Avoid Automatic Logoff by the Installer](#)
- [Interrupted Processing of the Installer](#)
  - Here you find information about how to restart the installer if its processing has been interrupted.
- [Entries in the Services File Created by the Installer](#)
- [Troubleshooting with the Installer](#)
  - This section tells you how to proceed when errors occur while the installer is running.
- [Using the Step State Editor (SAP Support Experts Only)](#)
This section describes how to use the Step State Editor available in the installer.

5.5.1 Useful Information About the Installer

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

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

The SL Common GUI connects the web browser on a client with the sapinst executable - which is part of Software Provisioning Manager - running on the installation host using the standard protocol HTTPS. For the SL Common GUI, the installer provides a pre-generated URL in the Program Starter window. If you have a supported web browser installed on the host where you run the installer, the SL Common GUI starts automatically.

By default, the SL Common GUI uses the default browser defined for the host where you run the installer. However, you can also specify another supported web browser available on the host where you start the installer. 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 the Installer [page 61]. If you need to run the SL Common GUI in accessibility mode, apply the standard accessibility functions of your web browser.

- As soon as you have started the sapinst.exe executable, the installer creates a .sapinst directory underneath the <Drive>:\Users\<User> directory where it keeps its log files. <User> is the user which you used to start the installer.

After you have reached the Welcome screen and selected the relevant installer option for the SAP system or instance to be installed, the installer creates a directory sapinst_instdir, where it keeps its log files, and which is located directly in the %ProgramFiles% directory. If the installer 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.

**Recommendation**

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

- The installer extracts itself to a temporary directory called sapinst_exe.xxxxxx.xxxx, which is located in %TEMP%, %TMP%, %TMPDIR%, or %SystemRoot%. These files are deleted after the installer has stopped running.

The temporary directory sapinst_exe.xxxxxx.xxxx sometimes remains undeleted. You can safely delete it.
The temporary directory also contains the log file `dev_selfex.out` from the self-extraction process of the installer, which might be useful if an error occurs.

⚠️ **Caution**

If the installer cannot find a temporary directory, the installation terminates with the error `FCO-00058`.

- To see a list of all available installer properties, open a command prompt and start the installer with a command line parameter `-p`:
  ```bash
  sapinst.exe -p
  ```

- If you want to install an SAP system in unattended mode, see SAP Note 2230669 which describes an improved procedure using `inifile.params`.

- If required, stop the installer by choosing the `Cancel` button.

ℹ️ **Note**

If you need to terminate the installer, choose ➤ *File ➤ Exit* in the menu of the *Program Starter* window.

### 5.5.2 How to Avoid Automatic Logoff by the Installer

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 domain installation, the account needs to be both a member of the local *Administrators* group and the domain *Admins group*. For a local installation, the account needs to be a member of the local group *Administrators group*.

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 installer assigns them and automatically logs the account off to activate them. To avoid the installer 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.

⚠️ **Caution**

Be aware that domain policies override locally defined policies. This means that if you want to grant domain administrator rights to a user who belongs to the local *Administrators group*, make sure that you have also defined domain administrator rights for this user on domain level.
1. Windows Server 2012 (R2) and higher: Press Ctrl + Esc and choose Administrative Tools > Local Security Policy.


3. In the Local Security Settings window, choose Local Policies > User Rights Assignment.

4. Double-click the required right under Policy and choose Add User or Group.

5. In the Select Users and Groups window, choose the required user and choose Add. The selected user appears in the box below.

6. Confirm your entry and then repeat the steps for each remaining policy that the user requires for the installation.

7. Log off and log on again to apply the changes.

More Information

Required User Authorization for Running the Installer [page 50]

5.5.3 Interrupted Processing of the Installer

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

Context

The processing of the installer might be interrupted for one of the following reasons:

- An error occurred during the Define Parameters or Execute phase:
  The installer does not abort the installation in error situations. If an error occurs, the installation pauses and a dialog box appears. The dialog box contains a short description of the choices listed in the table below as well as a path to a log file that contains detailed information about the error.

- You interrupted the processing of the installer by choosing Cancel in the SL Common GUI.

⚠️ Caution

If you stop an option in the Execute phase, any system or component installed by this option is incomplete and not ready to be used. Any system or component uninstalled by this option is not completely uninstalled.
The following table describes the options in the dialog box:

Table 16:

<table>
<thead>
<tr>
<th>Option</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Retry</strong></td>
<td>The installer retries the installation from the point of failure without repeating any of the previous steps. This is possible because the installer records the installation progress in the keydb.xml file. We recommend that you view the entries in the log files, try to solve the problem, and then choose <strong>Retry</strong>. If the same or a different error occurs, the installer displays the same dialog box again.</td>
</tr>
<tr>
<td><strong>Stop</strong></td>
<td>The installer stops the installation, closing the dialog box, the installer GUI, and the GUI server. The installer records the installation progress in the keydb.xml file. Therefore, you can continue the installation from the point of failure without repeating any of the previous steps. See the procedure below.</td>
</tr>
<tr>
<td><strong>Continue</strong></td>
<td>The installer continues the installation from the current point.</td>
</tr>
<tr>
<td><strong>View Log</strong></td>
<td>Access installation log files.</td>
</tr>
</tbody>
</table>

The following procedure describes the steps to restart an installation, which you stopped by choosing **Stop**, or to continue an interrupted installation after an error situation.

**Procedure**

1. Log on to the installation host as a user with the required permissions as described in Running the Installer [page 62].
2. Make sure that the installation media are still available.
   For more information, see Preparing the Installation Media [page 53].
   ➤ **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 installer by double-clicking **sapinst.exe** from the directory to which you unpacked the Software Provisioning Manager archive.
   By default, the SL Common GUI uses the default browser defined for the host where you run the installer. However, you can also specify another supported web browser available on the host where you start the installer. You can do this by starting the **sapinst** executable with command line option
4. The installer is restarting.

The installer now starts and waits for the connection with the SL Common GUI. If you have a supported web browser (see Prerequisites for Running the Installer [page 61]) installed on the host where you run the installer, the SL Common GUI starts automatically by displaying the Welcome screen.

If the SL Common GUI does not open automatically, you can find the URL you require to access the SL Common GUI at the bottom of the Program Starter window of the installer. 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]
```
...```

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

**Note**

Before you reach the Welcome screen, your browser might warn you that the certificate of the sapinst process on this computer could not be verified. Accept this warning to inform your browser that it can trust this site, even if the certificate could not be verified.

5. 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.

6. On the What do you want to do? screen, decide between the following alternatives and continue with Next:
### Table 17:

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perform a new run</strong></td>
<td>The installer does not continue the interrupted installation option. Instead, it moves the content of the old installer directory and all installer-specific files to a backup directory. Afterwards, you can no longer continue the old option. The following naming convention is used for the backup directory: \log_&lt;Day&gt;_&lt;Month&gt;_&lt;Year&gt;_&lt;Hours&gt;_&lt;Minutes&gt;_&lt;Seconds&gt;</td>
</tr>
<tr>
<td><strong>Example</strong></td>
<td></td>
</tr>
<tr>
<td><strong>log_01_Oct_2016_13_47_56</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>All actions taken by the installation before you stopped it (such as creating directories or users) are not revoked.</td>
</tr>
<tr>
<td><strong>Caution</strong></td>
<td>The installer moves all the files and folders to a new log directory, even if these files and folders are owned by other users. If there are any processes currently running on these files and folders, they might no longer function properly.</td>
</tr>
<tr>
<td><strong>Continue with the existing one</strong></td>
<td>The installer continues the interrupted installation from the point of failure.</td>
</tr>
</tbody>
</table>

### 5.5.4 Entries in the Services File Created by the Installer

After the installation has finished successfully, the installer 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
If there is more than one entry for the same port number, this is **not** an error.

### 5.5.5 Troubleshooting with the Installer

This section tells you how to proceed when errors occur while the installer is running.

**Context**

If an error occurs, the installer:

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

**Procedure**

1. Check SAP Note [1548438](https://support.sap.com) for known installer issues.
2. If an error occurs during the **Define Parameters** or the **Execute Service** phase, do one of the following:
   - Try to solve the problem:
     - To check the installer log files (`sapinst.log` and `sapinst_dev.log`) for errors, choose the **LOG FILES** tab.
     - **Note**
       The **LOG FILES** tab is only available if you have selected on the **Welcome** screen the relevant installer option for the SAP product to be installed.
       
       If you need to access the log files before you have done this selection, you can find the files in the `.sapinst` directory underneath the `<Drive>:\Users\<User>\` directory, where `<User>` is the user which you used to start the installer.
       For more information, see Useful Information About the Installer [page 66].
   
   - To check the log and trace files of the installer GUI for errors, go to the directory `%userprofile%\sapinst\`
   
   - Then continue by choosing **Retry**.
   
   - If required, abort the installer by choosing **Cancel** in the tool menu and restart the installer. For more information, see Interrupted Processing of the Installer [page 68].
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](https://support.sap.com).
5.5.6 Using the Step State Editor (SAP Support Experts Only)

This section describes how to use the Step State Editor available in the installer.

Note

Only use the Step State Editor if SAP Support requests you to do so, for example to resolve a customer incident.

Prerequisites

- SAP Support requests you to use the Step State Editor.
- Make sure that the host where you run the installer meets the requirements listed in Prerequisites for Running the Installer [page 61].

Procedure

1. Start the installer from the command line as described in Running the Installer [page 62] with the additional command line parameter `SAPINST_SET_STEPSTATE=true`.
2. Follow the instructions on the installer screens and fill in the parameters prompted during the Define Parameters phase until you reach the Parameter Summary screen.
3. Choose Next.

   The Step State Editor opens as an additional dialog. Within this dialog you see a list of all steps to be executed by the installer during the Execute Service phase. By default all steps are in an initial state. Underneath each step, you see the assigned installer component. For each step you have a Skip and a Break option.
   - Mark the checkbox in front of the Break option of the steps where you want the installer to pause.
   - Mark the checkbox in front of the Skip option of the steps which you want the installer to skip.
4. After you have marked all required steps with either the Break or the Skip option, choose OK on the Step State Editor dialog.

   The installer starts processing the Execute Service phase and pauses one after another when reaching each step whose Break option you have marked. You can now choose one of the following:
   - Choose OK to continue with this step.
   - Choose Step State Editor to return to the Step State Editor and make changes, for example you can repeat the step by marking the checkbox in front of the Repeat option.
   - Choose Cancel to abort the installer.
5. Continue until you have run through all the steps of the Execute Service phase of the installer.
6 Post-Installation

6.1 Post-Installation Checklist

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

- Central, distributed, or high-availability system
- Dialog instance

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

Central, Distributed, or High-Availability System

Note

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

You can install optional standalone units J2EE Adapter Engine, Partner Connectivity Kit, Application Sharing Server only as a central system.

You have to complete the following post-installation steps, which are described in more detail in the linked chapters:

1. If required, you perform a full system backup [page 97] immediately after the installation has finished.
2. You check whether you can log on to the Application Server Java [page 75].
3. If you have installed SAP NetWeaver Portal or SAP NetWeaver Portal Core Component, you check whether you can log on to the SAP NetWeaver Portal [page 77].
4. If you have installed Development Infrastructure, you check whether you can log on to the Development Infrastructure [page 78].
5. You provide access to the SAP NetWeaver Administrator [page 79].
6. You install the SAP license [page 80].
7. You configure the remote connection to SAP support [page 81].
8. Windows Server 2008 (R2) or higher: If required, you set up symbolic links for application servers [page 81].
9. For production systems it is highly recommended that you connect the system to SAP Solution Manager [page 82].
10. You apply the latest kernel and Support Package stacks [page 84].
11. You configure the user management [page 85].
12. You ensure user security [page 85].
13. To perform basic configuration steps, you run the Configuration Wizard [page 90].
14. If you have installed J2EE Adapter Engine as an optional standalone unit, you perform Post-Installation Steps for the J2EE Adapter Engine (Optional Standalone Unit) [page 91].
15. If you have installed Partner Connectivity Kit (PCK) as an optional standalone unit, you perform Post-Installation Steps for the PCK (Optional Standalone Unit) [page 94].
16. You **enable the database** [page 96].
17. You **perform a full installation backup** [page 97].
18. You check the Master Guide for your SAP Business Suite application or SAP NetWeaver application (chapter **Configuration of Systems and Follow-Up Activities**) for further implementation and configuration steps, such as language installation, monitoring, work processes, transports, SAP license, printers, system logs, and connectivity to system landscape directory (SLD).

**Dialog Instance**

You have to complete the following post-installation steps, which are described in more detail in the linked chapters:

1. If required, you **perform a full system backup** [page 97] immediately after the installation has finished.
2. You check whether you can **log on to the Application Server Java** [page 75].
3. If you have installed SAP NetWeaver Portal or SAP NetWeaver Portal Core Component on the central instance, you check whether you can **log on to the portal** [page 77] from the dialog instance host.
4. If you have installed Development Infrastructure on the central instance, you check whether you can **log on to the Development Infrastructure** [page 78] from the dialog instance host.
5. Windows Server 2008 (R2), or higher: If required, you **set up symbolic links for application servers** [page 81].
6. You **ensure user security** [page 85].
7. You **perform a full installation backup** [page 97].

**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.
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.

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.

Table 18:

<table>
<thead>
<tr>
<th>User</th>
<th>User Name Storage: Database</th>
<th>User Name Storage: External ABAP System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>The user name that you specified during the installation. The default name is Administrator.</td>
<td>The user that you created manually in the external ABAP system. The recommended name is J2EE_ADM_&lt;SAPSID_Java_System&gt;</td>
</tr>
</tbody>
</table>

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

   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 157]

6.3 Logging On to SAP NetWeaver Portal

You need to check that you can log on to the application server using the following standard users.

Prerequisites

The SAP system is up and running.

Context

This procedure applies when you install usage type NetWeaver Enterprise Portal Core Components (EPC) only and when you install it together with usage type SAP NetWeaver Enterprise Portal (EP):

i Note

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

Table 19:

<table>
<thead>
<tr>
<th>User</th>
<th>User Name Storage: Database</th>
<th>User Name Storage: External ABAP System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>The user name that you specified during the installation. The default name is Administrator.</td>
<td>The user that you created manually in the external ABAP system. The recommended name is J2EE_ADM_&lt;SAPSID_Java_System&gt;</td>
</tr>
</tbody>
</table>

You access the SAP NetWeaver 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_J2EE_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 NetWeaver 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 SAP NetWeaver Development Infrastructure (NWDI)

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

Procedure

1. Start a web browser and enter the following URL: `http://<hostname_of_J2EE_Engine_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

Due to security restrictions, the SAP NetWeaver Administrator can only be accessed **locally** via \http://<Hostname_Of_J2EE_Engine_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](http://<Hostname_Of_J2EE_Engine_Server>:5<Instance_Number>00/nwa after the installation has finished).
6.6 Installing the SAP License

You must install a permanent SAP license.

Context

When you install your SAP system, a temporary license is automatically installed.

⚠️ 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.

If you do a failover of the SAP (A)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.

---

ℹ️ Note

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

In a high-availability system with Microsoft Failover Clustering, the message server is part of the (A)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 (A)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 SAP Library at

http://help.sap.com/nw

SAP NetWeaver Platform

SAP NetWeaver 7.0 <Including Enhancement Package>

Application Help

Key Areas of SAP NetWeaver

Solution Life Cycle Management by Key Capability

SAP Licenses

SAP License Key / SAP Licensing Procedure

Installation of SAP Systems Based on the Application Server Java of SAP NetWeaver 7.02 on Windows: SAP Adaptive Server Enterprise

PUBLIC

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6.7 Configuring Remote Connection to SAP Support

SAP offers its customers access to support and a number of remote services such as the Early Watch Service or the GoingLive Service. Therefore, you have to set up a remote network connection to SAP.

For more information, see SAP Support Portal at https://support.sap.com/remote-support.html.

6.8 Creating Symbolic Links on Windows Server 2008 (R2) and Higher for Application Servers

Use

As of Windows Server 2008 (R2), you can create symbolic links for dialog instances to simplify their administration.

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

Windows Server 2012 (R2) and higher

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 \texttt{mklink} creates the link without checking whether the link target exists or can be accessed. If the link does not work after you created it, make sure that it exists and check that the UNC path can be accessed.

\textbf{Windows Server 2008 (R2)}

To create symbolic links, perform the following steps:

1. In the \textit{Start} menu, right-click on \textit{Command Prompt} and choose \textit{Run as administrator}.
2. Enter the following command in a single line:
   \begin{verbatim}
   mklink /d <localdisk>:\usr\sap\<SAPSID>\SYS \<sapglobalhost>\sapmnt\<SAPSID>\SYS
   \end{verbatim}
   \textbf{Note}
   Enter a blank before \<sapglobalhost>\....
3. If you use a central transport directory, you can also create the following link:
   \begin{verbatim}
   mklink /d <localdisk>:\usr\sap\trans \<trans_dir_host>\sapmnt\trans
   \end{verbatim}
   \textbf{Note}
   The transport directory host \<trans_dir_host> and the \<sapglobalhost> can be identical.

Caution

The command \texttt{mklink} creates the link without checking whether the link target exists or can be accessed. If the link does not work after you created it, make sure that it exists and check that the UNC path can be accessed.

\section*{6.9 Connecting the System to SAP Solution Manager}

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

\section*{Prerequisites}

An SAP Solution Manager system must be available in your system landscape. For more information, see \url{http://help.sap.com/solutionmanager}. 
Context

SAP Solution Manager gives you central access to tools, methods, and preconfigured content that you can use to evaluate and implement your solutions.

When your implementation is running, you can use SAP Solution Manager to manage, monitor, and update systems and business processes in your solution landscape, and also to set up and operate your own solution support.

Procedure

You connect a technical system to SAP Solution Manager by the following steps:

1. On the technical systems of your landscape, data suppliers are implemented, for example, with transaction RZ70 for Application Server ABAP and with Visual Administrator for Application Server Java.

   For more information, see the SAP Solution Manager Application Help:
   - If your SAP Solution Manager release is 7.1: [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]
   - If your SAP Solution Manager release is 7.2: [Version 7.2 SPS <No> Application Help (English) – Technical Infrastructures – Landscape Management Database (LMDB) – Managing Technical System Information – Registering 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.

   For more information, see the Planning Guide - System Landscape Directory in the SAP Community Network at System Landscape Directory (SLD) - Overview.

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

   For more information, see the SAP Solution Manager Application Help:
   - If your SAP Solution Manager release is 7.1: [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)]
   - If your SAP Solution Manager release is 7.2: [Version 7.2 SPS <No> Application Help (English) – Technical Infrastructures – Landscape Management Database (LMDB) – 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 7.1:
Solution Manager Operations Managing System Landscape Information

If your SAP Solution Manager release is 7.2:

Next Steps

For more information, see the following pages in the SAP Community Network:
- System Landscape Directory (SLD) - Overview
- Documentation for Landscape Management Database - LMDB

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.

Prerequisites

If the central instance host and the dialog instance host run on different operating systems or platforms, all application servers must have the same kernel patch level.

Procedure

- Download and apply the latest Kernel and Support Package stacks using the Software Update Manager (SUM) as described in the documentation Updating SAP Systems Using Software Update Manager 1.0 SP<Number> available at http://support.sap.com/slitoolset System Maintenance Software Update Manager (SUM) 1.0 SP<Latest Version> Guides for SUM 1.0 SP<Latest Version>
- 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 User Management

During the installation of your SAP system, you specified the database of the AS Java as the initial data source of the User Management Engine (UME) (see SAP System Parameters [page 32]).

After the installation of your SAP system has finished, you can still change the data source of the UME to a directory service.

During the installation of your SAP system, you specified one of the following initial data sources of the User Management Engine (UME) (see SAP System Parameters [page 32]):

- Database of the AS 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 data source changes are supported:

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

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


### 6.12 Ensuring User Security

You need to ensure the security of the users that the installer created during the installation.

The tables below at the end of this section list these users:

- Operating system users
- SAP system users
- Users in the SAP NetWeaver Development Infrastructure (NWDI)

During the installation, the installer by default assigned the master password to all users created during the installation unless you specified other passwords.

If you change user passwords, be aware that SAP system users might exist in multiple SAP system clients (for example, if a user was copied as part of the client copy). Therefore, you need to change the passwords in all the relevant SAP system clients.
Recommendation

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.

For more information, see:


Caution

Make sure that you perform this procedure before the newly installed SAP system goes into production. For security reasons, you also need to copy the installation directory to a separate, secure location – such as a separate storage medium – and then delete the installation directory.

For the users listed below, take the precautions described in the relevant SAP security guide.


Example


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:

Table 20: Operating System Users

<table>
<thead>
<tr>
<th>User</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;sapsid&gt;admSAP system administrator</td>
<td>SAP system administrator</td>
</tr>
<tr>
<td>SAP system administratorsyb&lt;dbsid&gt;</td>
<td>Database administrator</td>
</tr>
<tr>
<td>SAPService&lt;sapsid&gt;</td>
<td>SAP service user</td>
</tr>
</tbody>
</table>
Table 21: SAP Host Agent User

<table>
<thead>
<tr>
<th>User</th>
<th>User Name</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system user</td>
<td>sapadm</td>
<td>SAP system administrator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You do not need to change the password of this user after the installation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This user is for administration purposes only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>You are not able to log on as sapadm as this user is locked.</td>
</tr>
</tbody>
</table>

SAP System Users

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

Table 22: Users Stored in an External ABAP System

<table>
<thead>
<tr>
<th>User</th>
<th>User Name Storage: External ABAP System</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>The name that you gave this user when you created it manually in the external ABAP system</td>
<td>This user has administrative permissions for user management and its 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 J2EE Engine Config Tool.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>➤ Recommendation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>We recommend that you use strong password and auditing policies for this user.</td>
</tr>
<tr>
<td>Guest</td>
<td>The name that you gave this user when you created it manually in the external ABAP system</td>
<td>This user is used for anonymous access. Lock this user for interactive logon.</td>
</tr>
<tr>
<td>SDM</td>
<td>SDM</td>
<td>This user is used to access the Software Deployment Manager (SDM) in the Java system.</td>
</tr>
<tr>
<td>Communication user for the J2EE Engine</td>
<td>The name that you gave this user when you created it manually in the external ABAP system</td>
<td>This user is used for the communication between the ABAP system and the Java system. Specify this user as a Communications user and not as a dialog user. This user exists in at least the SAP system client that you specified during the installation.</td>
</tr>
<tr>
<td>User</td>
<td>User Name Storage: External ABAP System</td>
<td>Comment</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>----------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Users for Adobe Document Services (ADS)</td>
<td>The name of this user is ADSUSER.</td>
<td>This user exists in at least clients 000 and 001 of the external ABAP system. You must have created this user manually in the external ABAP system before you started the installation.</td>
</tr>
<tr>
<td></td>
<td>This user resides in the external ABAP system.</td>
<td></td>
</tr>
<tr>
<td>ADS_AGENT</td>
<td></td>
<td>This user exists in at least clients 000 and 001 of the external ABAP system. You must have created this user manually in the external ABAP system before you started the installation.</td>
</tr>
<tr>
<td>This user resides in the external ABAP system.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data supplier user for System Landscape Directory (SLD) (optional)</td>
<td>This user exists in at least clients 000 and 001 of the external ABAP system</td>
<td></td>
</tr>
<tr>
<td>ABAP API user for System Landscape Directory (SLD) (optional)</td>
<td>This user exists in at least clients 000 and 001 of the external ABAP system</td>
<td></td>
</tr>
</tbody>
</table>

**Table 23: Users Stored in the Java Database**

<table>
<thead>
<tr>
<th>User</th>
<th>User Name Storage: Database</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>The name that you gave this user during the installation or the default name Administrator</td>
<td>This user has administrative permissions for user management and its 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 J2EE Engine Config Tool.</td>
</tr>
<tr>
<td>Guest</td>
<td>The name that you gave this user during the installation or the default name Guest</td>
<td>This user is used for anonymous access. Lock this user for interactive logon.</td>
</tr>
<tr>
<td>SDM</td>
<td>SDM</td>
<td>This user is used to access the Software Deployment Manager (SDM) in the Java system.</td>
</tr>
<tr>
<td>Users for Adobe Document Services (ADS)</td>
<td>ADSUSER</td>
<td>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 J2EE Engine Config Tool.</td>
</tr>
</tbody>
</table>
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 J2EE Engine Config Tool.

Note

The installer created this user automatically if you chose Configure local SLD during the Define Parameters phase.

Users in the SAP NetWeaver To change passwords at the Development Infrastructure (NWDI)

If you chose usage type (software unit) SAP NetWeaver Development Infrastructure (DI) during the installation, users in the SAP NetWeaver Development Infrastructure (NWDI) are available after the installation as listed in the following table:

Table 24:

<table>
<thead>
<tr>
<th>User</th>
<th>User Name</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator of the SAP NetWeaver Development Infrastructure (NWDI) and password</td>
<td>NWDI_ADM</td>
<td>Administrator of the NWDI</td>
</tr>
<tr>
<td>Developer in the SAP NetWeaver Development Infrastructure (NWDI) and password</td>
<td>NWDI_DEV</td>
<td>Developer in the NWDI</td>
</tr>
<tr>
<td>Landscape Directory Service User in the SAP NetWeaver Development Infrastructure (NWDI) and password</td>
<td>NWDI_CMSADM</td>
<td>Administrator of the NWDI Change Management System (CMS)</td>
</tr>
</tbody>
</table>

Caution

This user has extensive authorizations. Make sure that you assign a secure password.

Caution

Do not log on with this user. It is used by the system for internal communication.

More Information

- For more information about managing Java users, see:
For more information about Java administration tools for user maintenance, see:

6.13 Running the Configuration Wizard

This section provides information about how to run the configuration wizard for the SAP NetWeaver usage types.

⚠️ Caution

You can run the configuration wizard **only once** and **only directly after you installed and patched** your SAP system.

You cannot use the configuration wizard after:

- Upgrade
- Installation of additional usage types in an existing SAP system
- System copy

In these cases, you need to manually perform the corresponding configuration steps.

**BI Java only**: This does not apply to configuration tasks for BI Java. For more information about BI Java, see SAP Note 917950. We recommend that you check the configuration of BI Java using SAP Note 937697.

To configure an SAP NetWeaver usage type, proceed as described in the SAP Library at:

<table>
<thead>
<tr>
<th>Table 25: SAP Release and SAP Library Quick Link</th>
<th>SAP Library Path (Continued)</th>
</tr>
</thead>
</table>
More Information

- If you have SAP Solution Manager 7.1, see the configuration structure of your implementation project in SAP Solution Manager.
- SAP Note 923359 Collective Note: Configuration Wizard – Template Installer

6.14 Post-Installation Steps for the J2EE Adapter Engine (Optional Standalone Unit)

After the installation has finished successfully, you need to perform the following post-installation steps for the J2EE Adapter Engine.

Configuring the SLD Data Supplier Service in the Visual Administrator [page 91]
This section describes how you can configure the SLD Data Supplier Service in the Visual Administrator.

Configuring the Gateway Service of the Central Integration Server [page 92]
On the J2EE Adapter Engine host, you need to enter the gateway service of the central integration server in the services file as described in this section.

Adding Connection Parameters to Central Exchange Profile [page 93]
This section describes how you can add connection parameters to the central exchange profile.

6.14.1 Configuring the SLD Data Supplier Service in the Visual Administrator

This section describes how you can configure the SLD Data Supplier Service in the Visual Administrator.

Procedure

2. Choose Cluster ➤ Server ➤ Services ➤ SLD Data Supplier ➤
3. On the Runtime tab in the right frame, select the HTTP Settings tab.
4. Enter the data required for the HTTP connection from the SLD service to the SLD as follows:
   - **Host**: Enter the name of the host on which the SLD bridge runs.
   - **Port**: Specify the HTTP standard access port of the SLD. This is the HTTP port of the J2EE engine. The following naming convention applies: \(5<\text{Java\_instance\_number}>00\).

Example

This is for example 50000 if your Java instance is 00.
○ **User**: Specify a Java user that already exists on the host on which the SLD Bridge runs (PISUPER, for example).
○ **Password**: Enter the user password.

If you want to use HTTPS for the connection from the SLD service to the SLD, choose **Use HTTPS**. The **Trust Store** field is now ready for input.

**i Note**
A trust store contains the root certificates of the trusted roots and checks the authentication of a received server certificate. The default setting for the trust store is **TrustedCAs**. You can change this setting if necessary. For a list of the available trust stores, see the **Key Storage service** (Runtime Views).

5. Save your entries.

An error message appears if an error occurs. If your entries have been saved successfully, the connection data is saved in encrypted form in the secure store in the database.

**i Note**
Alternatively, you can use an RFC connection to send data to the SLD (tab **RFC Settings**). However, we recommend that you use this type of connection for test purposes only.

6. If you want to test your settings by sending test data to the SLD, click the blue arrow with the quick info text **Trigger data transfer to System Landscape Directory**.

7. To apply the new configuration immediately, restart the SLD service as follows:
   a. On the Cluster tab, choose **SLD Data Supplier** with the secondary mouse button.
   b. Choose **Stop**.
   c. When the service has been stopped, again choose **SLD Data Supplier** with the secondary mouse button and choose **Start**.

The service starts within a few seconds and the first data transfer to the SLD takes place after several minutes.

### 6.14.2 Configuring the Gateway Service of the Central Integration Server

On the J2EE Adapter Engine host, you need to enter the gateway service of the central integration server in the **services** file as described in this section.

**Procedure**

1. Open the **services** file using a text editor.

   You can find the file in the directory

   ```
2. Enter the gateway service entry as follows:

```
sapgw<xx> <port>/tcp #SAP System Gateway Port
```

where `<xx>` is the instance number of SAP NetWeaver on which usage type PI is running and `<port>` is the gateway port of SAP NetWeaver.

**Note**

You can copy and paste the correct entry from the services file on the PI host.

---

### 6.14.3 Adding Connection Parameters to Central Exchange Profile

This section describes how you can add connection parameters to the central exchange profile.

**Procedure**

1. On the noncentral J2EE Adapter Engine server, enter the following URL in a browser:

   `http://<AE_server>:<AE_HTTP_Port>/exchangeProfile`

2. Choose *Connections*.
3. Enter the respective values.

   **Note**

   If you do not know the values, call the Exchange Profile on the PI server at `http://<PI_server>:<HTTP_Port>/exchangeProfile` and choose Connections. You can find the values up there.

4. Under Exchange ProfileConnections, check the existence of the parameter `com.sap.aii.connect.integrationserver.sld.name`. If it exists, make sure that it points to the PI server. If required, adapt it manually as follows:

   `is.<PI_server_instance_number>.<PI_server_hostname>`

5. Restart the application `com.sap.aii.af.cpa.app` in the Visual Administrator or reboot the J2EE Engine.

**Results**

You now find the noncentral J2EE Adapter Engine in the System Landscape Directory (SLD) and under the node *Non-central Adapter Engines* in the Runtime Workbench of the PI server.
6.15 Post-Installation Steps for the PCK (Optional Standalone Unit)

You must perform the following steps on the central instance host on which you have installed the Partner Connectivity Kit (PCK).

**Note**

You need an SAP NetWeaver AS Java system with release 7.0 EHP 1 or higher and usage type Process Integration (PI) to connect to.

- **Configuring the PCK [page 94]**
  After the installation you have to configure the PCK by performing the following steps.

- **Starting the PCK [page 95]**
  This section describes how to start the PCK.

- **Changing Passwords for User Management (UME) [page 95]**
  After installation you need to log on to the UME and change the passwords for users `pckuser` and `pckreceiver`.

### 6.15.1 Configuring the PCK

After the installation you have to configure the PCK by performing the following steps.

**Procedure**

1. Configure the `aii.properties`.
   
   For more information, see SAP Note 746328.

2. Change the properties of the J2EE Service **SAP NetWeaver XI AF CPA Cache Service**.
   
   For more information, see SAP Note 746328.

3. Assign the required user roles.
   
   For more information, see SAP Note 746328.

4. Change the properties of the J2EE Service **SAP NetWeaver XI AF Core Service**.
   
   For more information, see SAP Note 1156008.
6.15.2 Starting the PCK

This section describes how to start the PCK.

Procedure

1. On your PCK host, enter the following URL in your Web browser:

   \texttt{http://<PCK\_host>:<J2EE\_port>/pck/start}

   where \texttt{<PCK\_host>} is the host name on which you installed the PCK and \texttt{<J2EE\_port>} is the HTTP port of the SAP J2EE engine with the following naming convention: \texttt{5<J2EE\_instance\_number>00} (for example 50000 if your J2EE instance is 00).

2. Starting the PCK GUI on a Client:

   To start the PCK GUI on a client, the Java \texttrademark\ Web Start 1.4.2 must be installed on that client. For more information on how to install and configure Java \texttrademark\ Web Start 1.4.2, choose \textit{Client Installation Guidelines} on the PCK start page.

   To start the PCK GUI, choose \textit{PCK} on the PCK start page.

   If you start the PCK GUI for the first time on the client, the software packages are prepared for download to the client. After a few moments (depending on the hardware of your J2EE host) you may use the same link again to launch the PCK UI.

6.15.3 Changing Passwords for User Management (UME)

After installation you need to log on to the UME and change the passwords for users \texttt{pckuser} and \texttt{pckreceiver}.

Procedure

1. On your PCK host, log on to User Management by entering the following URL in your Internet browser:

   \texttt{http://<host>:<HTTP\_port>/useradmin}

2. With your first logon, you are prompted to change the passwords for users \texttt{pckuser} and \texttt{pckreceiver}. 
6.16 Enabling the Database

Use

After the SAP system installation, you must enable the database.

Procedure

Caution

The DBA Cockpit is not available in a Java-only system. To monitor the ASE database of your Java stack, connect it to a DBA Cockpit of an ABAP system in your system landscape.

1. You must enable the database for monitoring by setting up a DBA Cockpit Framework (DCF) after the SAP system installation. The DCF provides a time-based collection and evaluation of performance, configuration, and space-related data. In your SAP system, call transaction DBACOCKPIT to start the DBA Cockpit. Calling the DBA Cockpit automatically checks the existence of the DCF.

Recommendation

To make sure that the DCF was set up correctly, we recommend that you go to Configuration DBA Cockpit Framework Data Collectors and Admin Procedures in the DBA Cockpit.

For further details, refer to the database administration guide. You can find the administration guide in the Service Marketplace: http://service.sap.com/instguides SAP NetWeaver SAP NetWeaver <Release> Operations Database-Specific Guides

2. Manually activate the Internet Communication Framework (ICF) service to ensure that the DBA Cockpit functions correctly. It is required to access Web Dynpro ABAP-based applications. It is not activated by default. For more information, see SAP Note 1245200.

3. Apply the latest patches for the DBA Cockpit. For more information, see SAP Note 1558958.

4. Set up Automatic Table Maintenance in the DBA Cockpit. Read the article DBA Cockpit: Automatic Table Maintenance for SAP ASE (http://scn.sap.com/docs/DOC-15162).

5. Check SAP Note 1539124 to make sure that the database configuration for your SAP installation complies with SAP’s requirements and recommendations.

6. For systems with high load, refer to SAP Note 1722359.
6.17 Performing a Full System Backup

You must perform a full system backup 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:

Table 26:

<table>
<thead>
<tr>
<th>Release</th>
<th>SAP Library Path</th>
</tr>
</thead>
</table>

For more information about backing up your database, see http://help.sap.com/nw | SAP NetWeaver Platform | SAP NetWeaver 7.0 <Including Enhancement Package> | Application Help > SAP NetWeaver by Key Capability > Database Administration | Database Administration for SAP ASE |
7 SAP ASE 15.7: Disaster Recovery Setup with SAP Replication Server

7.1 Disaster Recovery Setup with SAP Replication Server

In the following chapters you will learn how to set up a disaster recovery solution using SAP ASE, the SAP Replication Server and the Disaster Recovery Agent Management utility.

⚠️ Caution

Carefully follow the instructions outlined in the following chapters. This is the only supported installation method to set up a disaster recovery solution with the SAP Replication Server!

This solution is not designed to support high availability, reporting, or other solutions that might be supported by replication tools.

In a typical replication scenario, the SAP system updates data on the primary database. Transactions are replicated automatically to the standby database by the replication software. In a failover scenario, the SAP application connections are switched to the standby database. Transactions generated on the standby database continue to be saved by the replication server until the primary database comes back online. Once the primary database returns to service, the saved standby database transactions are released and applied to the primary host. Both databases are resynchronized.

The figure below illustrates the replication architecture. It consists of the primary and the standby environments. The database and replication servers need to be run on the same hardware platform and operating system at both sites. The hosts can be virtual or physical machines, or a mix of both.
All components of a primary or standby environment can run on the same host (co-located environment). It is also possible to separate the database and the Replication Server (dis-located environment). The Replication Server and Disaster Recovery Agent must run on the same host.

**Caution**

The installation and uninstallation processes of the Replication Server software require having the corresponding SAP system mount directory (`\<SAPGLOBALHOST>`\sapmnt) available on that host.

For more information, see [SAP Directories](page 146).

Replication is set up to support a replication in both directions between the primary and the standby site, although only one direction is available at any one point in time. Two databases are replicated between the primary and the standby site:

- SAP application database
- SAP ASE master database

Initially, the SAP Business Suite product must be installed with the SAP ASE database on the primary site. The SAP NetWeaver Application Server can be installed on the database host or a separate host. The standby database must be a copy of the database instance of the primary site. In case of a failover, the work processes of the SAP NetWeaver Application Server will automatically reconnect to the standby database.

**Caution**

Do not enable a replication environment if you are not familiar with the SAP Replication Server product. Particularly in outage situations, the database log of the primary database can run out of space and the SAP system could face downtime as a result. Stopping the replication in an inappropriate manner may require rematerialization of the standby database.
Read SAP Note 1891560 before you start the installation. The SAP Note contains the most recent information on the installation, as well as corrections to the installation documentation.

For more information, see the following guides:

- **Rolling Database Update in an SAP ASE and SAP Replication Server Environment**:  

- **HADR Users Guide**:  

### 7.2 Implementation Considerations

The standby database requires the same levels of protection and scheduled maintenance as the primary database. Periodic reorganizations, generation of statistics, and other housekeeping tasks are also required on the standby site. The standby site requires its own backup and recovery process. This includes disk-based file backup and recovery, as well as dump creation and archiving at database level.

As a result of the logical replication method, the standby database might need more device space than the primary site. Dump files from the primary host cannot be used for recovery of the standby site. Once replication begins, the physical attributes of the primary and standby databases are no longer equivalent and they cannot share the same dump and load files for recovery.

During replication, additional information is written to the database transaction log for each database. The transaction log volume will increase by 40 to 50%.

The master database will always be replicated. It is not possible to exclude it.

### 7.3 Prerequisites

The following prerequisites must be fulfilled before you set up a disaster recovery solution:

<table>
<thead>
<tr>
<th>Area</th>
<th>Requirements</th>
</tr>
</thead>
</table>
| Software  | SAP recommends to install the latest versions of SAP ASE and of the SAP Replication Server:  
For more information on the latest versions and the certified combinations of SAP ASE and SAP Replication Server, see SAP Note 1891560. |
| Hardware  | Database and replication server must use the same hardware platform. SAP recommends installing the replication server on a separate host to keep the impact on the database as low as possible. |
### ASE Server Names

The SAP ASE server name is based on the `<SID>` value and is the same on both primary and standby sites.

The SAP database name is the same on both sites.

### Directories

For an SAP installation, the replication environment must be installed in the following directory:

```
<drive:\sybase\<SID>_REP
```

Reserve at least 6 GB free space for software and configuration files.

The initial replication server partition file is placed in a folder at:

```
<drive:\sybase\<SID>_REP\repdata_1
```

You can specify another folder for placing replication server partition files during installation. This allows distribution of disk I/O to several disks.

The initial size of the partition file should be at least factor 1.5 of the log size of the SAP application database. Reserve additional 2 GB for replication server usage in this folder.

### TCP/IP ports

In addition to the ASE TCP/IP ports, the following ports are required for the replication environment:

- Replication server: 4905
- Replication server system database: 4906
- Replication server system database replication agent: 4907
- DR agent RMI: 4908
- DR agent: 4909

The values for the TCP/IP ports are default values. It is possible to customize the port numbers.

The primary and the standby site can use the same port numbers.

### Database Time Synchronization

Both primary and standby databases must have the same UTC time. Otherwise the SAP application will not work properly, if the SAP system is using the standby database.

### Database User

The following users are required on both sites:

- `sapsa`
- `sapso`
- `Replication user (<SID>_maint)`
- `DR agent administrator (DR_admin)`

The `sapsa` and `sapso` logins and their passwords must be identical across both databases. The replication user and the DR agent administrator are created by the SAP installer.

Be aware that the database user `DR_admin` is included in the secure storage of the SAP system, should you want to change the password.
<table>
<thead>
<tr>
<th>Area:</th>
<th>Requirements:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system user</td>
<td>The replication server and the DR agent are started with OS user syb&lt;dbsid&gt;. All operating system users and groups need to have the same user and group ID on all servers. Windows services are set up for the replication server and the DR agent. The services are installed with the logon information of OS user syb&lt;dbsid&gt;. Whenever the password of OS user syb&lt;dbsid&gt; is changed, you also have to change the services accordingly.</td>
</tr>
</tbody>
</table>

7.4 Installing the Replication Environment

Choose one of the following topologies and perform the appropriate installation steps to enable replication of an SAP system:

- Co-Located Replication Topology: Central Instance at the Primary Site [page 102]
- Co-Located Replication Topology: Central Instance on a Separate Server [page 104]
- Dis-Located Replication Topology: Central Instance on a Separate Server [page 106]

⚠️ Caution

- SRS is installed silently as part of the installation of the respective SAP product. Do not install the SRS separately.
- If you use virtual host names, choose parameter mode Custom during the installation. The installer will ask for the server names of SAP ASE and SRS. Enter the virtual host names not the physical host names. If the databases are located in different networks, specify the fully qualified DNS Domain Name (FQDN).
- The DR_agent will tune the SRS memory parameters based on the Physical Memory value of the SRS. If the values need to be changed after the installation, run the DR_agent command sap_tune_rs again on both sides.

7.4.1 Co-Located Replication Topology: Central Instance at the Primary Site

The following replication topology shows a co-located scenario. The database and the SAP Replication Server are installed on the same server. In this scenario the Central Instance (CI) is also installed on one of the database servers.
Prerequisites

You have installed an SAP application on SAP ASE. The Central Instance (CI) and ASE 1 are installed on host 1 according to the SAP Installation Guide.

Installation Steps

Proceed as follows to install an additional replication environment to ensure high availability:

**Note**

The following procedure describes the installation steps for a replication environment. Standard inquiries for the software location and the password need to be filled out as well.

- Step 1: Install the SAP Replication Server software on host 1.
- Step 2: Install the secondary ASE database and SAP Replication Server on host 2. Configure the replication environment on host 2.

**Step 1: Install the SAP Replication Server software on host 1.**

1. Run the installer with the following option: \SAP NetWeaver 7.0 including <Enhancement Package> > Software Life-Cycle Options > Database Tools > SAP ASE > Database Replication > Setup of Replication Environment
2. Follow the instructions in the installation dialog. Select the following options:
   1. Select **Install the replication server software**.
   2. Finish the installation process.
Step 2: Install the secondary ASE database and SAP Replication Server on host 2. Configure the replication environment on host 2.

1. Run the installer with the following option: SAP NetWeaver 7.0 including <Enhancement Package> > Software Life-Cycle Options > Database Tools > SAP ASE > Database Replication > Setup of Replication Environment.

2. Follow the instructions in the installation dialog. Select the following options:
   ○ Set up a secondary database instance
   ○ Install the replication server software
   ○ Configure the replication system
   ○ Materialize the secondary databases
     Select the desired materialization method.
     The materialization step performs the initial copy of database content from one site to the other. Once completed, the replication software will maintain the data integrity of the target site by continuously applying changes that occur after completion of the materialization process. The procedure for materialization is dependent on the type and size of the database being materialized (see section Materializing Databases). The installer provides user interaction points that are used to synchronize the replication environment with the end user’s manual dump and load activities.

3. Finish the installation process.

7.4.2 Co-Located Replication Topology: Central Instance on a Separate Server

The following replication topology shows a co-located scenario. The database and the SAP Replication Server are installed on one server. The central instance (CI) is installed on a separate server.
Figure 7: Co-Located Replication Topology: Central Instance on a Separate Server

**Prerequisites**

You have installed an SAP application on SAP ASE. The Central Instance (CI) and ASE 1 are installed on host 1 according to the SAP Installation Guide.

SAP system folder (`\sapmnt\<SID>` of host 3 is mounted on host 1.

The SAP central instance and the application server are installed on host 3.

ASE 1 is installed as a distributed database instance on host 1.

**Installation Steps**

The following procedure describes the installation steps for a replication environment to ensure high availability. Standard inquiries for the software location and the password need to be filled out as well.

- Step 1: Install the SAP Replication Server software on host 1.
- Step 2: Install the secondary ASE database and SAP Replication Server on host 2. Configure the replication environment on host 2.
Step 1: Install the SAP Replication Server software on host 1.

1. Run the installer with the following option:

   SAP NetWeaver 7.0 including <Enhancement Package> > Software Life-Cycle Options > Database Tools > SAP ASE > Setup of Replication Environment

2. Follow the instructions in the installation dialog. Select the following options:
   1. Select Install the Replication Server software.
   2. Finish the installation process.

Step 2: Install the secondary ASE database and SAP Replication Server on host 2. Configure the replication environment on host 2.

1. Run the installer with the following option:

   SAP NetWeaver 7.0 including <Enhancement Package> > Software Life-Cycle Options > Database Tools > SAP ASE > Database Replication > Setup of Replication Environment

2. Follow the instructions in the installation dialog. Select the following options:
   - Set up a secondary database instance
   - Install the replication server software
   - Configure the replication system
   - Materialize the secondary databases
     Select the desired materialization method.
     The materialization step performs the initial copy of database content from one site to the other. Once completed, the replication software will maintain the data integrity of the target site by continuously applying changes that occur after completion of the materialization process.
     The procedure for materialization is dependent on the type and size of the database being materialized (see Materializing Databases).
     The installer provides user interaction points that are used to synchronize the replication environment with the end user’s manual dump and load activities.

3. Finish the installation process.

7.4.3 Dis-Located Replication Topology: Central Instance on a Separate Server

The following replication topology shows a dis-located scenario. The database, the SAP Replication Server, and the central instance (CI) are installed on separate hosts.
Prerequisites:

- You have installed an SAP application on SAP ASE. You want to install an additional replication environment to ensure high availability.
- SAP system folder (`\sapmnt\<SID>`) of host 3 is mounted on host 1.
- The SAP central instance and the application server are installed on host 5.
- ASE 1 is installed as a distributed database instance on host 1.

Installation Steps

The following procedure describes the installation steps for a replication environment to ensure high availability. Standard inquiries for the software location and the password need to be filled out as well.

- Step 1: Install the SAP Replication Server software on host 3.
- Step 2: Install the secondary ASE database on host 2.
- Step 3: Install the SAP Replication Server and configure the replication environment on host 4.
Step 1: Install the SAP Replication Server software on host 3.

Procedure:

1. Run the installer with the following option:
   - SAP NetWeaver 7.0 including <Enhancement Package>
     - Software Life-Cycle Options > Database Tools > SAP ASE > Database Replication > Setup of Replication Environment

2. Follow the instructions in the installation dialog. Select the following option:
   - Install the replication server software
   Finish the installation process.

Step 2: Install the secondary ASE database on host 2.

Procedure:

1. Run the installer with the following option:
   - SAP NetWeaver 7.0 including <Enhancement Package>
     - Software Life-Cycle Options > Database Tools > SAP ASE > Database Replication > Setup of Replication Environment

2. Follow the instructions in the installation dialog using the installation option Custom.
   Select the following option:
   - Set up a secondary database instance
   Finish the installation process.

Step 3: Install the SAP Replication Server. Configure the replication environment on host 4.

1. Run the installer with the following option:
   - SAP NetWeaver 7.0 including <Enhancement Package>
     - Software Life-Cycle Options > Database Tools > SAP ASE > Database Replication > Setup of Replication Environment

2. Follow the instructions in the installation dialog. Select the following options:
   - Install the replication server software
   - Configure the replication system
   - Materialize the secondary databases
     Select the desired materialization method.
     The materialization step performs the initial copy of database content from one site to the other. Once completed, the replication software will maintain the data integrity of the target site by continuously applying changes that occur after completion of the materialization process.
     The procedure for materialization is dependent on the type and size of the database being materialized (see section Materializing Databases).
     The installer provides user interaction points that are used to synchronize the replication environment with the end user’s manual dump and load activities.
3. Finish the installation process.

7.4.4 Materializing Databases

This section describes how to materialize the following databases:

- Master database
  Some information in the master database is site-specific. The only master database changes that are replicated are logins and roles for synchronizing users and credentials between the two sites. The DR agent facilitates materialization of the master database providing an automated materialization function. The SAP installer materializes the master database automatically.

- SAP database
  The SAP installer, by default, offers automatic database materialization through database dump and load. This is the easiest method to materialize the SAP application database on the standby site. In this case, the installer will execute the dump database and load database commands without the interaction of a database administrator. Large databases may not fit for automatic materialization. Their size requires timing and control that is best left to the attention of the administrator. Therefore it is also possible to perform a customized database materialization. The SAP installer provides user interaction points that are used to synchronize the replication environment with the end user’s manual database actions. To guarantee recoverability, read SAP Note 1585981.

7.4.4.1 Manual Materialization

The following methods are available:

- Using Single Database Dump and Load
- Using Database and Transaction Dump and Load
- Using Snapshot Materialization

Using Single Database Dump and Load

If the database is small enough to support materialization using a single database dump file, the sequence for performing this process is as follows:

1. The installer stops for manual loading of the standby database. The primary database contains the necessary replication markers at this time.
2. Dump the database using the command dump database in the primary database server.
3. Copy the dump file to the standby site. You can use shared storage or FTP to make a copy of the dump file available at the standby site.
4. Load the SAP database using the ASE command load database in the standby database server.
5. Bring the standby database online using the command online database to make the database available for use in the standby system.
6. Confirm the installer dialog. The database will be checked for the dump marker.

**Using Database and Transaction Dump and Load**

For large databases, it may be impractical to create a new dump of the entire database. Or the time required to dump the database might create a backlog of hours or days that replication would need to apply in order to get back in sync. To facilitate materialization for large databases, the dump can be done in advance and transferred to the target side before the replication is started. Using this method, which includes transaction dumps, means that the replication delay and backlog are kept to a minimum.

The key difference in this technique is that the SAP installer is not involved until just before the last transaction dump is to be created. This allows the replication products to only address activity that occurs after the last transaction dump.

The sequence for performing materialization using transaction dump and load is as follows:

1. Dump the database on the primary database server. This can be a new dump or an existing dump if your system is already configured to perform periodic dumps of the entire database. If you are creating a new dump, use the ASE command `dump database` in the primary database server to create a dump of the entire database. Transfer the database dump to the standby site.

2. Install the SAP Replication Server software and perform the configuration on the primary site just before you intent to do the last transaction dump/load.

3. The installer stops for manual loading of the standby database. The primary database now contains the necessary replication markers.

**Note**

Make sure that there is no automatic `dump database` or `dump transaction` enabled at that time. Once you start the installer on the primary site to install and configure the replication server no automatic/manual dump should occur.

4. Load the database on the standby database server. Use the ASE command `load database` in the standby database server to load the dump.

5. Apply the necessary transaction log dumps to the standby database with the ASE command `load transaction`.

6. Dump the final transaction log of the SAP database which contains the replication marker. Use the ASE command `dump transaction` in the primary database server to create the last dump of the ASE transaction log.

7. Load the last transaction log dump.

8. Bring the standby database online using the ASE command `online database` to make the database available for use.

9. Confirm the installer dialog. The database will be checked for the dump marker.

**Using Snapshot Materialization**

It is possible to materialize the standby database by using a snapshot of the primary database files with the help of a hardware mirroring product.
The sequence for performing materialization using database device files is as follows:

1. The installer stops for manual materialization of the standby database. The primary database contains the necessary replication markers at this time.

2. Quiesce the primary database.
   Use the ASE command `quiesce database` to freeze the database by suspending all disk write activities.

3. Generate a snapshot of the database files. The action to be performed depends on the hardware mirror product you are using. You could also just copy the files, use shared storage or FTP to make a copy of the dump file available at the standby site.

4. Unquiesce the primary database.
   Use the ASE command `quiesce database _ release` to enable disk write activities on the primary database again.

5. Load the standby database with the snapshot files.
   Use the ASE command `mount database` in the standby database to mount the database content.

6. Bring the database online using the ASE command `online database` in the standby database server to make the database available for use.

7. Confirm the installer dialog. The database will be checked for the dump marker.

### 7.5 Starting and Stopping the DR Agent and the Replication Server

To be able to stop and start the DR Agent and the replication server, you must have the credentials of OS user `syb<dbsid>`.

**Note**

ASE, the DR Agent and the replication server can also be started and stopped using `startdb`, `stopbd`, `sapdbctrl`, or `saphostctrl`. For more information, see SAP Note 1899185: "SAP ASE and SAP Replication Server: startdb & stopdb".

### Connecting to the DR Agent

Although there are two DR agents (one in primary and another in the standby environment), you will only need to enter commands at one of the DR agents. The DR agents can connect to each other in order to share configuration information or to execute any activity that requires local access to the host. To set up and monitor replication, log on to the DR agent on the primary environment.

Use the DR agent’s host and port and the DR agent administrator’s security credentials to establish a connection to the DR agent. The following example illustrates the use of ISQL to connect to the DR agent. Open a command shell for OS user `syb<dbsid>`:

**Example**

```
isql -X -U DR_admin -S <hostname>:<DR agent port>
```
The DR agent does not store its own security credentials, but rather, enforces authentication by pass-through authentication to the database server, or replication server.

**Starting the DR Agent**

Start the Windows Service named `DRAgent_<SID>`.

**Stopping the DR Agent**

Stop the Windows Service named `DRAgent_<SID>`.

If you are using Microsoft Cluster Services, both the replication server and DR agent must be represented by Windows Services, and they must be defined as services in all nodes of the cluster. If the services are not defined on all nodes, attempts to fail-over will not be successful.

**Starting the Replication Server**

Start the Windows service named `SYBREP_<SID>_REP`.

**Stopping the Replication Server**

Stop the Windows service named `SYBREP_<SID>_REP`.

### 7.6 Removing the Replication Environment

The installer provides installation options for teardown and removal of a replication environment.

Start with the uninstallation of the current primary environment. Otherwise database connects will be redirected and the installer will not be able to execute the necessary cleanup in the database.

As soon as the primary replication environment is removed, it is possible to uninstall the standby replication environment.

Choose the following installer options to disable replication and remove the replication software on the hosts running the replication servers.

- `<SAP product>` Software Lifecycle Options > Database Tools > SAP ASE > Database Replication > Removal of Replication Environment
Specify the kind of removal. Choose one of the following options:

- **Tear down replication system**
  This option
  - disables replication in the ASE servers
  - stops the replication servers
  - deletes all directories and files created during setup, including the replication server instances

  Data that was replicated to the standby databases will not be modified. The databases on the primary and standby hosts will not be “unmarked” for replication. The state of the environment after teardown will allow the immediate recreation of the replication environment. Materialization will again be required after setup.

  **Note**
  You can only tear down the replication environment if the DR Agent is up and running.

- **Unmark databases for replication and remove replication software**
  This option
  - unmarks the databases
  - drops the database users for replication
  - removes the replication software

If the replication server was running on a separate host, it is possible to clean up remaining SAP standalone units using the installer option *Deleting an SAP System or Single Instances*. 
7.7 Integration of the SAP Replication Server into an OS Cluster Environment

Installing the SAP Replication Server on the same host as the SAP ASE database is not supported in an OS cluster environment. The only supported option is to install the SAP Replication Server on its own host as shown below:

![Diagram showing SAP ASE and SAP Replication Server integration in an OS cluster environment]

7.8 Defining Dependencies

Both resources for replication – the replication server and the DR agent resource – will have the same dependencies. Each will be dependent on:

- The shared disk resource(s)
- The IP Address handling resource

Use the appropriate commands for your cluster software to add these dependencies to both the replication server and DR agent resources.
Note

There is no dependency between the replication server and DR agent. They can execute independently of each other.

7.9 Defining Node Failure Criteria

Most cluster software allows the state of the different cluster resources to trigger an automatic fail-over from one node in the cluster to another. The replication server and DR agent resource availability should not be used to trigger cluster fail-over.

Since the replication server processing is considered part of the SAP ASE database solution, no separate fault monitoring is required. If your existing hardware server or ASE monitoring determines that fail-over should occur, this is sufficient for replication to participate. It is not suggested that you add replication availability as a monitor for cluster node or ASE availability.

A failure by either of the replication resources will not affect the availability of your SAP application. However, a failure of your ASE resources does affect your SAP application availability. It is recommended that node failure continue to be triggered by ASE, but not include replication availability.
The Disaster Recovery setup for SAP ASE 16.0 offers the following replication modes:

- Synchronous Replication (Hot Standby)
- Near-Synchronous Replication (Hot Standby)
- Asynchronous Replication (Warm Standby)

SAP recommends to always install the latest versions of SAP ASE and of the SAP Replication Server. For more information on the latest versions and the certified combinations of SAP ASE and SAP Replication Server, see SAP Note 1891560.

The DR setup with SAP ASE 16.0 provides additional features for monitoring the SAP Replication Server using the Replication Management Agent (RMA).

You can install the SAP Replication Server on the same host as SAP ASE 16.0 (co-located scenario).

For more information, see the HADR Users Guide for SAP ASE 16.0, Chapter 4, Installing HADR for SAP Business Suite and SAP Note 1891560, section Additional Information.
9 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 one SAP system in one Microsoft failover cluster.
- You install one SAP system in two Microsoft failover clusters.
- You install several SAP systems in one or more Microsoft failover clusters with two and more Microsoft failover cluster nodes.

You have the following options to install the database instance with a high-availability SAP system:

- You install the database instance in the same failover cluster as the 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.
- 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 or shared disks.
- 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 (A)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.
- As of Windows Server 2008 there are the following terminology changes for a cluster configuration:
  - The cluster feature is called Failover Clustering. You might still find the previous terminology Microsoft Cluster Service and abbreviation MSCS in some sections of this guide.
  - Cluster groups are called services and applications (Windows Server 2008 (R2)), or roles (Windows Server 2012 (R2) and higher).
    In some sections we are continuing to use the old term. In this case, “cluster group” also means “service and application”, or “role”.
  - The Cluster Administrator is called Failover Cluster Manager.

9.1 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 check that you have completed the same planning activities as for a non-HA system.
2. You decide how to set up your SAP system components in a Microsoft failover cluster [page 120].
3. You decide how to distribute SAP system components to disks for a high-availability system [page 127].
4. You read Directories in a Microsoft Failover cluster Configuration [page 130].
5. You read IP Addresses in a Microsoft Failover Cluster Configuration [page 130].
6. You obtain IP addresses for a high-availability system [page 133].

**Preparation**

1. You check that you have completed the same preparations [page 46] as for a non-HA system.
2. To make sure that all preparation steps have been correctly performed, check that you can move the disk resources from one cluster node to another so that they are accessible from a single node at any time.

**Installation**

1. You make sure that:
   1. You are logged on as domain administrator, unless otherwise specified.
   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. You configure the first cluster node [page 136].
3. You install the database instance on the first cluster node [page 137] of the database instance host.
4. You configure the database on the additional node. [page 138]
5. You configure the additional cluster node [page 138].
6. You install the central instance [page 139].
7. You install at least one dialog instance [page 140].

**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 74] as for a non-HA system.

**Additional Information**

- Moving Cluster Groups, or Services and Applications, or Roles [page 142]
- Starting and Stopping the SAP System in a Microsoft Failover Cluster [page 143]
9.2 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 118].

9.2.1 System Configuration with Microsoft Failover Clustering

The following chapters provide information about the configuration of your SAP system configuration 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 120]
- Multiple SAP Systems in One Microsoft Failover Cluster [page 124]
- Multiple SAP Systems in Multiple Microsoft Failover Clusters [page 125]
- Enqueue Replication Server in a Microsoft Failover Cluster [page 126]

9.2.1.1 SAP System Components in a Microsoft Failover Cluster

In a Microsoft failover cluster configuration you have the following components for your SAP system:

<table>
<thead>
<tr>
<th>Component</th>
<th>Number of Components per SAP System</th>
<th>Single Point of Failure (SPOF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCS instance (message services and enqueue services)</td>
<td>1</td>
<td>yes</td>
</tr>
<tr>
<td>Database instance (*)</td>
<td>1</td>
<td>yes</td>
</tr>
<tr>
<td>Application server (central instance, dialog instance)</td>
<td>1-&lt;N&gt;</td>
<td>no</td>
</tr>
</tbody>
</table>

(*) the database instance can also be installed outside the Microsoft failover cluster.

- To protect the SPOFs ((A)SCS instance, database instance) you have to use Microsoft Failover Clustering.
  - If a hardware or software problem occurs on the first cluster node, the clustered (A)SCS instance and the clustered database automatically fail over to another node.
  - If you need to maintain the cluster node where the (A)SCS instance and database are running you can switch these instances to another node. When maintenance work is finished you move the (A)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 (one central instance and at least one dialog instance) on two different hosts. You have the following options:
  ○ You install the central instance and the dialog instance on the cluster nodes of a Microsoft failover cluster. You install them on a local disk. Any additional dialog instances are installed on hosts outside of the Microsoft failover cluster.
    If you have to maintain a cluster node, you have to stop the central or dialog instance on that node. When you have finished maintenance, you restart the instances.

  i Note

    If you install the central instance and the dialog 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 an Microsoft failover cluster setup, the (A)SCS and database instances also switch to run on the failover cluster host in the event of failover, which temporarily also increases system load.

  ○ You install the central instance and all dialog instances on hosts, which are not part of a Microsoft 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 a Microsoft failover cluster configuration where the non-SPOFs components (central instance, dialog instance) are installed locally on the cluster nodes. Any additional dialog instances are installed outside the Microsoft failover cluster on separate hosts.
Figure 9: Java System with SPOFs, where non-SPOFs are installed locally on the Failover Cluster Nodes

The following figure shows an HA configuration, where the non-SPOFs components (central instance, dialog instance) are installed on separate hosts that are not part of the Microsoft failover cluster.

CI = Central Instance
DI = Dialog Instance
DB = Database Instance
ERS = Enqueue Replication Server Instance
SCS = Central Services Instance
Besides installing your SAP system within one Microsoft failover cluster, you can also set up two Microsoft 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 (A)SCS instance is installed on the second Microsoft failover cluster. The application servers (central instance, dialog 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.

**Figure 10: Java System where the non-SPOFs are installed on hosts outside of the Microsoft Failover Cluster**

**SAP System Components in Two Microsoft Failover Clusters**

Besides installing your SAP system within one Microsoft failover cluster, you can also set up two Microsoft 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 (A)SCS instance is installed on the second Microsoft failover cluster. The application servers (central instance, dialog 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.
9.2.1.2 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 additional local instances such as an enqueue replication server, central instance, or dialog instance 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 shared disk, IP address, network name, `sapmnt` share, as well as a SAP service resource (or generic service resource), and the SAP instance resource.

If you have a Microsoft failover cluster configuration with three or more cluster nodes, the following restrictions apply:

- The (A)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 one Microsoft failover cluster. For each SAP system you have to install one central and at least one dialog instance.

![Diagram of multiple SAP systems in one Microsoft Failover Cluster](image)

**Figure 12: Multiple SAP Systems in One Microsoft Failover Cluster**

### 9.2.1.3 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.

**Note**

As of Windows Server 2012, the Microsoft Failover Clustering software supports up to 64 cluster nodes.

For this failover cluster configuration the following restrictions apply:

- The (A)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 and ASCS 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 (A)SCS instance on **two** nodes.

For more information, see SAP Note [1634991](https://support.sap.com/).  

**Figure 13: Multiple SAP Systems in Two Microsoft Failover Clusters**

### 9.2.1.4 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 (A)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 (A)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 second 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 a Microsoft failover cluster configuration with two nodes:

![Figure 14: Enqueue Replication Server Mechanism on One Microsoft Failover Cluster with Two Nodes](image)

### 9.2.2 Distribution of SAP System Components to Disks for a Microsoft Failover Cluster

When planning the high-availability installation, keep in mind that the cluster hardware has two different sets of disks:

- Local disks that are connected directly to the cluster nodes
- Shared disks that can be accessed by all cluster nodes via a shared interconnect

**Note**

Shared disk is a synonym for the cluster resource of Resource type Physical disk.

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
- On the shared storage used in common by all cluster nodes

You install the following on different shared disks:

- Database instance files, if the database instance is installed in a Microsoft failover cluster.
- (A)SCS instance
- SAP system executables
- Single quorum device, if used
**Caution**

You **must not** install any SAP or database components on the quorum disk.

The following figure shows a cluster configuration, where the (A)SCS and DB 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 in a Failover Cluster](image)

**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), and the number of data centers. For more information, see the Windows documentation.

The default quorum configuration used on Windows Server 2008 (R2) and higher is called **Node and Disk Majority** for clusters with more than two nodes.

With this quorum configuration, each node and the witness disk maintain its own copy of the cluster configuration data. This ensures that the cluster configuration is kept running even if the witness disk fails or is offline.

**Note**

The disk layout of the Node and Disk Majority and the Single Quorum Device Cluster is identical.

**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 Windows failover clustering configuration consists of two cluster nodes and a shared disk 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 disk storage architecture since a shared disk 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 disk storage subsystem
- Acceptable amount of data loss during a failover
- Physical layout of the disk 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 Microsoft failover cluster and the database is replicated by pure database techniques, such as shadow database, log shipping, and mirrored database.

⚠️ **Caution**

The numerous variants with geospan cluster configurations and the complex technical requirements are the reasons why the installation and configuration of such high-availability (HA) systems are not directly supported by SAP. Instead, the hardware vendors of this cluster configuration are responsible for the installation, configuration, and operation of the HA components running in geospan clusters. SAP only supports the standard operation and function of the SAP components running in such HA configurations.

All functionality to set up geospan clusters is available since Windows Server 2008 (R2).
9.2.3 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:

Table 29: Directories on Local Disks on Cluster Nodes

<table>
<thead>
<tr>
<th>Component</th>
<th>Default Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>A supported operating system</td>
<td>%windir%</td>
</tr>
<tr>
<td>Microsoft Failover Clustering software</td>
<td>%windir%\Cluster</td>
</tr>
<tr>
<td>Application server (if installed locally)</td>
<td>&lt;Local_Drive&gt;:\usr\sap&lt;SAPSID&gt;&lt;Instance&gt;</td>
</tr>
<tr>
<td>Enqueue replication server</td>
<td>&lt;Local_Drive&gt;:\usr\sap&lt;SAPSID&gt;\ERS&lt;Instance_Number&gt;</td>
</tr>
<tr>
<td>Diagnostics Agent (optional)</td>
<td>&lt;Local_Drive&gt;:\usr\sap&lt;DASID&gt;\SMDA&lt;Instance_Number&gt;</td>
</tr>
<tr>
<td>SAP Host Agent</td>
<td>%ProgramFiles%\SAP\hostctrll</td>
</tr>
</tbody>
</table>

Table 30: Directories on Shared Disks

<table>
<thead>
<tr>
<th>Component</th>
<th>Default Directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster <em>quorum resource</em> (if used)</td>
<td>&lt;Drive&gt;:\Cluster</td>
</tr>
<tr>
<td>SAP global and instance directories</td>
<td>&lt;Drive&gt;:\usr\sap ...</td>
</tr>
</tbody>
</table>

9.2.4 IP Addresses in a Microsoft 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.

**Note**

As of Windows Server 2008, besides static IP addresses, you can also have DHCP-based (dynamic) IP addresses.

Currently DHCP-based IP configurations are not supported for high-availability SAP systems. If the virtual IP address of the SAP cluster group changes during a failover, your clients can no longer reach the system due to DNS caching.
Types of IP Addresses

In a proper 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 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 configuration has two networks:

- A public network that is used for the communication between the central instance, 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.

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:

<table>
<thead>
<tr>
<th>Network Adapter</th>
<th>IP Address</th>
<th>Host Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter 1 (private network)</td>
<td>10.1.1.1</td>
<td>clusA_priv</td>
</tr>
<tr>
<td>Network Adapter</td>
<td>IP Address</td>
<td>Host Name</td>
</tr>
<tr>
<td>------------------------------</td>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Adapter 3 (heartbeat network)</td>
<td>192.168.1.1</td>
<td>clusA</td>
</tr>
</tbody>
</table>

**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 often 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.

A Microsoft failover 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.
9.2.5 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.
Note: In the following tables we are still using the terminology *cluster group*, and not the Windows Server 2008 (R2) terminology *services and applications* or the Windows Server 2012 (R2) terminology *Roles*.

### Table 32: Physical IP Addresses

<table>
<thead>
<tr>
<th>Component</th>
<th>Example for Physical IP Address</th>
<th>Example for Physical Host Name</th>
<th>Purpose</th>
<th>Defined During</th>
</tr>
</thead>
<tbody>
<tr>
<td>First cluster node: adapter for heartbeat network</td>
<td>10.1.1.1</td>
<td>clusA_priv</td>
<td>Address for internode communication on the heartbeat network</td>
<td>Windows installation</td>
</tr>
<tr>
<td>First cluster node: adapter for public network</td>
<td>129.20.5.1</td>
<td>clusA</td>
<td>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)</td>
<td>Windows installation</td>
</tr>
<tr>
<td>Additional cluster node: adapter for heartbeat network</td>
<td>10.1.1.2</td>
<td>clusB_priv</td>
<td>Address for internode communication on the heartbeat network</td>
<td>Windows installation</td>
</tr>
<tr>
<td>Additional cluster node: adapter for public network</td>
<td>129.20.5.2</td>
<td>clusB</td>
<td>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)</td>
<td>Windows installation</td>
</tr>
</tbody>
</table>

### Table 33: Virtual IP Addresses

<table>
<thead>
<tr>
<th>Component</th>
<th>Example for Virtual IP Address</th>
<th>Example for Host Name</th>
<th>Purpose</th>
<th>Defined During</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster group</td>
<td>129.20.5.3</td>
<td>clusgrp</td>
<td>Virtual address and name of the cluster group. It identifies the cluster and is used for administration purposes.</td>
<td>Failover cluster software installation</td>
</tr>
</tbody>
</table>
### Component Example for Virtual IP Address Example for Host Name Purpose Defined During

<table>
<thead>
<tr>
<th>Component</th>
<th>Example for Virtual IP Address</th>
<th>Example for Host Name</th>
<th>Purpose</th>
<th>Defined During</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP cluster group</td>
<td>129.20.5.4</td>
<td>sapgrp</td>
<td>Virtual address and name for accessing the group of SAP resources, regardless of the node it is running on</td>
<td>Configuration of SAP system for high availability with the installer on the first node</td>
</tr>
<tr>
<td>Database cluster group</td>
<td>129.20.5.5</td>
<td>dbgrp</td>
<td>Virtual address and name for accessing the group of database resources, regardless of the node it is running on</td>
<td>Execution of HA-wizard or database-specific cluster scripts</td>
</tr>
</tbody>
</table>

### 9.3 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 118].

1. You check that you have completed the same preparations [page 46] as for a non-HA system.
2. To make sure that all preparation steps have been correctly performed, check that you can move the disk resources from one cluster node to another so that they are accessible from a single node at any time.

### 9.4 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 118].

Due to a SAP MaxDB technical restriction, the use of passwords longer than nine characters is not possible in an MSCS environment. For more information, see SAP Note 2319006.
9.4.1 Configuring the First Cluster Node

Use

The following procedure describes how to configure the first cluster node.

When you run the First Cluster Node option it:

- Creates the saploc share, pointing to a local disk
- Creates the sapmnt share, pointing to a local disk
- 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, and move the resources back to the original node.

Prerequisites

- You are logged on to the first cluster node as domain administrator or as a local user with domain administration rights. For more information, see Performing a Domain Installation without being a Domain Administrator [page 153].
- You must install the SCS instance on a shared disk, and the ERS instance and SAP Host Agent on a local disk.

Procedure

1. Run the installer and choose:
   - <Product> <System> <Database> High-Availability System First Cluster Node

   🔄 Note
   
   If the installer 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 installer.
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 142]

9.4.2 Installing the Database Instance

Use

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.

Procedure

Perform the following steps on the first cluster node.

1. Run the installer [page 62] and on the Welcome screen, choose:
   - <Product> <System> <Database> High-Availability System Database Instance
2. Follow the instructions in the installer dialogs and enter the required parameter values.
   1. For the profile UNC path you have to use the UNC path of the virtual (A)SCS host name, for example:
      \<SAPGLOBALHOST>\sapmnt\<SAPSID>\SYS\profile.
      In an HA-system, the virtual host name of the (A)SCS instance is the same as the SAP global host name.

   Note

   For more information about the input parameters, position the cursor on a parameter and press the F1 key in the installer.
9.4.3 Configuring the Database on the Additional Node

Perform the steps below to configure the database on the additional cluster node.

1. On the additional cluster node, run the installer [page 62] and in the Welcome screen, choose [Product] > [Database] > [System] > [High-Availability System] > [Additional Database Cluster Node].

2. Follow the instructions in the installer dialogs and enter the required parameter values.

**Caution**
- Make sure that you enter the same drive as you did on the first database node.
- Make sure that you distribute the SAP ASE software and logs correctly to local and shared disks as described in Directories in a Microsoft Failover Cluster Configuration [page 130].

**Note**
For more information about the input parameters, position the cursor on a parameter and press the F1 key in the installer.

9.4.4 Configuring the Additional Cluster Node

**Use**

This procedure describes how to configure the additional cluster node.

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
- Installs the enqueue replication server instance (ERS) for the SCS instance
- Installs the SAP Host Agent

**Caution**
- You must install the ERS and SAP Host Agent on a local disk.
- 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, and move the resources back to the original node.
Prerequisites

- You are logged on to the additional cluster node as domain administrator or as a domain user who is a local administrator on all cluster nodes. For more information, see Performing a Domain Installation without being a Domain Administrator [page 153].
- You have already performed the First Cluster Node [page 136] option.

Procedure

1. Run the installer and choose:
   - <Product> <System> <Database> High-Availability System Additional Cluster Node
   
   i Note
   If the installer prompts you to log off from your system, log off and log on again.

2. Enter the required parameter values.
   
   i Note
   ○ For more information about the input parameters, position the cursor on the parameter and press F1 in the installer.

When you have made all required entries, the installer begins processing and converts the SAP instances on the other cluster node for operation in Microsoft failover clustering.

More Information

Moving Cluster Groups or Services and Applications or Roles [page 142]

9.4.5 Installing the Central Instance

Use

The following procedure describes how to install the central instance for Microsoft Failover Clustering.

You have the following options to install the central instance:

- You install the central instance on a cluster node.
  In this case, bring the SAP cluster group online on this node, and make sure that the central instance number is different from the (A)SCS instance number.
- You install the central instance on a host outside of the Microsoft failover cluster.
  In this case, you have to install the database client software on this host.
Procedure

1. Run the installer [page 62] and choose:
   - <Product> <System> <Database> High-Availability System Central Instance

2. If the installer prompts you to log off, choose OK and log on again.

3. Follow the instructions in the installer 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 installer.
   ○ If you install the central instance on an cluster node, make sure that on the screen SAP System > General Parameters for the:
     ○ Profile Directory, you use the UNC path of the virtual (A)SCS host name, for example: \SAPGLOBALHOST\sapmnt\<SID>\SYS\profile.
     In a HA-system, the virtual host name of the (A)SCS instance is the same as the SAP global host name.
     ○ Installation Drive, you choose the local disk where you want to install the central instance.

4. Check that the central instance is running.

9.4.6 Installing the Dialog Instance

Use

You have to install at least one dialog instance for a high-availability configuration. You have the following options to install the dialog instance:

- You install the dialog instance on a cluster node.
  In this case, bring the SAP cluster group online on this node, and make sure that the dialog instance number is different from the (A)SCS instance number.
- You install the dialog instance on a host outside of the Microsoft failover cluster.
  In this case, you have to install the database client software on this host.

Procedure

1. Run the installer [page 62] and choose:
   - <Product> <System> <Database> High-Availability System Dialog Instance

2. If the installer prompts you to log off, choose OK and log on again.

3. Follow the instructions in the installer 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 installer.
4. When you have finished, change the instance profile of the dialog instance so that the number of its work processes equals the number of work processes of the central instance.

5. If required, install additional dialog instances outside of Microsoft failover cluster.

9.5 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 perform the post-installation checks for the enqueue replication server. For more information, see the SAP Library at:
   

2. If required, you perform the general post-installation steps [page 74] listed in this guide.

9.6 Additional Information

The following sections provide additional information about:

- Moving Cluster Groups, or Services and Applications, or Roles [page 142]
- Starting and Stopping the SAP System in a Microsoft Failover Cluster Configuration [page 143]
9.6.1 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, SAP, or disk cluster groups from one cluster node to the other, you use the following:

- **PowerShell** (Windows Server 2012 (R2) and higher)
- **Failover Cluster Manager** (Windows Server 2008 (R2))

**Note**

As of Windows Server 2008 (R2) there are the following terminology changes:

- Cluster groups are called **services and applications** (Windows Server 2008 (R2), or **Roles** (Windows Server 2012 (R2) and higher)
  
  We do not always use all names in this section.
- The **Cluster Administrator** is now called **Failover Cluster Manager**.

Prerequisites

Windows Server 2008 (R2):

The services or applications you want to move are configured and are visible in the **Failover Cluster Manager**.

Procedure

**Moving Roles, or Services and Applications, or Groups**

To move the roles (Windows Server 2012 (R2) and higher) or services and applications (Windows Server 2008 (R2)), proceed as follows:

- Windows Server 2012 (R2) and higher:
  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.
- Windows Server 2008 (R2):
  1. Start the **Failover Cluster Manager** with [Start] Administrative Tools > Failover Cluster Manager
  2. In the **Failover Cluster Manager**, right-click the service and application you want to move.
  3. Choose [Move this service or application to another node] Move to <relevant node>
4. Repeat the previous step for each service and application that you want to move.

**Note**

You can only move disks that are assigned to **Services and Applications** (Windows Server 2008 (R2)) or **Roles** (Windows Server 2012 (R2) and higher).

The disks that are added to the cluster are automatically added to a group named **Available Storage**. Although the groups **Available Storage** and **Cluster Group** exist in a failover cluster on Windows Server 2008 (R2) or higher, they are not visible under **Services and Applications** (Windows Server 2008 (R2)) or **Roles** (Windows Server 2012 (R2) and higher). Therefore, you cannot move these groups with the **Failover Cluster Manager**.

- If you use Windows Server 2012 (R2) and higher, proceed as follows:
  - To move **Cluster Group**, open PowerShell in elevated mode, and enter the following command:
    ```
    move-clustergroup "cluster group"
    ```
  - To move **Available Storage**, open PowerShell in elevated mode, and enter the following command:
    ```
    move-clustergroup "Available Storage"
    ```
- If you use Windows Server 2008 (R2) proceed as follows:
  - To move **Cluster Group**, open a command prompt and enter:
    ```
    cluster group "cluster group" /move
    ```
  - To move **Available Storage**, open a command prompt and enter:
    ```
    cluster group "Available Storage" /move
    ```

9.6.2 Starting and Stopping the SAP System in a Microsoft Failover Cluster Configuration

**Use**

An SAP high-availability system with Microsoft Failover Clustering is typically configured into two cluster groups: one cluster resource group contains the database resources, the other group contains the SAP (A)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 the clustered or non-clustered SAP instances – except the clustered database and (A)SCS instance.

With certain HA administration tools (Cluster Administrator, Failover Cluster Manager, or PowerShell), you can only start or stop a clustered SAP instances, such as the (A)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 (A)SCS and Database Instance”.

For more information about SAP MMC or SAPControl, see Starting and Stopping the SAP System [page 165].

Note

- To start or stop the database instance, you have to use the tools described in “Starting and Stopping the clustered (A)SCS and Database Instance”.
- The SAP MMC is not available on the Server Core for Windows Server 2012 (R2) and higher.

Starting and Stopping the clustered (A)SCS and Database Instance

With certain HA administration tools, such as PowerShell (Windows Server 2012 (R2) and higher) or Failover Cluster Manager (Windows Server 2008 (R2)), you can only start or stop a clustered SAP instances, such as the (A)SCS instance or the database instance. For all other non-clustered instances, such as dialog instances or the central instance, you must use the SAP MMC or SAPControl.

Note

- You first have to start the (A)SCS instance and then the database instance, whereas you first have to stop the database instance and then the (A)SCS instance.

Using PowerShell (Windows Server 2012 (R2) and higher)

To start or stop the clustered (A)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:
   ```powershell
   start-clusterresource <Database Resource>
   ```
2. To start the clustered (A)SCS instance, open PowerShell in elevated mode, and enter the following command:
   ```powershell
   start-clusterresource "SAP <SAPSID> <Instance_Number> Instance"
   ```
3. To stop the clustered (A)SCS instance, open PowerShell in elevated mode, and enter the following command:
   ```powershell
   stop-clusterresource "SAP <SAPSID> <Instance_Number> Instance"
   ```
4. To stop the clustered database instance, open PowerShell in elevated mode, and enter the following command:
   ```powershell
   stop-clusterresource <Database Resource>
   ```

Using Failover Cluster Manager (Windows Server 2008 (R2))

With the Failover Cluster Manager, you can only start or stop clustered instances such as the (A)SCS instance or the database instance. For all other non-clustered instances, such as dialog instances or the central instance, you must use the SAP MMC or SAPControl.
To start or stop the clustered (A)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 (A)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 (A)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*.
10 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.

10.1 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 Environment [page 130].

End of 'High Availability': HA (Windows)

The installer 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
      - In a non-high-availability-system, you can install the central instance or the (A)SCS instance on the global host or on any other host.
      - End of 'High Availability': non-HA
    - **Profile** – contains the profiles for all instances
    - **Exe** – contains the executable replication directory for all instances and platforms
    - **Local** host and shared with the name saploc.
      - 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)
    - **Local** host, the \usr\sap\<SAPSID>\<Instance_Name> directory contains copies of the SAP software and local (instance-specific) data.
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.

In a high-availability system, file shares that are 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.

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

If you want to have it created on another host or if you want to use an existing transport host from your SAP system landscape, you can specify another host during the installation. In this case, you have to prepare that host for the new SAP system to use it. For more information, see Preparing the SAP System Transport Host [page 52].

The following figures show how the physical directory `\usr\sap` is shared on the global host in a central 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

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

Central services instance: SCS<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)

Central instance: JC<Instance_Number>

Dialog instance: J<Instance_Number>.

---

**i** Note

Every new installation of an SAP system is Unicode.

### Figure 18: Directory Structure on the Global Host in a Central Java System
10.2 Integration of LDAP Directory Services

This section explains the benefits of using the SAP system with the Lightweight Directory Access Protocol (LDAP) directory and gives an overview of the configuration steps required to use an SAP system with the directory.

LDAP defines a standard protocol for accessing directory services, which is supported by various directory products such as Microsoft Active Directory, and OpenLDAP slapd. Using directory services enables important information in a corporate network to be stored centrally on a server. The advantage of storing information centrally for the entire network is that you only have to maintain data once, which avoids redundancy and inconsistency.
If an LDAP directory is available in your corporate network, you can configure the SAP system to use this feature. For example, a correctly configured SAP system can read information from the directory and also store information there.

**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. As of Windows 2000 or higher, the Active Directory is automatically available on all domain controllers. A generic LDAP directory is an additional component that you have to install separately on a UNIX or Windows server.

**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 the 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
```

Installation of SAP Systems Based on the Application Server Java of SAP NetWeaver 7.02 on Windows: SAP Adaptive Server Enterprise  
Additional Information
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 at the following locations:

Table 34:

<table>
<thead>
<tr>
<th>Release Representations</th>
<th>Path on SAP Help Portal</th>
</tr>
</thead>
<tbody>
<tr>
<td>● SAP NetWeaver 7.0</td>
<td><a href="http://help.sap.com/viewer/p/SAP_NETWEAVER">http://help.sap.com/viewer/p/SAP_NETWEAVER</a></td>
</tr>
<tr>
<td>● SAP NetWeaver 7.0 including enhancement package 1</td>
<td>SAP NetWeaver 7.0 &lt;Including Enhancement Package&gt;</td>
</tr>
<tr>
<td>● SAP NetWeaver 7.0 including enhancement package 2</td>
<td>Application Help SAP NetWeaver by Key Capability</td>
</tr>
<tr>
<td></td>
<td>Application Platform by Key Capability</td>
</tr>
<tr>
<td></td>
<td>Java Technology</td>
</tr>
<tr>
<td></td>
<td>Administration Manual J2EE Engine</td>
</tr>
<tr>
<td></td>
<td>J2EE Engine Administration Tools</td>
</tr>
<tr>
<td></td>
<td>SAP Management Console</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including enhancement package 3</td>
<td><a href="https://help.sap.com/viewer/p/SAP_NETWEAVER_703">https://help.sap.com/viewer/p/SAP_NETWEAVER_703</a></td>
</tr>
<tr>
<td></td>
<td>Application Help SAP NetWeaver by Key Capability</td>
</tr>
<tr>
<td></td>
<td>Solution Life Cycle Management by Key Capability</td>
</tr>
<tr>
<td></td>
<td>SAP Management Console</td>
</tr>
</tbody>
</table>

Configuration Tasks for LDAP Directories

This section describes the configuration tasks for the Active Directory or other (generic) LDAP directories.

Configuration Tasks for Active Directory

To enable an SAP system to use the features offered by the Active Directory, you have to configure the Active Directory so that it can store SAP system data.

To prepare the directory, you use the installer to automatically:

- Extend the Active Directory schema to include the SAP-specific data types
- Create the domain accounts required to enable the SAP system to access and modify the Active Directory. These are the group SAP_LDAP and the user sapldap.
- Create the root container where information related to SAP is stored
- Control access to the container for SAP data by giving members of the SAP_LDAP group permission to read and write to the directory

You do this by running the installer and choosing <Product> Software Life-Cycle Options 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 installer software contains schema extensions for directory servers Netscape/iPlanet (ldregns4.txt, ldregns5.txt) and OpenLDAP slapd (ldregslapd.schema). Both files are located in the directory \Unpack_Directory\COMMON\ADS. After you have applied the schema extension, you need to create a root container to store the
SAP-related information and create a directory user that the SAP application server can use to write information to the directory.

For more information about how to set up a Netscape/iPlanet directory server, see the documentation SAP System Information in Directory Services at:


Enabling the SAP System LDAP Registration

Once you have correctly configured your directory server, you can enable the LDAP registration of the SAP system by setting some profile parameters in the default profile.

To do this, run the installer once for your system and choose <Product> Software Life-Cycle Options > 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=<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.

10.3 Performing a Domain Installation Without Being a Domain Administrator

Use

You normally perform a domain installation of the SAP system with a user who is a member of the domain Admins group, as described in Required User Authorization for Running the Installer [page 50]. If for any reason, the account used for the installation is not a member of the domain Admins group, you can perform the installation with a domain user who is a member of the local Administrators group. In this case, the domain administrator has to prepare the system appropriately for you. The domain administrator can perform the following steps either using the installer or manually:

1. Create the new global group `SAP_<SAPSID>_GlobalAdmin`.

   **Note**

   The installer 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:

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

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

- You must be domain administrator to perform the required steps.
- Windows Server 2008 (R2), Windows Server 2012 (R2), and higher:
  You must have installed the feature Remote Server Administration Tools as follows:
  - Windows Server 2012 (R2) and higher:
    Open PowerShell in elevated mode, and enter the following command:
    \\add-windowsfeature RSAT-ADDS\\
  - Windows Server 2008 (R2):
    1. Choose Start ➤ Administrative Tools ➤ Server Manager
    2. In the Server Manager window, select Features.

Procedure

Creating the Required Users and Groups Using the Installer

On the host where the SAP system is to be installed, the domain administrator runs the installer [page 62], and chooses <Product> ➤ Software Life-Cycle Options ➤ Additional Preparation Options ➤ Operating System Users and Groups to have the group and users created automatically.

Creating the Required Users and Groups Manually

Note

To create the users and groups specific to the SAP Host Agent, you must follow the procedure below, and replace the users and groups with those for the SAP Host Agent.

Creating the New Global Group SAP_<SAPSID>_GlobalAdmin

Perform the following steps:

- Windows Server 2012 (R2) and higher:
  Open PowerShell in elevated mode, and enter the following command:
  \\net group SAP_<SAPSID>_GlobalAdmin /add /domain\\
- Windows Server 2008 (R2):
  1. Log on as domain administrator.
  2. Start the Active Directory Users and Computers Console by choosing:
     Start ➤ Control Panel ➤ Administrative Tools ➤ Active Directory Users and Computers
  3. Right-click Users in Tree, and choose New ➤ Group
  4. Enter the following:
     Group name: SAP_<SAPSID>_GlobalAdmin
  5. Select the following:
     1. Group scope: Global
     2. Group type: Security
6. Choose OK.

Adding the Manually Created Users to Groups

**Note**

To add the users specific to the SAP Host Agent to the relevant groups, you must follow the procedure below, and replace the users and groups with those for the SAP Host Agent.

**Adding the `<sapsid>adm` User to the `SAP_<SAPSID>_GlobalAdmin` Group**

- **Windows Server 2012 (R2) and higher:**
  
  Open PowerShell in elevated mode, and enter the following command:
  ```
  net group SAP_<SAPSID>_GlobalAdmin <sapsid>adm /add /domain
  ```

- **Windows Server 2008 (R2):**
  
  1. In the **Users** folder, double-click the newly created user account `<sapsid>adm` in the list on the right.
  2. Choose **Member** > **Add**.
  3. Select the new `SAP_<SAPSID>_GlobalAdmin` group and choose **Add** to add it to the list.
  
  **Note**

  By default, the user is also a member of the **Domain Users** group.

  4. Choose **OK** twice.

**10.4 Checking and Changing the Paging File Settings on Windows Server 2012 (R2) and Higher**

**Use**

This section describes how to check and change the paging file size on Windows Server 2012 (R2) and higher 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

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:

   ```powershell
   (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:

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

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

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

   The output looks like the following:

<table>
<thead>
<tr>
<th>MaximumSize</th>
<th>Name</th>
<th>InitialSize</th>
<th>FileSize</th>
</tr>
</thead>
<tbody>
<tr>
<td>41943040000</td>
<td>C:\pagefile.sys</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>41943040000</td>
<td>E:\pagefile.sys</td>
<td>40000</td>
<td>80000</td>
</tr>
</tbody>
</table>

   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:

```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*. 

---

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Additional Information
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:

```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:

```powershell
$pagefile = Get-WmiObject Win32_PagefileSetting | Where-Object {$_._name -eq “E:\pagefile.sys”}
$pagefile.delete()
```

10.5 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 AS Java of your SAP Java system to be installed. To do this, you configure the User Management Engine (UME) of the J2EE engine for the user management of the external ABAP system.

Prerequisites

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

**i Note**

If you want to install the J2EE Adapter Engine as an optional standalone unit, you have to configure the User Management Engine (UME) for the ABAP UME of the SAP NetWeaver Process Integration (PI) system.

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 engine.

You can take one of the following approaches:

<table>
<thead>
<tr>
<th>Approach</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each Java system uses different users</td>
<td>No interdependencies between the connected engines</td>
<td>Initially more administration to create the users in the ABAP system</td>
</tr>
</tbody>
</table>
| 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:  
  - If you change the password of any of the users on the ABAP system, this change affects all connected engines.  
  - If you change the administrator user’s password, you must also change the password in secure storage on all of the connected J2EE Engines |

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

**Recommendation**

For security reasons, we recommend the first approach.

More Information

- For more information about UME, see: [https://help.sap.com/viewer/p/SAP_NETWEAVER](https://help.sap.com/viewer/p/SAP_NETWEAVER)  

- For more information about creating users and roles in an ABAP system, see: [https://help.sap.com/viewer/p/SAP_NETWEAVER](https://help.sap.com/viewer/p/SAP_NETWEAVER)  
  > SAP NetWeaver 7.0 (Including Enhancement Package) > Application Help > SAP NetWeaver by Key Capability > Security > Identity Management > User and Role Administration of Application Server ABAP

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:
  a. Call transaction PFCG 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.
     - If you want to use Adobe Document Services (ADS), do the following:
       - Check that the role SAP_BC_FPADS_ICF exists.
       - Create a role named ADSCallers. You do not need to maintain authorization data or generate any profiles for this role.
     - If you want to install the system with a local System Landscape Directory, check that the following roles exist and make sure that their profiles are generated:
       - SAP_SLD_CONFIGURATOR
       - SAP_SLD_ADMINISTRATOR
       - SAP_SLD_DEVELOPER
       - SAP_SLD_GUEST
       - SAP_SLD_ORGANIZER
  b. 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_ADMIN_<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.
     - If you want to use Adobe Document Services (ADS), do the following:
       - Create a user ADSUSER for basic authentication and assign this user the role ADSCallers. You can use any password.
       - Create a user ADS_AGENT and assign this user the role SAP_BC_FPADS_ICF. You can use any password.
If you want to install the system with a local System Landscape Directory, do the following:

1. Create an SLD Data supplier user. We recommend that you name this user **SLDDSUSER**. You can use any password.
2. Assign this user the following roles:
   - SAP_SLD_CONFIGURATOR
   - SAP_SLD_ADMINISTRATOR
   - SAP_SLD_DEVELOPER
   - SAP_SLD_GUEST
   - SAP_SLD_ORGANIZER

If you want to install Development Infrastructure (DI), create the following users:

- **NWDI_ADM**
  You do not need to assign a role and you can use any password.
- **NWDI_DEV**
  You do not need to assign a role and you can use any password.
- **NWDI_CMSADM**
  You do not need to assign a role and you can use any password.

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/](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 installer dialogs.

### 10.6 Dialog Instance Installation for an Upgraded System only: Updating Profiles

You only need to perform these steps if you want to install a dialog instance and you have already performed the steps listed under “Prerequisites” in this section.

#### Prerequisites

1. You upgraded your SAP system from an earlier source release as follows:
   - You upgraded your SAP NetWeaver system from an earlier source release to a target release lower than SAP NetWeaver 7.0 SR3.
   - You upgraded your SAP ERP system from an earlier source release to a target release lower than SAP ERP 6.0 SR3.
   - You upgraded your SAP CRM system from an earlier source release to a target release lower than SAP CRM 5.0 SR3.
You upgraded your SAP SCM system from an earlier source release to a target release lower than SAP SCM 5.0 SR3.
You upgraded your SAP SRM system from an earlier source release to a target release lower than SAP SRM 5.0 SR3.

2. You installed the current Enhancement Package.

**Procedure**

1. On the SAP Global host, go to folder `\usr\sap\<SAPSID>/profile`.

   **Note**

   SAP system profiles are named as follows:
   - **Instance profiles:** `<SAPSID>_<INSTANCE_ID>_<Host_Name>.pfl`
   - **Start profiles:** `START_<INSTANCE_ID>_<Host_Name>.pfl`

2. Make sure that the parameter `DIR_CT_RUN`, if set, has identical values in the instance profile and the start profile of the central instance:
   - If it is set in the instance profile, it must also be set in the start profile.
   - If it is not set in the instance profile, it must not be set in the start profile either.

3. Change the default profile DEFAULT.PFL by setting `rdisp/msserv_internal` to a free port number.

   **Example**

   **DEFAULT.PFL**

   **Before the change:**

   ...
   rdisp/msserv = sapms<SAPSID>
   ...

   **After the change:**

   ...
   rdisp/msserv = sapms<SAPSID>
   rdisp/msserv_internal = <Free_Port_Number>
   ...

4. Change the instance profile of the central services instance for Java (SCS instance) as follows:
   a. Set `rdisp/msserv` to 0.
   b. Set `rdisp/msserv_internal` to the port number assigned to `rdisp/msserv`.
Example

Instance profile of the SCS instance:

**Before the change:**
...
rdisp/msserv = 4711
...

**After the change:**
...
rdisp/msserv = 0
rdisp/msserv_internal = 4711
...

5. Restart all SAP services and instances of your SAP system.

### 10.7 Installation of Additional Usage Types or Software Units in an Existing SAP System

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

The procedure how to do this is described in the documentation *Update of SAP Systems Using Software Update Manager 1.0 SP<Current_Number>*, which is available at: [http://support.sap.com/sltoolset](http://support.sap.com/sltoolset) → **System Maintenance** → **Software Update Manager (SUM) SP<Current_Number>** → **Guides for SUM 1.0 SP<Current_Number>**
10.8 Installing the SAP Host Agent Separately

This procedure tells you how to install an SAP Host Agent separately.

Context

The SAP Host Agent is installed automatically during the installation of new SAP instances with SAP kernel 7.20 or higher (integrated installation). This procedure is only for hosts with no SAP Host Agent running on them, due to the following reasons:

- There is no SAP system or instance on the host.
- The SAP system or instance running on the host has a kernel release lower than SAP kernel 7.20 and the host does not yet have an SAP Host Agent.
- You have upgraded your SAP system to a release with a kernel release lower than SAP kernel 7.20 and the host of the upgraded system or instance does not yet have an SAP Host Agent.

SAP Host Agent has the following executable programs and services:

- The SAPHostExec service
- The sapstartsrv service SAPHostControl
- The operating system collector saposcol

Note

The installed programs are automatically started when the host is booted.

On Microsoft Windows hosts, the services SAPHostControl and SAPHostExec automatically start the installed programs.

The following procedure describes the steps you have to perform on the host where you install the SAP Host Agent separately.

Procedure

1. You check the hardware and software requirements on the installation host.
2. You perform basic preparations on Windows [page 48].
3. You check that you have the required user authorization for running the Installer [page 50].
4. Make the unpacked Software Provisioning Manager 1.0 archive available on the installation host as described in Downloading and Extracting the Software Provisioning Manager 1.0 Archive [page 54].
5. Make the latest patch level of the SAPHOSTAGENT <Version>.SAR file available on the host where you want to install the SAP Host Agent.
You can do this in the following ways:

- Download it from the following path: [https://launchpad.support.sap.com/#/softwarecenter](https://launchpad.support.sap.com/#/softwarecenter)
  
  SUPPORT PACKAGES & PATCHES > By Category > SAP Technology Components > SAP HOST AGENT > SAP HOST AGENT 7.21 > <Operating System>

- Alternatively, you can also copy it from the UC kernel medium (folder K_<Version>_U_<OS>), where "_U_" means Unicode.
  You can either use the physical UC kernel medium from the installation package of your SAP system, or download the kernel medium from [https://launchpad.support.sap.com/#/softwarecenter](https://launchpad.support.sap.com/#/softwarecenter). For more information, see Downloading Installation Media [page 57].

**Recommendation**

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

6. You run the installer [page 62] to install the SAP Host Agent.

   On the Welcome screen, choose <Product> > Software Life-Cycle Options > Additional Preparation Options > Host Agent.

7. Check whether the installed services are available as follows:
   a. Log on as user sapadm.
   b. Check whether the following services are available:
      - The control program saphostexec
      - The operating system collector saposcol.
      - The SAP NetWeaver Management agent SAPHostControl (sapstartsrv in host mode)

   **Note**

   The installed programs are automatically started when the host is booted.
   
   This is done by the services SAPHostControl and SAPHostExec.

**Next Steps**

For more information about the SAP Host Agent, see SAP Help Portal at:

Table 36:

<table>
<thead>
<tr>
<th>Release</th>
<th>SAP Help Portal Path</th>
<th>SAP Help Portal Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0 including enhancement package 1</td>
<td></td>
<td>Application Help</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 including enhancement package 3</td>
<td></td>
<td>SAP NetWeaver by Key Capability</td>
</tr>
<tr>
<td>Solution Life Cycle Management by Key Capability</td>
<td></td>
<td>SAP Host Agent</td>
</tr>
</tbody>
</table>
10.9 Starting and Stopping the SAP System

Use

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

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 HA 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 143].

End of 'High Availability': HA (Windows)

Prerequisites

The user who wants to start and stop the SAP system or instances 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**
- You can also start and stop a UNIX system with the SAP MMC.
- The SAP MMC is not available on Server Core for Windows Server 2012 (R2) and higher.

For more information about the SAP MMC, see the following documentation:

<table>
<thead>
<tr>
<th>Release</th>
<th>SAP Help Portal Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0 SR3</td>
<td><a href="https://help.sap.com/viewer/p/SAP_NETWEAVER">https://help.sap.com/viewer/p/SAP_NETWEAVER</a> &lt;Including Enhancement Package&gt;</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 incl. EHP1</td>
<td>SAP NetWeaver 7.0 &lt;Including Enhancement Package&gt; Function-Oriented View: English</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 incl. EHP2</td>
<td>Solution Life Cycle Management by Key Capability Monitoring Monitoring in the CCMS</td>
</tr>
<tr>
<td></td>
<td>SAP Microsoft Management Console: Windows</td>
</tr>
<tr>
<td>SAP NetWeaver 7.0 incl. EHP3</td>
<td><a href="https://help.sap.com/viewer/p/SAP_NETWEAVER_703">https://help.sap.com/viewer/p/SAP_NETWEAVER_703</a> Application Help Function-Oriented</td>
</tr>
<tr>
<td></td>
<td>View: English Solution Life Cycle Management by Key Capability Monitoring Monitoring in the CCMS</td>
</tr>
<tr>
<td></td>
<td>SAP Microsoft Management Console: Windows</td>
</tr>
</tbody>
</table>

To start or stop the SAP system 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. If the SAP system is installed on multiple hosts (distributed or high-availability system), you have the following options to start or stop your system:
   - You start or stop the SAP instances 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 with SAPControl (*sapcontrol.exe*), perform the following steps:

- To start or stop the complete SAP system – except the database instance – 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
```

## 10.10 Configuring the Windows Server Firewall on Windows Server 2008 (R2) and Higher

### Use

As of Windows Server 2008 (R2), 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.

<table>
<thead>
<tr>
<th>Caution</th>
</tr>
</thead>
<tbody>
<tr>
<td>In a high-availability system, you have to configure the firewall on <strong>all</strong> cluster nodes.</td>
</tr>
</tbody>
</table>

### Prerequisites

You turn on the **disabled firewall** [page 47] as follows:

- **Windows Server 2012 (R2) and higher:**
  Open Windows PowerShell in elevated mode, and enter the following command:
  ```
  Set-NetFirewallProfile "public","domain","private" -enabled true
  ```

- **Windows Server 2008 (R2):**
  1. Choose **Start ➤ Administrative Tools ➤ Windows Firewall with Advanced Security**.
  2. Right-click *Windows Firewall with Advanced Security* and choose *Properties*.
  3. Set the *Firewall state to On*.
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:

Table 38:

<table>
<thead>
<tr>
<th>Instance number</th>
<th>TCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ports</td>
<td>3200, 3300, 4800, 8000, 3600, 50013, 1433, 1434</td>
</tr>
</tbody>
</table>

- Windows Server 2012 (R2) and higher:
  
  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
  ```

- Windows Server 2008 (R2):
  
  3. The `New Inbound Rule Wizard` starts.
  4. For `Rule Type`, select `Port` and choose `Next`.
  5. For `Protocol and Ports`, select port type `TCP` or `UDP` depending on the port type used.
  6. Select `Specific local ports`, and enter the port numbers for which you want to apply the new rule.
  7. Note that the final two digits of the port number correspond to the instance number.
  8. Choose `Next`.
  9. For `Action`, select `Allow the connection`, and choose `Next`.
  10. For `Profile`, keep `Domain`, `Private` and `Public` selected, and choose `Next`.
  11. Enter the `Name`, for example `SAP ABAP Server 00`, and `Description` for the new rule.
  12. Choose `Next`.
  13. Choose `Finish` to save the rule.

  The new inbound rule appears in the `Inbound Rules` list. To modify the settings, right-click on the rule and choose `Properties`.

**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.
10.11 Usage Type-Specific Initial Technical Configuration Done by the Installer

The installer automatically performs initial technical configuration steps for the usage types shown below during the installation. However, you might have to perform these steps manually if you want to change existing parameters or you want to set additional parameters.

For more information, see the following usage type-specific sections.

Related Information

Initial Technical Configuration for SAP NetWeaver Application Server for Java (AS Java) [page 169]
Initial Technical Configuration for Development Infrastructure (DI) [page 172]
Initial Technical Configuration for the Portal (Usage Types EPC and EP) [page 173]
Initial Technical Configuration for BI Java [page 174]

10.11.1 Initial Technical Configuration for SAP NetWeaver Application Server for Java (AS Java)

The installer automatically performs initial technical configuration steps for some components of SAP NetWeaver Application Server for Java (AS Java). However, you might have to perform some of these steps manually after the installer has finished, depending on your installation scenario.

These are the following components.

Related Information

Initial Technical Configuration for Adobe Document Services [page 170]
Initial Technical Configuration for Composite Application Framework Core (CAF) [page 171]
Initial Technical Configuration for the System Landscape Directory (SLD) [page 172]
10.11.1.1 Initial Technical Configuration for Adobe Document Services

The installer automatically performs some initial technical configuration steps for Adobe Document Services (ADS) during the installation. However, you might have to perform these steps manually if you want to change existing parameters or if you want to set additional parameters.

The installer performs the following steps:

- The installer creates user ADSUser in AS Java for basic authentication and assigns it to group ADSCallers.
  For more information about this user, see Ensuring User Security [page 85].
- The installer sets up basic authentication in the Java environment.

More Information

For more information about how to perform these steps manually, see SAP Help Portal at the following locations:

Table 39:

<table>
<thead>
<tr>
<th>Release</th>
<th>SAP Help Portal Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0 including enhancement package 2</td>
<td></td>
</tr>
</tbody>
</table>

Additional Information
10.11.1.2 Initial Technical Configuration for Composite Application Framework Core (CAF)

The installer automatically performs some initial technical configuration steps for Composite Application Framework Core (CAF) during the installation. However, you might have to perform these steps manually if you want to change existing parameters or if you want to set additional parameters.

The installer performs the following steps:

- The installer creates the following roles with the required User Management Engine (UME) actions:
  - CAFAdmin
  - CAFUIAdmin

  For more information about how to perform this step manually, see SAP Help Portal at:

- The installer configures CAF runtime properties for SAP NetWeaver Business Warehouse (BW) integration.

  For more information about how to perform this step manually, see SAP Help Portal at:

- The installer configures CAF runtime properties for knowledge management integration.

  For more information about how to perform this step manually, see SAP Help Portal at:

- The installer creates data sources to extract custom enumeration types.

  For more information about how to perform this step manually, see SAP Help Portal at:
  http://help.sap.com/nw Development SAP NetWeaver Developer’s Guide Fundamentals Creating Composite Applications Developing Composite Applications with CAF Core Integration CAF Core and SAP Business Information Warehouse Integration DataSource Use in CAF and SAP BW Integration DataSources to Extract Custom Enumeration Types
10.11.1.3 Initial Technical Configuration for the System Landscape Directory (SLD)

The installer automatically performs some initial technical configuration steps for the System Landscape Directory (SLD) during the installation. However, you might have to perform these steps manually if you want to change existing parameters or if you want to set additional parameters.

- If you choose option Register in existing central SLD, the installer automatically configures the connection of the system being installed to an existing central SLD.
  
  For more information about how to perform these steps manually, see:
  

- If you choose option Configure a local SLD, the installer automatically sets up and configures a local SLD during the installation.
  
  For more information about how to perform these steps manually, see the documentation Post Installation Guide – System Landscape Directory of SAP NetWeaver 7.0 which you can find on the System Landscape Directory (SLD) - Overview page at https://wiki.scn.sap.com/wiki/display/SL/System+Landscape+Directory+%28SLD%29+-+Overview.

10.11.2 Initial Technical Configuration for Development Infrastructure (DI)

The installer automatically performs some initial technical configuration steps for usage type Development Infrastructure (DI) during the installation. However, you might have to perform these steps manually if you want to change existing parameters or you want to set additional parameters.

The installer performs the following steps:

- The installer creates the following NWDI users:
  
  ○ NWDI_ADM
  ○ NWDI_DEV
  ○ NWDI_CMSADM
  
  For more information about these NWDI users, see the table in Users in the SAP NetWeaver Development Infrastructure (NWDI) of Ensuring User Security [page 85].

- The installer creates the following roles:
  
  ○ NWDI.Administrator
  ○ NWDI.Developer

- The installer adds the following actions to the role NWDI.Administrator:
  
  ○ CBS.Administrator
  ○ sap.com_com.sap.lcr.LcrInstanceWriterAll

- The installer adds the following actions to the role NWDI.DEVELOPER:
  
  ○ CBS.Developer
The installer creates the following groups:
- NWDI.Administrators
- NWDI.Developers

The installer assigns the security role LcrInstanceWriterAll of the component sap.com/com.sap.lcr/LcrInstanceWriterNR to the group NWDI.Administrators.

The installer assigns the security role LcrInstanceWriterNR of the component sap.com/com.sap.lcr/LcrInstanceWriterNR to the group NWDI.Developers.

The installer assigns the role NWDI.Administrator to the group NWDI.Administrators.

The installer assigns the role NWDI.Developer to the group NWDI.Developers.

The installer assigns the group NWDI.Administrators to the user NWDI_ADM.

The installer assigns the group NWDI.Developers to the user NWDI_DEV.

The installer assigns the group NWDI.Administrators to the user NWDI_CMSADM.

More Information

For more information about how to perform these steps manually, see SAP Help Portal at:

  SAP NetWeaver 7.0 <Including Enhancement Package> 
  Configuration  Technology Consultant’s Guide: English  Developing, Configuring, and Adapting Applications  Post Installation Steps of Usage Type DI  Setting Up Privileges, Roles and Groups

  SAP NetWeaver 7.0 <Including Enhancement Package> 
  Application Help  SAP NetWeaver by Key Capability  Security  Identity Management  
  User Management of the Application Server Java  Administration of Users and Roles  Managing Users, Groups, and Roles

10.11.3 Initial Technical Configuration for the Portal (Usage Types EPC and EP)

This section applies when you install usage type EPC only and when you install it together with usage type EP. The installer automatically performs some initial technical configuration steps for the usage types EPC and EP during the installation. However, you might have to perform these steps manually if you want to change existing parameters or you want to set additional parameters.
Context

The installer performs the following steps:

- The installer copies the CMS_MAPPING Properties file.
- The installer renames the InitialPermissions.xml.template file to initialPermissions.xml.
- The installer renames the initialPermissionsKMC.xml.template file to initialPermissionsKMC.xml.

Procedure

- **Copying CMS_MAPPING properties**
  a. Change to the following source directory:
     `<drive>:\usr\sap\<sapsid>\<Instance_Name>\j2ee\cluster\server<x>\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\portal\system\pcd\Migration\mapping`.
  b. Copy file cms_mapping.properties from the source directory to the following target directory:
     `<drive>:\usr\sap\<sapsid>\SYS\global\pcd\Migration\mapping`.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the target directory does not exist, you also have to create it.</td>
</tr>
</tbody>
</table>

- **Renaming InitialPermissions.xml.template**
  a. Go to the following directory:
     `<drive>:\usr\sap\<sapsid>\<Instance_Name>\j2ee\cluster\server<x>\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\portal\system\xml\acl`.
  b. Rename file initialPermissions.xml.template to initialPermissions.xml.

- **Renaming initialPermissionsKMC.xml.template**
  a. Go to the following directory:
     `<drive>:\usr\sap\<sapsid>\<Instance_Name>\j2ee\cluster\server<x>\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\portal\system\xml\acl`.
  b. Rename file initialPermissionsKMC.xml.template to initialPermissionsKMC.xml.

10.11.4 Initial Technical Configuration for BI Java

The installer automatically performs BI Java-specific initial technical configuration steps during the installation. However, you might have to perform these steps manually if you want to change existing parameters or you want to set additional parameters.

The following steps might be affected.
Related Information

Configuring BI Java Information Broadcasting [page 175]
Process Chains: Transporting Texts for the Alert Category [page 176]
Renaming initialPermissionsBI.xml.template [page 176]

10.11.4.1 Configuring BI Java Information Broadcasting

The installer automatically configures BI Java information broadcasting. However, you might have to perform some of these steps manually if you upgraded your SAP system to the current release. The following steps might be required.

Context

For the configuration of the BI Information Broadcasting you need to perform the following steps in your ABAP system:

Procedure

1. Call transaction SPRO and perform the following steps:
   a. Settings for Information Broadcasting:
      Go to SAP NetWeaver > Business Intelligence > Reporting-relevant Settings > Settings for Information Broadcasting.
   b. Destinations for Web Dynpro ALV:
      Go to SAP NetWeaver > Application Server > Web Dynpro for ABAP > Set-Up Printing for Web Dynpro ABAP ALV
      ○ Create the RFC destination in the SAP NetWeaver Portal
      ○ Create the RFC destination to the SAP NetWeaver Portal
      ○ Set up the Web Service destination for the Adobe Document Services
2. Installation of BI Content:
   Call transaction RSTCO_ADMIN to check whether the installation has been performed successfully. If the installation status is red, restart the installation by calling transaction RSTCO_ADMIN again. If you need further assistance or information, check the installation log.

   For more information, see SAP Note 834280.
10.11.4.2 Process Chains: Transporting Texts for the Alert Category

Alert categories need to be defined.

Context

Alerts can be triggered and sent for BI process chains that contain errors. For this purpose, you need to define alert categories. Alert category `BWAC_PROCESS_CHAIN_FRAMEWORK` is returned for errors in background processing of process chains. This category has set texts that are not transported when the alert category is transported.

Procedure

To manually transport the texts, proceed as described in SAP Note 601619.

10.11.4.3 Renaming initialPermissionsBI.xml.template

If the installer does not automatically rename the initialPermissionsBI.xml.template file, you need to rename it yourself.

Procedure

1. Go to the following directory:
   
   `<drive>\usr\sap\<sapsid>\JCxx\j2ee\cluster\server<x>\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\portal\system\xml\acl`

2. Rename file `initialPermissionsBI.xml.template` to `initialPermissionsBI.xml`. 
10.12 SAP System Security on Windows

In a standard SAP system installation, the installer automatically performs all steps relevant for security. Although the installer 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 installer creates during a domain installation and shows how these are related to the SAP directories.

**User Accounts**

The installer creates the following accounts for SAP system administration:

<table>
<thead>
<tr>
<th>User account</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;sapsid&gt;adm</td>
<td>This is the SAP system administrator account that enables interactive administration of the system.</td>
</tr>
<tr>
<td>sapadm</td>
<td>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 Parameter Summary screen. For security reasons, however, SAP strongly recommends to create this user as a local user. The SAP Host Agent contains all of the required elements for centrally monitoring any host with the Alert Monitor or the SAP NetWeaver Administrator.</td>
</tr>
</tbody>
</table>

**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 installer creates the following domain and local groups:

<table>
<thead>
<tr>
<th>Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP_&lt;SAPSID&gt;_GlobalAdmin</td>
<td>This domain (global) group is a domain-level SAP administration group for organizing SAP system administrators.</td>
</tr>
<tr>
<td>SAP_SAP_GlobalAdmin</td>
<td>This domain group for the SAP Host Agent is only created if you create the SAP Host Agent user sapadm as a domain user.</td>
</tr>
<tr>
<td>SAP_&lt;SAPSID&gt;_LocalAdmin</td>
<td>This local group is created on each host.</td>
</tr>
<tr>
<td>Group</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>SAP_SAP_LocalAdmin</td>
<td>If you create the SAP Host Agent user as domain user, the group SAP_SAP_LocalAdmin is also created.</td>
</tr>
<tr>
<td>SAP_LocalAdmin</td>
<td>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.</td>
</tr>
</tbody>
</table>

**SAP Directories**

The installer 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 installer for the <sapsid>adm and SAPService\<SAPSID> users in a system infrastructure consisting of two SAP systems.

![Figure 21: User Groups and Accounts](image)

**Note**

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 179]
10.13 Automatic Creation of Accounts and Groups

The installer 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 177].

Features

The following figures show the steps that the installer 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.

![Figure 22: Creating Users and Groups](image)

Creation of Accounts

| Domain users for SAP system <capsid> <ServiceName> | Local user for SAP Host Agent <capsid> |

Creation and Modification of Domain Group in the Domain

| Creation of domain group SAP_<capsid>_<GlobalAdmin> |
| Addition of <capsid> <ServiceName> to SAP_<capsid>_<GlobalAdmin> |

Creation and Modification of Local Groups and Users on Each Host

| Creation of local groups SAP_<capsid>_<LocalAdmin>, SAP_<GlobalAdmin> |
| Addition of local group SAP_<GlobalAdmin> to local group SAP_<LocalAdmin> |
| Addition of <capsid> to SAP_<GlobalAdmin> and SAP_<LocalAdmin> |
| Creation of local group SAP_<LocalAdmin> |
| Addition of domain group SAP_<GlobalAdmin> to localgroup SAP_<LocalAdmin> |
| Addition of local user <capsid> to local group SAP_<LocalAdmin> |
| Addition of SAP_<GlobalAdmin> group to local group SAP_<LocalAdmin> on the transport host |
10.14 Verifying and Adjusting the instanceID of an AS Java Instance

Using option Adjust instanceID of an AS Java Instance in Software Provisioning Manager (the “installer” for short), you can verify the correctness of the instanceID and box number parameters of an existing AS Java instance, and adjust them if required.

Prerequisites

- The AS Java instance can be started.
- **Caution:** The installer performs changes in the database which are related to J2EE Engine configuration. Therefore it is recommended that you back up the J2EE Engine configuration using the ConfigTool. You can do this by exporting configurations `cluster_data.HttpHosts`, `apps.jms_provider`, and WebContainer using OfflineConfigEditor and configuration of `<SAPSID>/Server <xxx>/Services/Key Storage` using the Visual Administrator.

Context

When to Use Option Adjust instanceID of an AS Java Instance

- Software Update Manager (SUM) fails due to incorrect parameter instanceID.

**Example**

An error like the following occurs during the upgrade of a Java system based on SAP NetWeaver 7.0.x:

The detected instance ID IDXXXXX and the one calculated from the box number IDXXXXX do not match. A possible reason for this could be that you have changed the box number in the central instance instance.properties file.
The installer (70SWPM*.SAR) fails due to incorrect parameter instanceID.

Example

An error like the following occurs during system copy, dual-stack split, or system rename of a Java system based on SAP NetWeaver 7.0x with Software Provisioning Manager:

The source or target cluster ID is not present on the system! The current (source) cluster ID is XXXXX and the new (target) cluster ID is XXXXX

You are in doubt about consistency or correctness of the instanceID parameter of an AS Java instance.

Background Information About How Adjust instanceID of an AS Java Instance Works

Software logistics tools (Software Provisioning Manager (the "installer"), Software Update Manager) verify if the instanceID parameter corresponds to the box number of an SAP system based on SAP NetWeaver AS for Java. If the instanceID parameter is not consistent, Software Provisioning Manager fails.

The Box number has the format <SAPSID><instance_name><host_name> and is used as a parameter for the instanceID generation. instanceID is a unique identifier generated for each instance and is stored in the SAP system database schema when creating a new Java system.

An inconsistency between instanceID and box number is caused by applying an unsupported procedure to create or maintain the system. Using Software Provisioning Manager for system copy or system rename (changing the <SAPSID>, host name, or instance name) guarantees consistency.

Adjust instanceID of an AS Java Instance changes the box number and instanceID in the database and synchronizes the instance.properties file.

More Information

For more information, such as troubleshooting and FAQ, see SAP Note 2259748.

Procedure

1. Stop the AS Java instance or dual-stack instance and make sure that the database is running.
2. Start the installer and choose option Adjust instanceID of an AS Java Instance from the following path in the Welcome screen:

   ! Caution
   
   If the AS Java instance uses a virtual host name, start the installer with the installer property SAPINST_USE_HOSTNAME as follows:

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

3. Follow the instructions given on the screens.
Next Steps

Perform the following activities after applying the correction:

1. Calculate the box number using the SAPLOCALHOST profile parameter in lower case.
2. Calculate the correct instanceID using the tool attached to SAP Note 1987497.
3. Adapt the /usr/sap/<SAPSID>/<instance_name>/j2ee/cluster/bootstrap/bootstrap.properties file: Assign the instance.prefix property to the correct instanceID.
4. Examine the instance profile - if j2ee/instance_id exists, change it to the new instanceID.
5. Open the OfflineConfigEditor and expand cluster_data
   If the performerID property exists, change it to the new instanceID.
6. If you have EP: Knowledge Management and Collaboration installed on your system, you have to do the following adjustments for the Scheduler Service:
   Assign scheduler tasks to the new system IDs of the target system. This is required because after applying the correction, tasks are still assigned to the IDs of the source system.
   For more information, see SAP Help Portal at:

<table>
<thead>
<tr>
<th>Release</th>
<th>Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP NetWeaver 7.0:</td>
<td><a href="https://help.sap.com/viewer/p/SAP_NETWEAVER">https://help.sap.com/viewer/p/SAP_NETWEAVER</a></td>
</tr>
<tr>
<td>o SAP NetWeaver 7.0 including EHP1:</td>
<td>SAP NetWeaver 7.0 &lt;Including Enhancement Package&gt; Application Help SAP NetWeaver by Key Capability Information Integration: Key Areas Knowledge Management Administration Guide Minimal Configuration for Knowledge Management Cluster Only: Assigning Tasks to Nodes</td>
</tr>
<tr>
<td>o SAP NetWeaver 7.0 including EHP2:</td>
<td></td>
</tr>
<tr>
<td>o SAP NetWeaver 7.0 including EHP3:</td>
<td></td>
</tr>
</tbody>
</table>

10.15 Troubleshooting for Portal Installation

This section applies both when you install usage type EPC only and when you install it together with usage type EP.

Context

If the iViews 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:
   - `/usr/sap/<SAPSID>/JC<Instance_Number>/j2ee/cluster/server0/apps/sap.com/irj/servlet_jsp/irj/root/WEB-INF/deployment`
   - `/usr/sap/<SAPSID>/JC<Instance_Number>/j2ee/cluster/server0/apps/sap.com/irj/servlet_jsp/irj/root/WEB-INF/deployment/pcd`
   - `/usr/sap/<SAPSID>/JC<Instance_Number>/j2ee/cluster/server0/apps/sap.com/irj/servlet_jsp/irj/root/WEB-INF/deployment/pcdContent`
   - `/usr/sap/<SAPSID>/JC<Instance_Number>/j2ee/cluster/server0/apps/sap.com/irj/servlet_jsp/irj/root/WEB-INF/deployment/pcdContent/no_overwrite`
   - `/usr/sap/<SAPSID>/DVEBMGS<Instance_Number>/j2ee/cluster/server0/apps/sap.com/irj/servlet_jsp/irj/root/WEB-INF/deployment`
   - `/usr/sap/<SAPSID>/DVEBMGS<Instance_Number>/j2ee/cluster/server0/apps/sap.com/irj/servlet_jsp/irj/root/WEB-INF/deployment/pcd`
   - `/usr/sap/<SAPSID>/DVEBMGS<Instance_Number>/j2ee/cluster/server0/apps/sap.com/irj/servlet_jsp/irj/root/WEB-INF/deployment/pcdContent`
   - `/usr/sap/<SAPSID>/DVEBMGS<Instance_Number>/j2ee/cluster/server0/apps/sap.com/irj/servlet_jsp/irj/root/WEB-INF/deployment/pcdContent/no_overwrite`
   - `<Drive>:\usr\sap\<SAPSID>\JC<Instance_Number>\j2ee\cluster\server0\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\deployment`
   - `<Drive>:\usr\sap\<SAPSID>\JC<Instance_Number>\j2ee\cluster\server0\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\deployment\pcd`
   - `<Drive>:\usr\sap\<SAPSID>\JC<Instance_Number>\j2ee\cluster\server0\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\deployment\pcdContent`
   - `<Drive>:\usr\sap\<SAPSID>\JC<Instance_Number>\j2ee\cluster\server0\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\deployment\pcdContent\no_overwrite`
   - `<Drive>:\usr\sap\<SAPSID>\DVEBMGS<Instance_Number>\j2ee\cluster\server0\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\deployment`
   - `<Drive>:\usr\sap\<SAPSID>\DVEBMGS<Instance_Number>\j2ee\cluster\server0\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\deployment\pcd`
   - `<Drive>:\usr\sap\<SAPSID>\DVEBMGS<Instance_Number>\j2ee\cluster\server0\apps\sap.com\irj\servlet_jsp\irj\root\WEB-INF\deployment\pcdContent`
   - `<Drive>:\usr\sap\<SAPSID>\DVEBMGS<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 the Java Engine, using the commands stopsap and startsap, to change the files to *.bak.

10.16 Deleting an SAP System or Single Instances

This section describes how to delete a complete SAP system or single SAP instances with the Uninstall option of the installer.

Prerequisites

- You have installed your SAP system with standard SAP tools according to the installation documentation.
- You are logged on with a user account that has the required authorization to run the installer tool and the SAP system. For more information, see Required User Authorization for Running the Installer [page 50].

⚠️ 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. If there is a lock on one of the SAP system objects, the uninstall fails. Make also sure that all SAP-related processes are stopped.

⚠️ Note

You do not have to stop the SAP Host Agent. The SAP Host Agent is stopped automatically during the uninstall process.

- Make sure that there are no open sessions by one of the SAP system users when starting the uninstall.

Context

Note the following when deleting an SAP system:

- You cannot delete an SAP system remotely.
- The installer deletes the database instance and optionally the database software.
- 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 in 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 installer as described in Running the Installer [page 62].
2. On the Welcome screen, choose: <Product> ➤ Software Life-Cycle Options ➤ Uninstall ➤ Uninstall - System / Standalone Engine / Optional Standalone Unit
3. Follow the instructions in the installer input dialogs to delete a complete SAP system or single instances.

Note

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

The following table provides information about deleting a complete system or single instances with the installer.

Table 43:

<table>
<thead>
<tr>
<th>Deletion of</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central system</td>
<td>You can delete a central system (where all instances reside on the same host), in one installer run.</td>
</tr>
</tbody>
</table>
### Deletion of Distributed or high-availability system

If you want to delete a distributed or high-availability system, you have to run the installer to delete the required instances **locally** on each of the hosts belonging to the SAP system in the following sequence:

1. **Dialog instances, if there are any**

   **Caution**
   
   Do **not** select checkbox *Uninstall all instances of the SAP system from this host* if you do **not** want to uninstall the complete SAP system or standalone engine. For example, do not select this checkbox if you only want to uninstall a dialog instance of an existing SAP system distributed over several hosts. Otherwise, the contents of mounted global directories under `/<sapmnt>/<SAPSID>/`, such as instance profiles and kernel executables, are also deleted.

2. **Central instance**
   
   If the installer stops responding while trying to delete the central instance, do the following:
   
   1. Close the installer with **Cancel** and **Exit**.
   2. Log off and log on again.
   3. To finish uninstalling the central instance, restart the installer.

3. **Database instance**
   
   Since the installer 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 installer parameters for the deletion of the database instance.

4. **Only valid for ‘High Availability’**: HA (Windows)
   
   **Enqueue Replication Server**

   **End of ‘High Availability’**: HA (Windows)

5. **Central services instance (SCS)**

### Dialog instance

If you want to delete dialog instances of an existing SAP system, you have to run the installer to delete them **locally** on each dialog instance host.

### Standalone SAP Host Agent

The SAP Host Agent is automatically uninstalled from a host together with the last remaining SAP system instance.

If you want to uninstall a **standalone** SAP Host Agent, deselect *Profiles Available* and select *Uninstall Standalone SAP Host Agent* on the **General SAP System Parameters** screen.

---

4. **When you have finished**, delete the relevant directory structure on the global host.
5. **Delete the local user group** `SAP_<SAPSID>_LocalAdmin` **manually** as follows:

   ○

   ○ Windows Server 2012 (R2) and higher:
     
     Open a PowerShell in elevated mode and enter the following command:
     
     ```
     net localgroup SAP_<SAPSID>_LocalAdmin /delete
     ```
Windows Server 2008 (R2):

1. Choose **Start ➤ Programs ➤ Administrative Tools ➤ Computer Management**.
2. Choose **Local Users and Groups ➤ Groups**.
3. Right-click the local group SAP_<SAPSID>_LocalAdmin and choose **Delete**.

6. If required, you can delete the directory `\user\sap\trans` and its contents manually.
   The installer does not delete `\user\sap\trans` because it might be shared.

A Appendix

A.1 Using PowerShell

SAP uses Windows PowerShell to run and describe Windows commands.

For Windows Server 2012 (R2) and higher, 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:


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 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
  You can update to PowerShell 4.0 (search the internet for Windows Management Framework 4.0).

- Windows Server 2008 R2
  Windows Server 2008 R2 contains PowerShell 2.0.
  For more information about PowerShell 2.0, see http://support.microsoft.com/kb/968929.
  You can update to PowerShell 3.0 or 4.0 (search the internet for Windows Management Framework 3.0 or Windows Management Framework 4.0).

- Windows Server 2008
  Windows Server 2008 contains PowerShell 1.0.
  You have to activate the PowerShell feature with Start > Administrative Tools > Server Manager > Features.

How to Start PowerShell

⚠️ Caution

Make sure that you start the PowerShell in administrator mode.
• Windows Server 2012 (R2) and higher

Open the command prompt and enter the command:
`powershell.exe`

To start PowerShell on Windows Server 2008 (R2), you have the following options:

• From the command prompt, by entering the command:
`powershell.exe`

• From the **Start** Menu:
  ○ PowerShell 1.0:
    Choose **Start > All Programs > Windows PowerShell 1.0 > Windows PowerShell**
  ○ PowerShell 2.0:
    Choose **Start > All Programs > Windows PowerShell > Windows PowerShell**

### 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:
  ```powershell
  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 that are available on Windows Server 2012 (R2) and higher:

<table>
<thead>
<tr>
<th>Command</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>stop-service sap*</code></td>
<td>Stops all Windows services with service name starting with &quot;SAP&quot;</td>
</tr>
<tr>
<td><code>get-process</code></td>
<td>Lists currently started processes on your system</td>
</tr>
<tr>
<td>`get-process</td>
<td>sort starttime</td>
</tr>
<tr>
<td>`get-process</td>
<td>sort starttime</td>
</tr>
<tr>
<td>`get-process</td>
<td>sort starttime</td>
</tr>
<tr>
<td>`get-process</td>
<td>%{$_.<em>name;&quot;---------&quot;;$</em>._modules}`</td>
</tr>
<tr>
<td>`$processes = (get-process</td>
<td>sort starttime)`</td>
</tr>
<tr>
<td><code>$processes.length</code></td>
<td>The number of processes in the array (is equivalent to the number of processes on your computer)</td>
</tr>
<tr>
<td><code>$processes[$processes.length-1].kill()</code></td>
<td>Invokes the kill method (terminate process) of the last started process</td>
</tr>
<tr>
<td><code>(dir a.txt).set_attributes(&quot;readonly&quot;)</code></td>
<td>Sets the file <code>a.txt</code> to &quot;read-only&quot;</td>
</tr>
</tbody>
</table>
A.2 Online Information for SAP Applications on SAP Adaptive Server Enterprise

More information is available online as follows.

Table 45: General Quick Links

<table>
<thead>
<tr>
<th>Description</th>
<th>Internet Address</th>
</tr>
</thead>
</table>
Important Disclaimers and Legal Information

Coding Samples

Any software coding and/or code lines / strings ("Code") included in this documentation are only examples and are not intended to be used in a productive system environment. The Code is only intended to better explain and visualize the syntax and phrasing rules of certain coding. SAP does not warrant the correctness and completeness of the Code given herein, and SAP shall not be liable for errors or damages caused by the usage of the Code, unless damages were caused by SAP intentionally or by SAP's gross negligence.

Gender-Neutral Language

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